ICMR INDIAN COUNCIL OF MEDICAL RESEARCH | NICPR NATIONAL INSTITUTE OF CANCER PREVENTION AND RESEARCH

ICMR-National Institute of Cancer Prevention and Research

Annual Report 2018

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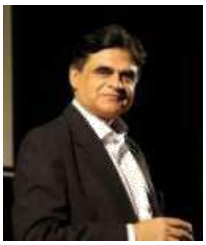
FROM THE DIRECTOR'S DESK



Dear All,

Greetings and Welcome...!

It is indeed my great pleasure in presenting the annual report of ICMR-National Institute of Cancer Prevention & Research (ICMR-NICPR) for the period January 2018- December 2018. The report provides a candid overview of our team's work and substantiates the progress of the Institute during this period. With this report, we wish to celebrate the achievements, share our perspectives on the challenges, and articulate our plans and visions for the future.

ICMR-NICPR was established way back in 1979 with the main mandate to conduct multidisciplinary research on prevalent cancers in the country in order to find out appropriate techniques and strategies for their prevention and early detection in the Indian setting. The most effective approach in prevention of cancer is to first define the various causative factors like environmental, behavioural, genetic etc; study their interactions and then, develop methods to modulate these factors. The other important aspect is to delineate the most cost-effective methods for screening and early detection of such cancers that can be subjected to screening in order to reduce the cancer-related morbidity and mortality. To achieve these goals, ICMR-NICPR has been involved in multidisciplinary research encompassing clinico-epidemiological studies, cancer screening and early detection activities, genetic susceptibility studies and molecular markers. ICMR-NICPR has a unique approach of amalgamating strong basic, clinical and applied research, involving medical and community practice with an emphasis on primary and secondary prevention through screening early detection of cancer. The thrust areas of research include the cancers of the uterine cervix, breast and oral cavity.

For cancer screening and early detection activities, a Health Promotion Clinic is functional in the Institute's premises on all working days. Individuals attending this clinic as well as those visiting the Institute for other services are motivated and assessed for important non-communicable diseases like diabetes, hypertension, obesity along with screening for cervical, breast and oral cancer, as applicable. Additionally, the Institute provides diagnostic and referral services for cervical smears, Colposcopy, Fine needle aspiration cytology, Effusion cytology and Histopathology. The cancer screening facilities are also extended to the rural areas of Noida by organizing screening camps at primary health centres (PHC) and community health centres (CHC) with the help of State Health authorities. Strategic alliances have been made with AIIMS, New Delhi and Rajiv Gandhi Cancer Research Institute, Rohini to facilitate timely management and follow- up of screen detected cases.

Considering the overall lack of awareness about cancer, their risk factors and prevention strategies among the general public, ICMR-NICPR has designed an India-specific web portal (http://cancerindia.org.in/) to provide comprehensive information to the public on prevalent cancers in our country. The content on this website has also been translated into Hindi, keeping in mind the large proportion of non-English speaking population. Efforts are underway to translate the content appropriately into the other major regional languages for wide dissemination.

ICMR-NICPR has also been taking big strides in the direction of tobacco control. With the setting up of the WHO FCTC Global Knowledge Hub on Smokeless Tobacco products and the Apex-level National Tobacco Testing Laboratory, the Institute is getting involved in testing the contents and emissions of tobacco products as well as collecting national, regional and global evidence on epidemiology, adverse health effects and effective tobacco control interventions to help the policymakers and contribute to this important area of tobacco control, which can additionally go a long way in prevention of tobacco-related cancers.

In the past year, ICMR-NICPR has made significant progress both on scientific and developmental fronts. I sincerely appreciate the unanimous support and cooperation from all the scientists and administrative staff of the Institute who have contributed to the developmental activities and scientific achievements. At the same time, I would like to reiterate that the Institute shall continue to work hard to reach greater heights in cancer research for the benefit and welfare of mankind.

Prof. Ravi Mehrotra
Director
www.nicpr.res.in
www.cancerindia.org.in
http://untobaccocontrol.org/kh/smokeless-tobacco/

About the Institute

ICMR-National Institute of Cancer Prevention and Research (ICMR-NICPR) was initially established as Cytology Research Centre (CRC) by the Indian Council of Medical Research (ICMR) in 1979, and was elevated to the level of an Institute (Institute of Cytology and Preventive Oncology) in 1989. It was granted national status with renaming in 2016 acknowledging its mandate and significant contributions towards cancer prevention in India. The thrust areas of research have included pre-cancer and cancers of the uterine cervix, breast and oral cavity. NICPR has made substantial contributions in the field of cervical cancer research. The concepts of clinical downstaging, visual inspection of cervix with selective cytology screening and novel diagnostic approaches for HPV and other oncogenes have been introduced for screening and early detection of cervical cancer. ICMR-NICPR has designed a simple and economical visual device with a light source (AV Magnivisualizer) for better visualization of the uterine cervix as well as the oral cavity. It can be used in community cancer screening programs.The technology has been transferred by ICMR to a private company for its commercialization.

The current major research areas at ICMR-NICPR include screening for common cancers, development and validation of point-of-care screening tests, transcriptional control of viral gene expression, preparatory work on India-specific HPV vaccine and analysis of breast cancer susceptibility genes.

In addition to research activities, the Institute provides diagnostic & referral services to various government-run hospitals across Noida. The Institute has been organizing community outreach activities including cancer awareness and screening camps in Gautam Budh Nagar district, U.P. The Institute runs a Health Promotion Clinic where screening for non-communicable diseases including the prevalent cancers is carried out. A Breast Cancer Clinic on Friday is regularly held where females with breast diseases are evaluated by a team of doctors from AIIMS and their further management at AIIMS, New Delhi is facilitated.

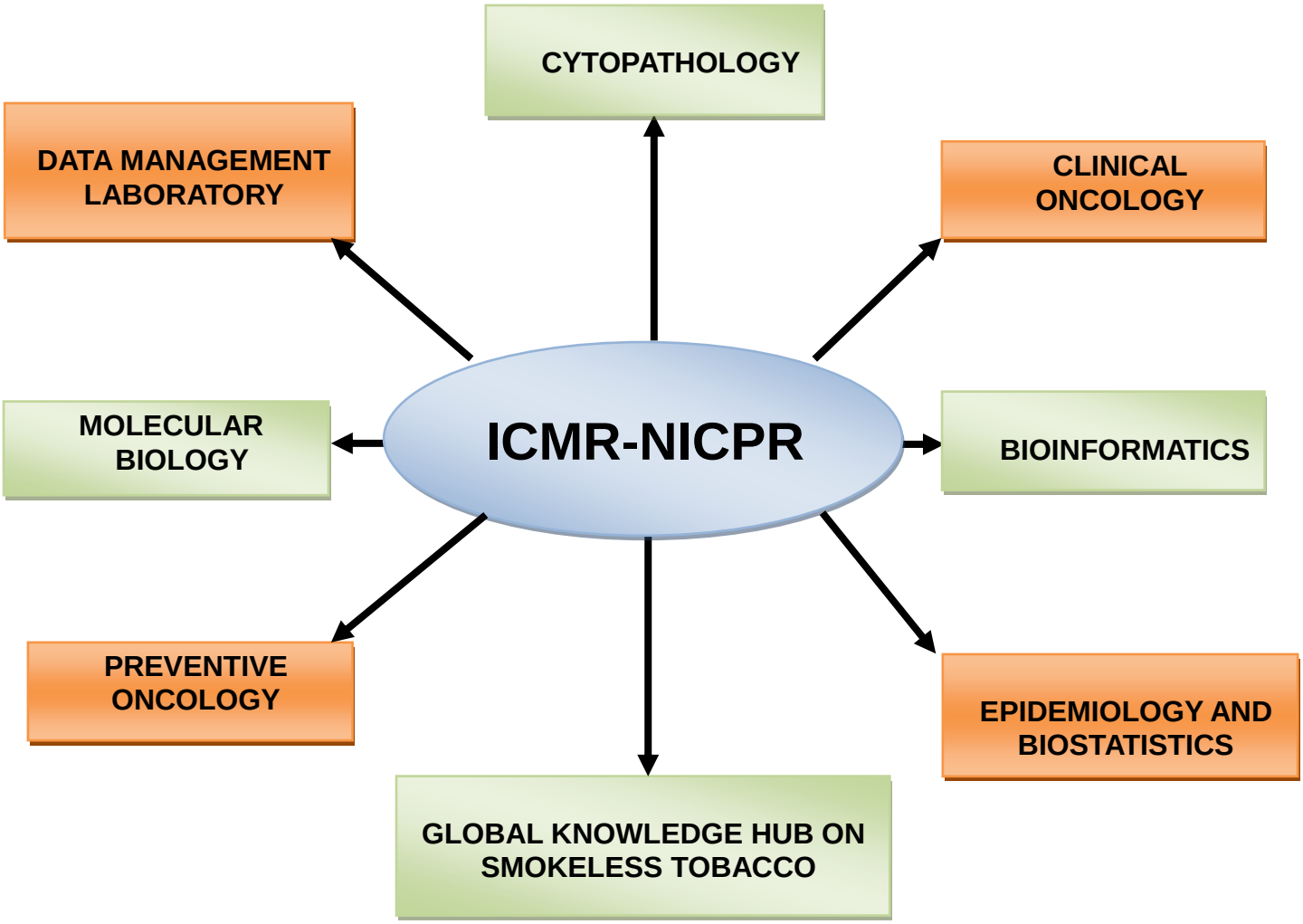
ICMR-NICPR had been instrumental in the formulation of "Operational framework document" for screening and management of common cancers, released by MoHFW in August 2016 and is currently involved in training different health cadre workers in the roll out of population-based screening of common cancers in India.

The Institute figures in many prestigious national and international scientific committees and has MOU with following premiere Institutes like BR Ambedkar Institute of Rotary Cancer Hospital & NCI, All India Institute of Medical Sciences, New Delhi; Asian Institute of Public Health, Odisha; Rajiv Gandhi Cancer Institute and Research Centre, New Delhi; and All India Institute of Ayurveda (AIIA), Ministry of Ayush to collaborate and conduct high-quality biomedical research in order to find out innovative solutions to the existing lacunae in prevalent and emergent cancers in the country.

We have affiliation with different universities for Ph.D. program, including, Delhi University, Banaras Hindu University and Jamia Millia Islamia. NICPR promotes human resource development through in-service training workshops, summer training programs, MSc. project dissertation and Ph.D. programs.

ICMR-NICPR is the Cancer Prevention Hub for Project ECHO (Extension for Community Healthcare Outcomes), the WHO FCTC Global Knowledge Hub on Smokeless Tobacco Products and also houses the apex-level National Tobacco Testing Laboratory.

The Institute is now poised to undertake a mission-mode project on cervical cancer elimination from India using a multi-pronged approach including awareness drives, augment the implementation of population-based cervical cancer screening, evaluation of the ongoing HPV vaccination programs in certain states of India and preparing a white paper for facilitation of its implementation by other states. Similarly, ICMR-NICPR is working towards realizing the dream of a Tobacco-free India by 2030 through creation of mass awareness, undertaking cutting edge research, promoting cessation at all levels for all types of tobacco products, and bringing about a step-change in implementation of effective prevention and control policies.



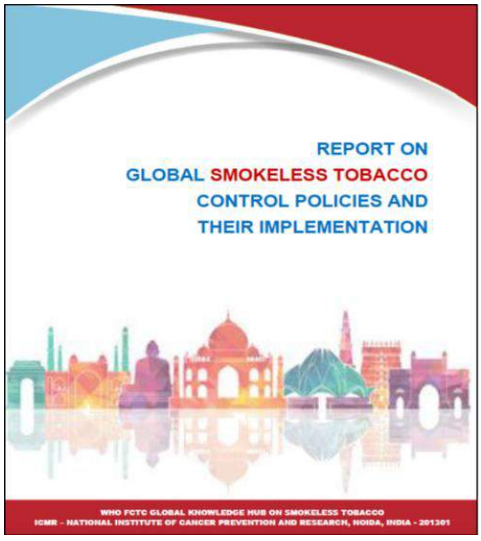
FLAGSHIP PROGRAMS

WHO FCTC Global Knowledge Hub on Smokeless Tobacco (SLT-KH)

ICMR-NICPR was designated as the 'WHO-FCTC Global Knowledge Hub on Smokeless Tobacco' (SLT KH) in 2016 with the following mandates:

- Generating evidence and sharing expertise on SLT control;
- Assisting Parties to the Convention to develop SLT oriented programs and policies; and
- Supporting the Convention Secretariat in its work to promote global SLT control.

Policy Document on SLT control:
The Knowledge Hub produced a comprehensive report on the "Global Smokeless Tobacco Control Policies and their Implementation". The Report was released by the Secretary DHR and DG ICMR Padmashri Prof. Balram Bhargava on 26th April, 2018. This report is the first ever compilation of the global progress made in implementing smokeless tobacco control policies in respect of the WHO Framework Convention on Tobacco Control. The report includes contributions and inputs from more than 60 national and international experts working in the field of tobacco control.



Dissemination of work through KH-SLT Website

Web portal
https://untobaccocontrol.org/kh/smokeless-tobacco/
To generate awareness around the world on the harms of SLT use and support global SLT control efforts. Support can be provided via scientific evidence and technical research inputs in coordination with all relevant disciplines and stakeholders globally, especially among Parties with high SLT burden

Participation of KH-SLT in International and national events

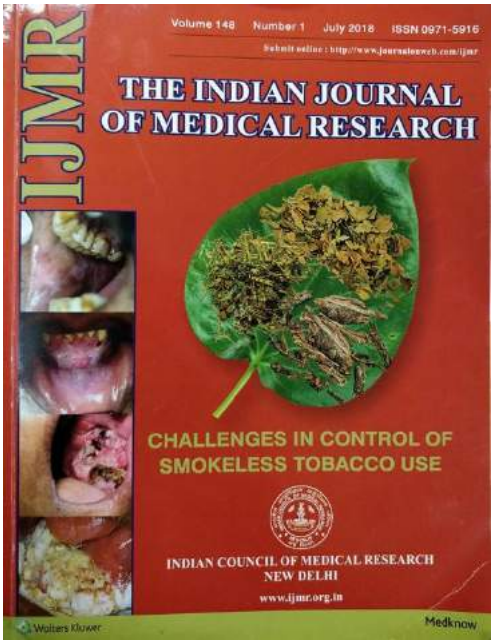
a. National Consultation on how to protect Tobacco Control Policies and Programme in India, organised by the Union, Goa, 25-26 April 2018.
b. State Level Consultation Meeting on 'Effective Enforcement of Tobacco Control Policies in Tamil Nadu- 'A Together Approach', Cancer Institute (WIA) Adyar, Chennai, 30 May 2018.
c. National Consultation on Accelerating Implementation of Tobacco Control Measures for Achievement of the Goals under National Health Policy, 2017' organised by the MoHFW and WHO India Office, New Delhi, 6 June 2018.
d. Multi-stakeholder meeting organized by the State Tobacco Control Cell, Gujarat, Gandhinagar, 29-30 August, 2018.
e. 12th Asia Pacific Conference on Tobacco or Health, Bali, 13-15 September 2018.
f. 6th National workshop on Implementation of MPOWER Policy in India, organized by the Union, Hyderabad, 25-27 September 2018.
g. 8th Session of the Conference of Parties to the WHO FCTC, Geneva, 1-6 October 2018
h. 1st Session of the Meeting of the Parties to the WHO FCTC, Geneva, 8-10 October 2018.
i. 1st Intensive Legal Training Programme Alumni Training Workshop organised by the McCabe Centre for Law and Cancer, Melbourne, 19-23 November 2018.
j. "Consultation for Development of research protocol including In-field Data collection tools to study bidi and SLT brand stretching", Chandigarh, 26-29 December 2018.

Workshops/Meetings conducted under the aegis of the Knowledge Hub

1. Stakeholders Meeting and National Consultation on Smokeless Tobacco Control, ICMR Headquarters, 18 July 2018
2. Cancer and media: workshop for health journalists; 14 November 2018.

Publications from the Knowledge Hub

- 17 (refer to the Publications section of this Report) including **Special Issue of the Indian Journal of Medical Research** on Smokeless Tobacco



National Tobacco Testing Laboratory

The National Tobacco Testing Laboratory (NTTL) has been established at ICMR- National Institute of Cancer Prevention and Research as an apex-level laboratory with latest equipment facilities for the analysis of smoking and smokeless forms of tobacco products. The NTTL at ICMR-NICPR shall serve as the coordination center for the other two NTTLs in India, ie Centre Drugs TestingLaboratory (CDTL), Mumbai and Regional Drugs Testing Laboratory (RDTL), Guwahati. NTTLs are envisaged as world class accredited laboratories providing analytical facilities and advisory for tobacco and tobacco products to generate and disseminate scientific information for public health and to carry out testing, research and development.

OBJECTIVES:

- Estimation of toxicants present in the local smokeless tobacco samples by employing CFA, NIR and GC instruments.
- Sharing of expertise, experience & exploration with world leaders on standard operating procedures, GLP, ISO etc.
- Research & Development in the establish methods to adapt according to Indian conditions.
- Adaptation of WHO, ISO and BIS Methods for testing of SLTproducts for estimation of pH, Moisture, Ammonia, Nitrates/Nitrites, Nicotine, TSNAs, Humectants, Sugars, Chlorides and Trace elements etc.
- To participate in the validation of WHO method for smoked and smokeless tobacco samples.
- Generation of Scientific data for the constituents present in various forms of Smoked & Smokeless Tobacco products.
- To develop sensory materials for the development sensors strip for detection of tobacco alkaloids.
- Development of methods for the estimation of nicotine in biological samples.
- Generation of Scientific Information on constituents present in various forms of Smoked & Smokeless Tobacco.

Work Done So Far:

- NTTL at ICMR-NICPR organized the 1st training program for the newly recruited staff of all three NTTLs from 29 January till 01 February 2018 at its premises.

- The NTTL at ICMR-NICPR was formally inaugurated on the World No Tobacco Day, 31 May 2018 by Ms. Anupriya Patel, Union Minister of State of Health and Family Welfare, Govt. of India in the presence of Prof. Balram Bhargava, DG ICMR

- All the major instruments, environmental chamber, continuous flow analyzer, gas chromatography, near infrared analyzer quantum neo and smoking machine have been successfully installed.
- Various smokeless and Smoked tobacco products such as Pan Masala, Zarda, Khaini, Tuibur, Kiwam, Dohra, Gul, Cigarettes, Bidies and Hukkah samples etc. have been analyzed for the estimation of tobacco contents.

NICPR-ECHO Cancer Prevention Program

NICPR-ECHO's online course in cancer screening and early detection was started in September 2017. Since then, we have conducted our online courses without any break. The following are some of the innovations we've introduced, which has resulted in a successful, dependable and trusted program, the only one of its kind in India.

Body of Experts:
We owe most of success of our program to our body of experts. We started with a small group of experts, mostly in-house (at NICPR) and others locally, from renowned institutes. However, over the years we have built a highly knowledgeable, completely dependable body of experts, who are not only from India, but also from international locations/ organisation. The insight our experts bring and share with our participants/ spokes is one of the major strengths of our program. They've patiently and diligently motivated every cohort of our's to screen for common cancers in the most appropriate way. It also helps as most of these experts also contributed to the Operational Framework of Guideline for Management of Common Cancers released in August 2016.

Clear-cut Curriculum:
The first course that NICPR offered was of introductory or beginner's level, lasted for 20-weeks duration and was conducted for a heterogenous (medical officers (AYUSH), dentists, social workers, public health professionals, staff nurses etc.) cohort. During this course, we were able to identify overlaps of topics as well as the topics that needs to be highlighted for each cadre of healthcare professional. Also, there was a huge demand for advanced level of training as well. Since then, we have been able to design two levels of courses – introductory and advanced level and streamline it to various cadres as follows:

a) Cancer Screening Training Program for Medical Officers (CSTP-MO)
b) Cancer Screening Training Program for Community Health Workers (CSTP-CHW)
c) Advanced Cancer Screening Training Program for gynecologists (ACSTP-G)
d) Advanced Cancer Screening Training Program dentists (ACSTP-O)

Each course is offered for a duration of 14-weeks, 1 hour every week. The criteria to complete the course is attendance in atleast 10 sessions out of the 14 and present atleast one case.

Repository of Cases:
Not all who enrol in our courses are actively involved in cancer screening. Therefore, case presentations are truly a challenge for our participants. Fortunately for NICPR, we have a Health Promotion Clinic (HPC) on campus, where active cancer screening is conducted daily. So, we have a huge repository of cases that were detected, diagnosed, treated and are being followed up round the year. When in need, we share our cases with our participants which hugely aids in learning.

Challenging Quizzes:
For the advanced level of the courses we include weekly quizzes after every session. These are anonymous quizzes, meant only for self-assessment of our participants. This reinforces the learning that occurred during the session.

Timely alerts:
NICPR takes great care to see that all alerts to every session go in a timely fashion, while ensuring that there are not more than three (3) alerts per session. Our participants have also appreciated our prompt and accurate response to their emails.

Social Media presence:
NICPR has an active social media (Twitter) presence, through which we share our story and activity. We also intend to start a WhatsApp group to alert our participants of the upcoming sessions, imminently. In time, we also will maintain a FaceBook page for the ease of staying in touch with our participants.

Screenshots of ongoing ECHO session

"India Against Cancer" Website

www.cancerindia.org.in

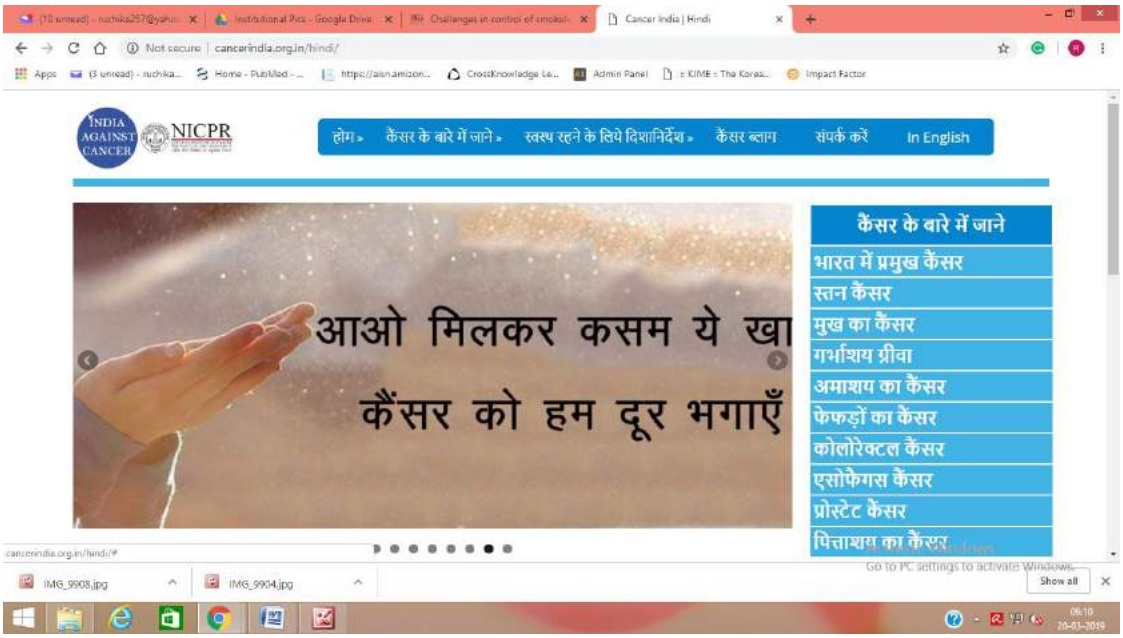
The India Against Cancer website has been designed by ICMR-NICPR as an India-specific portal providing comprehensive peer-reviewed authoritative information on the common cancers in the country. The information on the portal is currently available in two languages, English and Hindi and is intended to be translated in 24 more languages at the local level.

The portal intends to provide information to various stakeholders such as researchers, clinicians, policy makers, patients and the general public. It includes useful information on the leading cancers in India including cervical, oral and breast cancer along with updates on their diagnosis, prognosis, treatment and risk factors. Information on other cancers, like gall bladder, with high incidence in specific regions of India has also been added.

Apart from information on cancers, the portal also includes sections like myths and facts (to clear common myths regarding cancer), warning signs (most common signs that should alter an individual to seek medical attention) and most importantly, the available options for financial aid to cancer patients, at national and state level. Current news on cancer-related issues is also updated regularly in the blog section on the website. The portal provides the users with a facility to ask their queries from the experts involved in the content designing of the website.

In 2018, a series of **expert group meetings** were held with stakeholders from different walks of life in order to review the content and presentation of the website and provide suggestions for improvement with enhanced impact on the intended users. In accordance with the suggestions from experts, the content in both the languages has been simplified for easier understanding by the general public. Accessibility of the most important content of the website has also been enhanced through redesign of the layout. The social media pages (Facebook, Twitter) of the website are being updated on regular basis, including the various institutional events. Regular monitoring of the access data (from Google analytics) of the portal is being done.

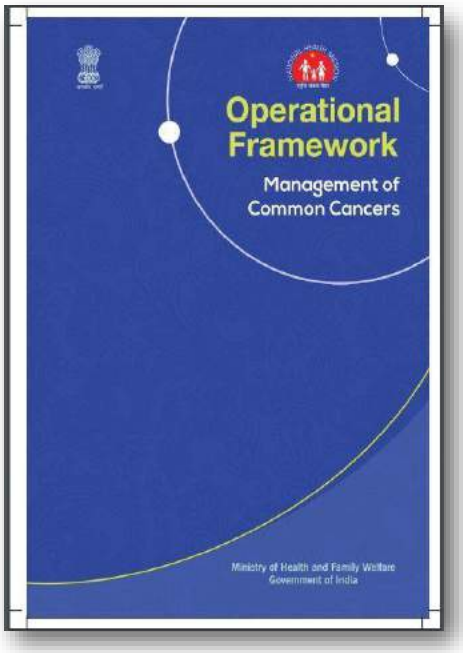
Efforts are underway to make the website more interactive and dynamic for the public, preparation of short videos to help increase the reach on social media platforms, off-page optimization, enhance the existing content and maintain weekly backup of the website content.



‘Operational Framework’ and roll out of population based cancer screening program (MoHFW, NHSRC, NICPR, WHO)

Technical Experts from NICPR: Dr Ravi Mehrotra, Dr Sanjay Gupta, Dr RoopaHariprasad

Roll out of Program: The cancer screening of three common cancers viz oral, breast and cervix is being rolled out in 109 districts of the country and NICPR has been designated as one of the training hub for training the master trainers of ASHAs, ANMs, staff nurses and Medical Officers.



Training Programs conducted/ participated: Training of Trainers, ASHAs, ANMs,
Resource person for ASHA state level master trainers in population-based cancer screening program
Conducted in 3 batches:

- **Northern states:** Training workshops for Training of ASHA Trainers orientation meeting from July 23rd - July 25th, 2018 organized by NHSRC at NIHFW

- **Southern states:** Training workshops for Training of ASHA Trainers orientation meeting from July 26rd - July 28th, 2018 organized by NHSRC at NIHFW

- **North-east, west and Union territories:** Training workshops for Training of ASHA Trainers orientation meeting from July 29th - July 31st, 2018 organized by NHSRC at NIHFW

Community Outreach Programs - Cancer Screening

Date of camp	Venue of camp	No. of Pap smears	No. of CBE	No. of oral exam
5 December 2018	SaiSansthan Charitable Hospital, Sec 40, Noida	27	28	
20 November 2018	Air Force Station , Dadri	27	34	78
13 November 2018	SaiSansthan Charitable Hospital, Sec 40, Noida	17	20	
12 October 2018	Swami Vivekanand School, Morena, Noida			33
9 October 2018	SaiSansthan Charitable Hospital, Sec 40, Noida	38	40	
25 September 2018	Village Chaura, Sector 22, in Collabration with CMO,GBN	20		
24 September 2018	PHC Jarcha, Dadri in Collabration with CMO, GBN	19		
11 September 2018	SaiSansthan Charitable Hospital, Sec 40, Noida	26	28	
7 August 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	30	30	
3 July 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	17	17	20
1 May 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	25	27	24
17 April 2018	H.L International School Banghel, Sec-82, Noida	16	25	30
7 April 2018	CRF Camp, Greater Noida	11	15	16
3 April 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	36	38	84
7 March 2018	Indira Gandhi ESI hospital, Jhilmil, Delhi	54	65	84
6 March 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	18	22	
20 February 2018	S.R.M School, Hoshiyarpur, Sec 51 Noida	32	50	68
6 February 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	40	40	42
2 February 2018	Village Ghodi Bhacheda, Dadri, Noida	17	25	35
2 January 2018	SaiSansthan Charitable Hospital, Sec 40 Noida	27	30	27

CBE: Clinical breast examination


PREVENTION IS BETTER THAN CURE

FACILITIES

Health Promotion Clinic

The health promotion clinic has been functional at NICPR for the last five years. It functions in the OPD rooms situated in the clinical oncology wing, ground floor. The timing of the clinic is from 10:00 am to 4:00 pm from Monday to Friday.

Activities carried out at Health Promotion Clinic:

- Recording demographic parameters.
- Anthropometric measurements which includes height, weight and BMI
- General physical examination, Blood pressure and blood sugar estimation
- Oral examination with naked eye
- Breast examination of female patients
- Complete gynecological examination including Pap smear of women above 30 years.
- Symptomatic treatment
- Counseling regarding diet and risk factors of cancer
- Referral of appropriate patients to the tertiary care centre who require further evaluation and treatment.

Summary of work done (Jan 2018 to Dec 2018):

- Total number of individuals screened: 5850
  (Females- 4665, Males-1185)
- Total number of Pap smears:3556

Breast Clinic (in collaboration with Dept. of Surgery, AIIMS)

Total registrations: 611

- Mastalgia: 61
- Fibroadenoma: 118
- Malignancies: 15

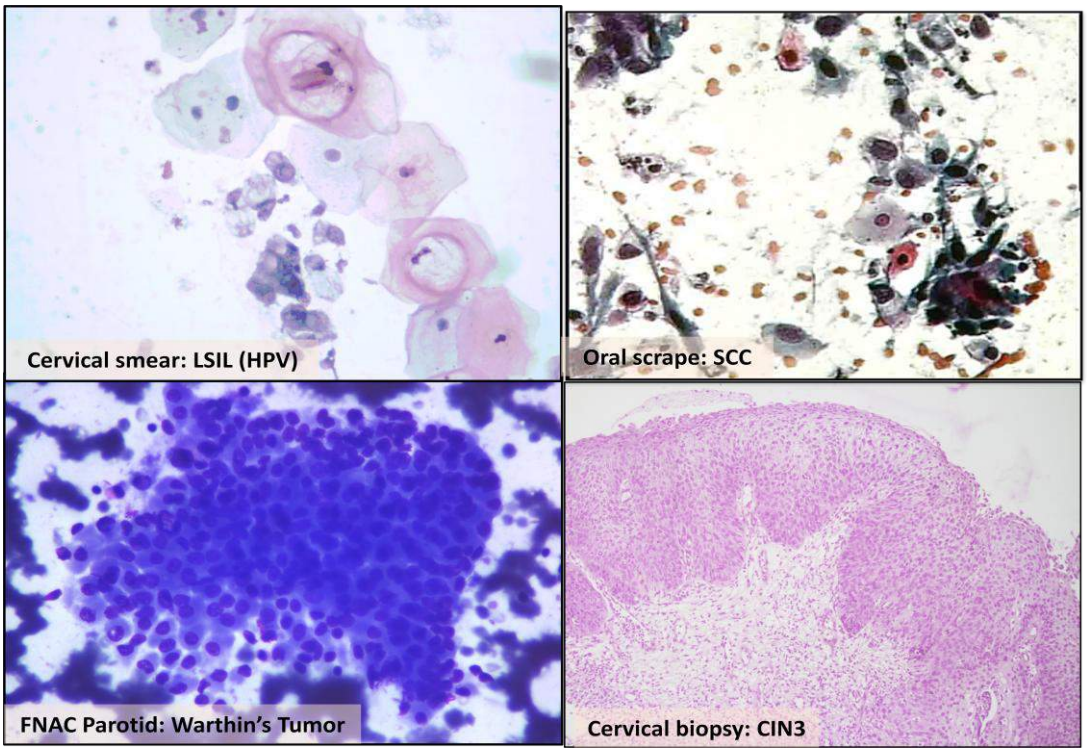
Oral Health Promotion Clinic

- A total of 5850 individuals (1185 males and 4665 females) were screened at the Health Promotion Clinic, of which 812 individuals were diagnosed with abnormalities (oral potentially malignant disorders-OPMDs, oral malignancy, other tobacco-related and non-tobacco related orodental lesions).
- There were 1813 individuals who had a habit of either smoked and/or smokeless tobacco, currently or formerly.
- Punch biopsy was performed for 35 suspected cases of OPMDs/oral malignancy, and brush biopsy (cytology) for 47 such individuals.

Diagnostic and Referral Services

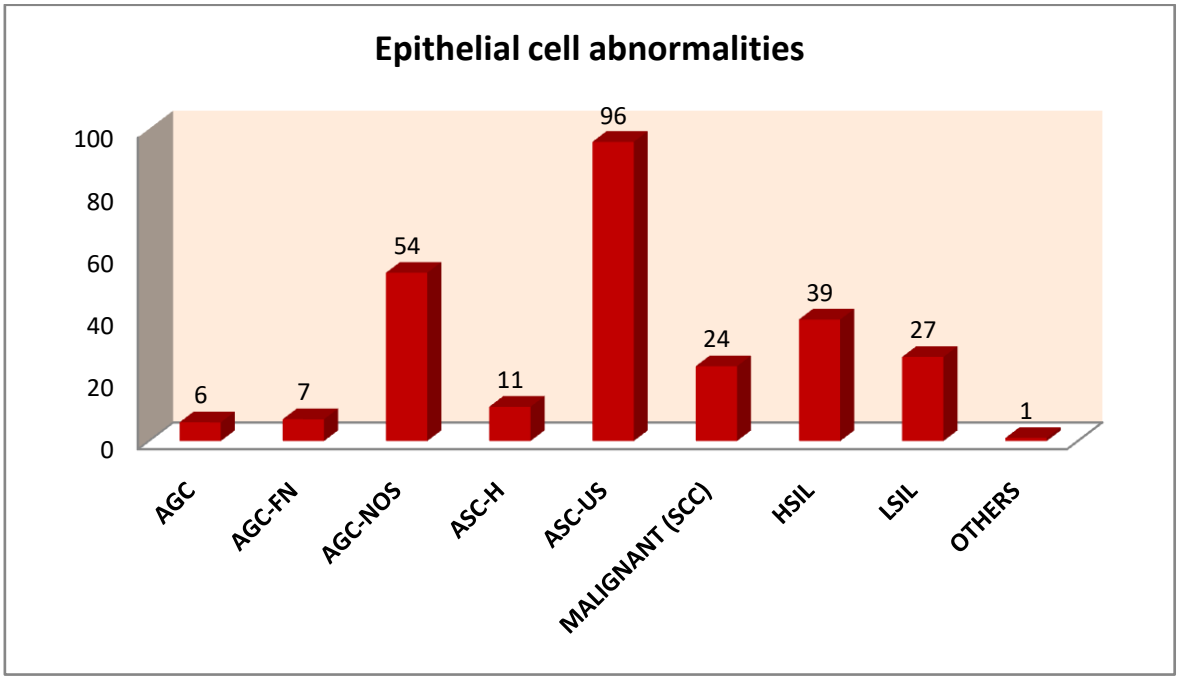
Diagnostic and referral services are provided to Lok Nayak Hospital, All India of Ayurveda, Delhi, District Hospital and ESI Hospitals, Noida, Sai Sansthan and Tuberculosis centres across Noida in the following fields:

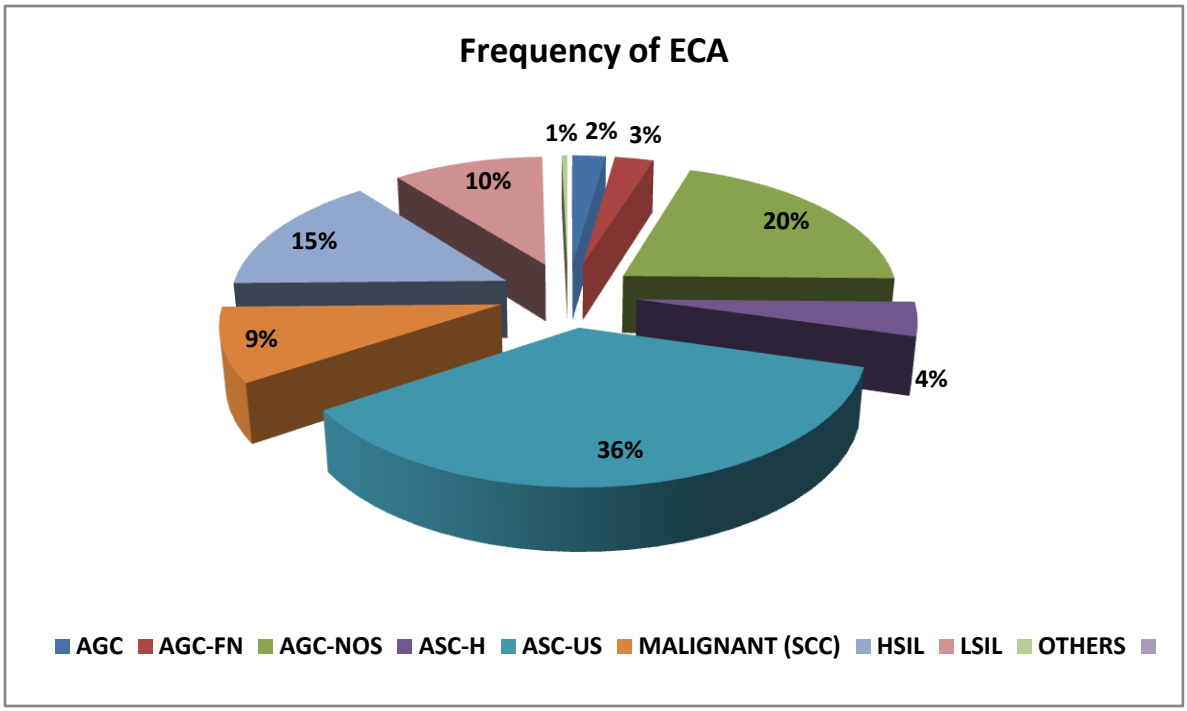
Investigation/ Procedure	No. conducted from Jan – Dec 2018
Pap smears	10097
Fine needle aspiration cytology (FNAC)	3382
Oral Scrape Cytology	47
Oral Punch Biopsy	35
Histopathology (biopsy examination)	314
Colposcopy	266
Thermocoagulation	30
LEEP procedure	4
HPV testing (HC2)	803



Audit of cervical smear reporting (Jan 2018-Dec 2018)

- Total no. of cervical smears: 10097
- Unsatisfactory rate: 52 (0.53%)
- Epithelial cell abnormalities (ECA): 273 (2.7%)



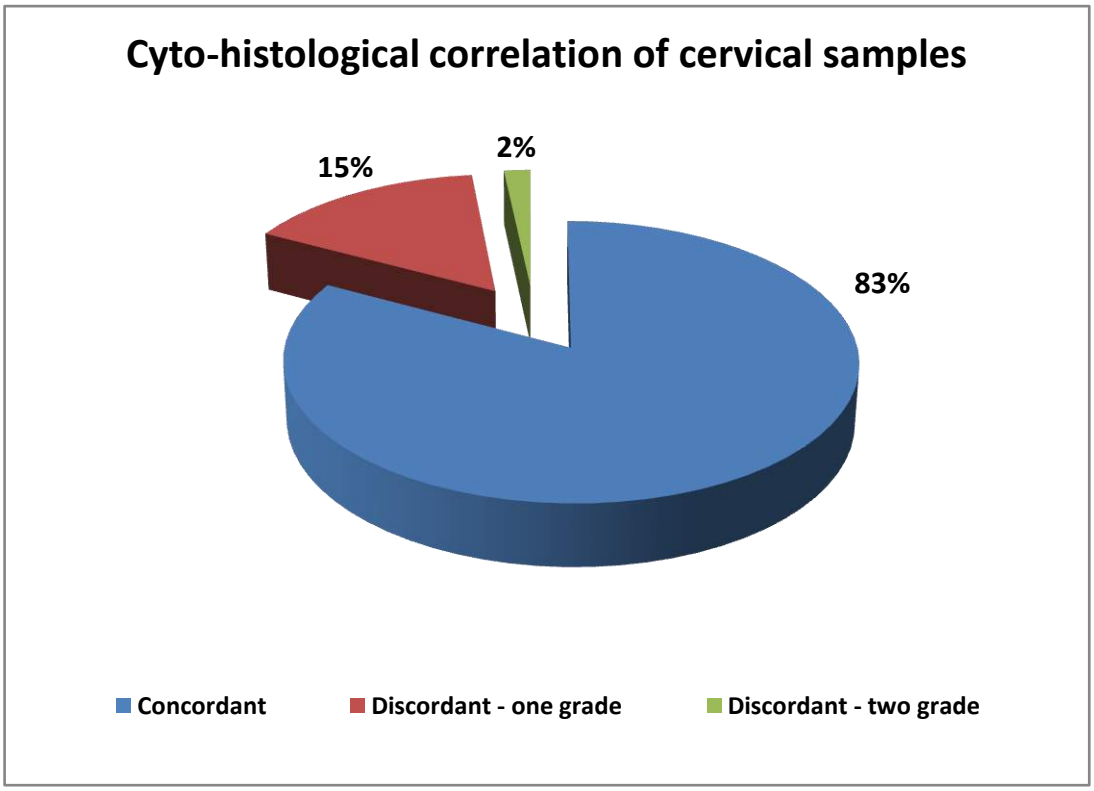


Cyto-histo correlation of cervical abnormalities:

- **Cervical biopsies**: 122
  - Inadequate biopsies: 6
  - Adequate biopsies: 116

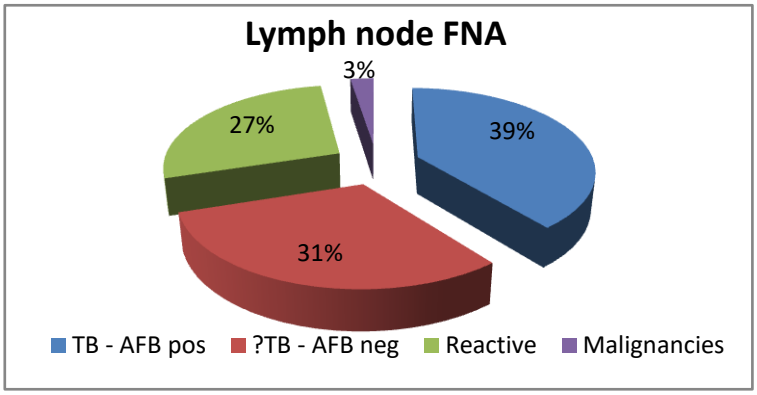
- **Cyto-histo concordance**: 96 (82.75% of 116)

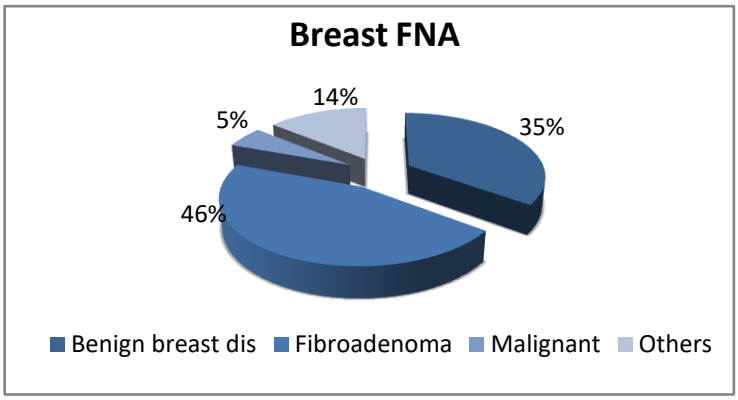
- **Discordance**: 20
  - Sampling error on biopsy: 3
  - Interpretative error on Pap: 14
  - Sampling error on Pap: 3

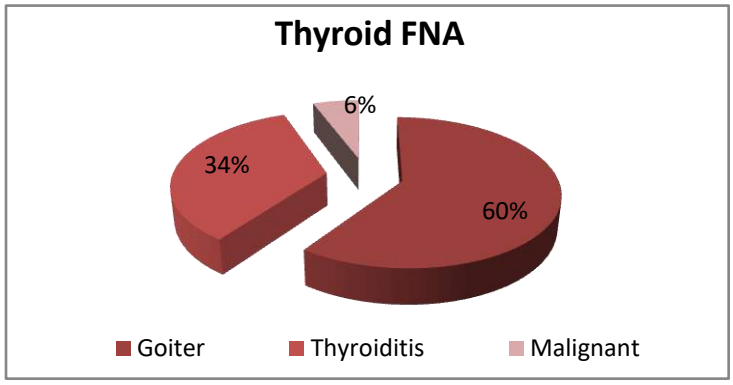


Fine needle aspiration cytology:

- **FNACs**: 3382
  - Lymph nodes: 1755
  - Breast: 521
  - Thyroid: 122
  - Other sites: 984







Colposcopy

Colposcopy is a diagnostic procedure that involves examination of the cervix, vagina and vulva with the help of equipment named 'Colposcope'. It has a powerful light source for illumination of the area to be examined and a variable magnification ranging from 4x to 30x. The evaluation of the screen positive women (Pap smear report ASCUS and above, Hr HPV positive and VIA positive) is done using colposcopy at NICPR. If any abnormal lesion is detected on colposcopic examination, biopsy is taken and sent to the cytopathology division for reporting. Further management of the woman is undertaken based on the histology report of the biopsy.

High risk HPV detection by Hybrid Capture 2 (*HC2*)

Hybrid Capture 2 (HC2) technology serves as the platform for QIAGEN's nucleic acid hybridization assay for detection of 13 High risk human papillomaviruses (HPV).

Cervical scrapes from 803 women were tested for HR-HPV. Of these 96 were detected HR-HPV positive. All the positive cases are being further analyzed for type specific HPV by PCR using HPV 16 & 18 primers. This information in conjunction with cytology report and colposcopy findings is utilized to guide patient management.

Data Management Laboratory (DML)

DML is a specialized unit for developing and providing professional data management solutions/applications for programs of ICMR and medical fraternity.

Responsibilities:

- Providing consultancy on developing portals for data collection, analysis and reporting
- Developing and maintaining secure and robust data portals compliance to Government Policies
- Developing apps for data collection and analysis
- Developing knowledge base and information hubs
- Long-term vision is to develop a system for mining data across platforms which will be easier if we develop centralized data portals on single platform.
- System requirement for developing the portal

Activities at DML: A number of projects are being undertaken by the team at DML.

Title of Project	Team Members
Whole Genome Sequencing Analysis of Candidda auris	Dr. Harpreet Singh, Dr. Dibyabhaba Pradhan, Dr Amit Kumar, Neetu Tyagi
Clinical significance of miRNA as biomarker in cytogenetically normal pediatric Acute Myeloid Leukemia (AML)	Dr. Harpreet Singh, Dr Suyash Agarwal
MD Simulation of protein inhibitor complexes of Greatwall Kinase	Dr. Harpreet Singh, Dr. Amit Kumar
Whole Genome and transcriptome data analysis of mosquito vector of Leishmania spp.	Dr. Harpreet Singh, Dr Amit Kumar
Differential gene expression analysis on Microarray data of gallbladder cancer	Dr. Harpreet Singh, Dr. Dibyabhaba Pradhan, Dr. Suyash Agarwal, Neetu Tyagi
Detection of highly deleterious somatic variants from the right and left colon cancer samples	Dr. Harpreet Singh, Dr. Suyash agarwal
Trios analysis on whole exome sequencing samples to identify genes associated with eye disease	Dr. Harpreet Singh, Dr. Dibyabhaba Pradhan, Dr. Suyash Agarwal, Neetu Tyagi
Identifying susceptible genomic variants in paediatric patients	Dr. Harpreet Singh, Dr. Dibyabhaba Pradhan, Dr. Suyash Agarwal, Neetu Tyagi
Development of IndiCleft portal using DHIS2 for capturing data on patients affected with Cleft anomaly	Jasmine Kaur, Harish Buttolia, Vinit Kumar
Data Management Unit of Antimicrobial Resistance Surveillance Network- AMR Surveillance	Ajay Singh Dhama, Dr. Arun Sharma, Harish Buttolia, Jasmine Kaur
Development of portal for capturing data on childhood associated mortality (CHAMPS)	Dr. Harpreet Singh, Jasmine Kaur
Development of data repository for data collection on Mental Health	Dr. Harpreet Singh, Ajay Singh Dhama, Harish Buttolia, Jasmine Kaur, Vinit Kumar, Santosh, Neeraj
Identification of lethal mutations in fbn1 gene in humans responsible for Marfan syndrome	Dr. Harpreet Singh, Dr Amit Kumar, Swati Ajmeriya

Tobacco Cessation Services

Tobacco cessation clinic (TCC) at NICPR is equipped to provide tobacco cessation counseling to the all the patients visiting the Health Promotion Clinic. Tobacco history is recorded utilising the online clinical portal. This information includes the current status of tobacco use (current/former user), the type of tobacco/areca nut product used, its amount, duration, the frequency of use, duration of quitting the habit for former users, and the next date for follow up.

Behavioural intervention (periodic counselling, use of relevant IEC material) is the method employed for tobacco cessation.The tobacco user is recalled every 7-10 days until the habit is quit; thereafter follow-up visits are scheduled once a month for uptoatleast 6 months. For those unable to be present for follow-up, periodic telephonic monitoring is done.The follow-up data is recorded for the concerned individuals, under the date of the follow-up visit, status of the tobacco/areca nut habit and next date of follow up, using the feature on the portal.

In the year 2018:

- A total of 1223 tobacco users (current & former users, males=710, females=513) reported to the oral health promotion clinic.
- The most common smoked tobacco products used were bidi (n=477) and cigarette (n=233), while the most common smokeless tobacco products used were gutkha (n=703), khaini (n=635), gulmanjan (n=290) and plain areca nut based products (n=221).
- The quit rate of these tobacco users was 9.2%.

EXTRAMURAL RESEARCH PROJECTS

A prospective cohort study to measure the effectiveness of Niswani in achieving the regression of Fibroadenoma& cyclic mastalgia

Principal Investigator: Prof. Ravi Mehrotra, Director & Sci G

Team Members: Prof Anurag Srivastava (AIIMS), Dr Surbhi Gupta (AIIMS), Dr.Rais-ur-Rehman (CCRUM), Dr. Anita Dhar (AIIMS), Dr. Piyush Ranjan (AIIMS), Dr. Kamal Kataria (AIIMS), Dr. Suhani (AIIMS), Dr. Pradeep K. Chaturvedi (AIIMS), Dr Roopa Hariprasad (NICPR), Dr. Pushpa Sodhani (NICPR-superannuated)

Staff: Dr.Shahbaz Ali Khan

Funding Agency & Budget: AYUSH, Rs 69,70,550

Project Duration: Jan 2017- Jan 2019

Objectives:

- To measure the effectiveness of Niswani in achieving the the regression of fibroadenoma by three month therapy of niswani
- To measure the effectiveness of Niswani in achieving the regression of cyclic mastalgia by three month therapy of niswani
- To study the endocrine changes & ovulation with three month therapy of niswani among the women having fibroadenoma & cyclic mastalgia

Methodology:

50 cases each of cyclic mastalgia and fibroadenoma will be recruited and their hormonal assessment (oestrdiol, progesterone, LH, FSH) will be done by salivary method by using Salivary ELISA KIT on day each for one month before starting the Niswani therapy. Blood sample will be also taken for assessment of harmone on day 7,14,21& 28 prior to administration of Niswani. After that a three month treatment will be given to the recruited patient. After two months of the therapy, hormonal assessment will be again done by adopting same protocol.

Work done during Jan 2018-Dec 2018:

- Case recruitment started from month of April 2018.
- 46 Fibroadenoma cases have been recruited.
- 18 Mastalgiacases have been recruited.
- Salivary analysis of 15 samples for oestrogen, Progesterone, LH, FSH done at AIIMS Delhi.

Screening for pre-cancer and cancer of cervix, breast and oral cavity in the setting of Health Promotion Clinic at NICPR, Noida

Principal Investigator: Prof. Ravi Mehrotra, Director & Sci G

Team Members: Dr. Roopa Hariprasad, Dr. Ruchika Gupta

Staff: Mrs Tanuja, Mrs. Preeti

Funding Agency & Budget: ICMR, Rs 59,45,367

Project Duration: Mar 2017- Feb 2020

Brief background & rationale: Over 80% of cancer cases in India are detected late and patients report for treatment in advanced stages. As the level of cancer awareness rises, the health seeking behaviour towards early detection may increase and consequently the cancer related mortality will begin to decline. In the Indian context, screening and early diagnosis is applicable for common cancers e.g. Cervix, Breast and the Oral cavity.

NICPR was instituted with the main aim of promoting research in the field of prevalent cancers with an emphasis on their early detection and prevention. A major drawback hampering the growth of NICPR is the lack of patient material in NICPR. As a solution, a Cancer Research Hospital has been planned in the NICPR campus. Till such time the Cancer Hospital comes up, we propose to start a cancer screening OPD in a Project mode.

Objectives:

- To evaluate before and after scores of knowledge, attitude and values for cancerprevention and early detection in the community.
- To evaluate before and after scores of knowledge, attitude and values for cancerprevention and early detection in the community health workers.
- To assess the prevalence and incident cases of cancers specially three commoncancers viz. cervix, breast and oral cavity and its premalignant conditions if any.

Work done during Jan 2018-Dec 2018:

- Screened total of 954 (Male-09 & Female -944) individuals motivated by ASHA workers from the neighbouring villages.
- Females were screened for cervical, breast and oral cancers.
- Motivational and awareness talks given on routine basis in villages viz Barola, Harola, Sadarpur, Bhangel, Salarpur, Morna, Nithari for the community members.
- Motivational and awareness talks given on routine basis in monthly gatherings of ASHA workers to assess the impact of health education on cancer-related issues in individuals attending Health Promotion Clinic at NICPR, Noida.
- A total number of 796 pre and post questionnaire were obtained from study participant for which result are as follows:

Question related to	Total number of questions	Correct answer		p-value (Chi-square)
		Pre (n=796)	Post (n=796)	
Cervical Cancer	5	32.2	80.7	<0.001
Breast Cancer	5	24.6	71.7	<0.001
Oral Cancer	5	59.6	89.8	<0.001
General NCD Risk factor	5	24.3	74.0	<0.001
Total	**20**	**35.2**	**79.1**	

Evaluation of existing web-portal for cancer awareness for general population and level 1 care providers

Principal Investigator: Prof. Ravi Mehrotra, Director & Sci G

Team Members: Dr. Sanjay Gupta, Dr. Roopa Hariprasad, Dr. Harpreet Singh

Funding Agency & Budget: ICMR, Rs 65 lacs

Project Duration: 2017-2020

Brief background & rationale: ICMR-NICPR has designed an India-centric cancer-related website with information base at two-tiers: general population in villages, smaller towns and large cities of India and primary health providers, viz. ASHA, ANMs, paramedics, AYUSH practitioners etc.

This project will help evolve a nascent cancer education website into a mature web-based education tool superadded with mobile apps for its popularity. The website will be strongly peer-reviewed for face validity, construct validity by testing the tool on a cross section of population from stratified groups of people at various levels of education and test-retest reliability, inter-observer reliability.

Objectives:

- ***To Assess the Face Validity***: To perform a detailed gap analysis of an already structured 2 tier web portal for cancer awareness of general population and level 1 care providers:

a) Compare it with the existing similar knowledgebase websites, apps, printed material etc
b) Strong peer review through intra-disciplinary, inter-disciplinary & trans-disciplinary experts

- ***To Assess the Construct Validity***: To pilot test this website for its content comprehension – construct validity on a cross section of potential users of village/town/city population and primary level health care providers

- ***Tool Evaluation*** – Before & After Study: To perform a qualitative & quantitative research analysis of improved knowledge and values. Translation of the web portal to Hindi and other regional languages.

- ***To Test the Efficacy*** of the web portal & its mobile based application by web analytics.

Work done during Jan 2018 – Dec 2018:

<table>
<tr><th colspan="2">Objective 1: To Assess the Face Validity</th></tr>
<tr><th>Work Done</th><th>Scope for improvement</th></tr>
<tr><td>A brief environmental scan of various available International and Indian web sites on cancer prevention conducted and the following fallacies detected:

Limited and disorganized information on Indian websites.

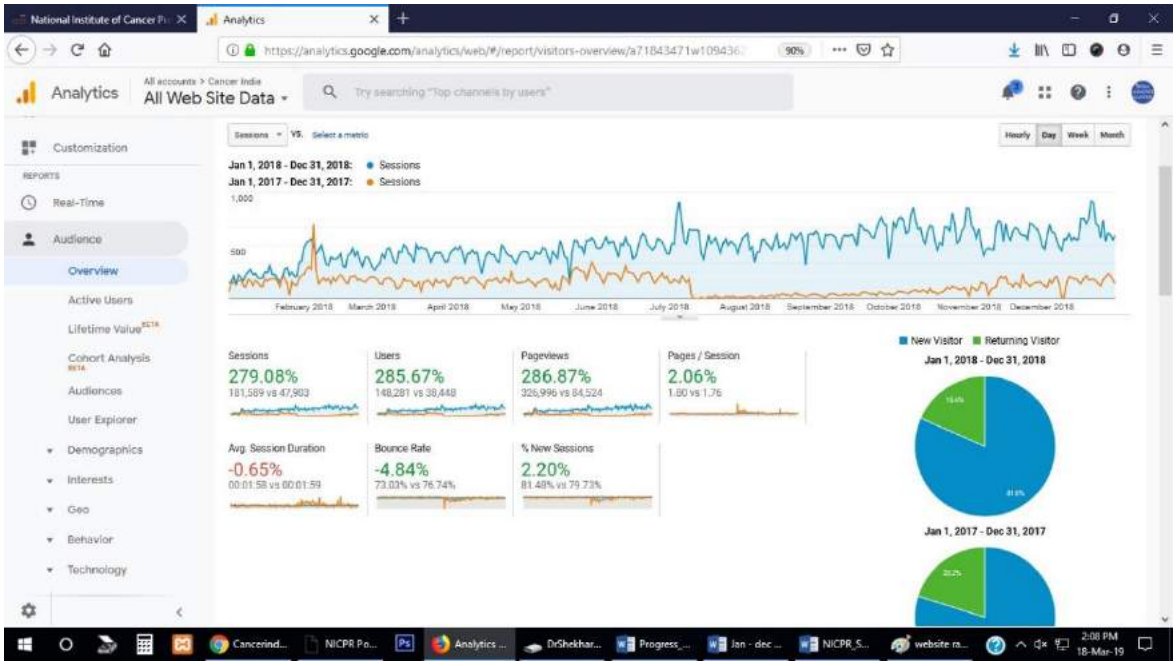
Information usually meant for advanced literacy level

Limited resources to engage families and communities in cancer prevention communication</td><td>IACan can add interactive tools to target information for different audiences like health care providers

Apply user-centred design techniques in order to facilitate usability and visitor engagement.

Enhance specific and measurable engagement strategy using blog, Facebook page, and monthly e-newsletter</td></tr>
<tr><th colspan="2">Objective 2: To Assess the Construct Validity</th></tr>
<tr><td colspan="2">o 3 villages of Gautum Buddha Nagar District namely Harola, Morna and Sadarpur identified
o Series of expert group meetings held to gather suggestions on improvement of website
o Questionnaires for qualitative and quantitative research on website prepared and validated in consultation with the experts
o Data Collection from the target population initiated. 100 quantitative data questionnaires from target participants have been filled till Dec 2018. In- depth interviews and Focus Group Discussions planned</td></tr>
<tr><th colspan="2">Objective 3: Tool Evaluation</th></tr>
<tr><td colspan="2">o Translation of web-portal in Hindi completed and uploaded
o Talks are on with CDAC for translation of webportal in other regional languages</td></tr>
<tr><th colspan="2">Objective 4: To Test the Efficacy of the web portal & its mobile based application by web analytics</th></tr>
<tr><td colspan="2">Web analytics of the portal post-modifications:

• Page views increased from 84,525 (2017) to 326,996 (2018)
• Unique page views went up from 67,206 to 251,695
• Number of sessions recorded jumped to 181,589 (47,903 in 2017)
• Similarly, number of users was 38,448 in 2017 which increased to 148,281 in 2018
• Number of pages visited per session, average session duration and % of new sessions remained almost the same
• Facebook likes 491 and 505 followers; Twitter follower 703; YouTube subscribers 237</td></tr>
</table>


Analytics
All Web Site Data
Customization
Real-Time
Audience
Overview
Active Users
Lifetime Value
Cohort Analysis
Audiences
User Explorer
Demographics
Interests
Geo
Behavior
Technology
Jan 1, 2018 - Dec 31, 2018: Sessions
Jan 1, 2017 - Dec 31, 2017: Sessions
Sessions 279.08% 181,589 vs 47,903
Users 285.67% 148,281 vs 38,448
Pageviews 286.87% 326,996 vs 84,524
Pages / Session 2.06% 1.80 vs 1.76
Avg. Session Duration -0.65% 00:01:58 vs 00:01:59
Bounce Rate -4.84% 73.03% vs 76.74%
% New Sessions 2.20% 81.48% vs 79.73%
New Visitor
Returning Visitor
Jan 1, 2018 - Dec 31, 2018
Jan 1, 2017 - Dec 31, 2017


https://twitter.com/nicpmoida
Home
Moments
INDIA AGAINST CANCER
Tweets 531
Following 134
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Likes 130
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@nicpmoida
National Institute of Cancer Prevention and Research
I – 7, Sector – 39, NOIDA UP
cancerindia.org.in
Joined November 2015
Tweets
Tweets & replies
Media
Ravi Mehrotra @ravimehro · Mar 11
Unfortunate but true: "Non-specific symptoms in initial stages of most cancers often lead to late diagnosis by which time cancer usually has progressed to an advanced stage.Lack of awareness of the warning signs,poor health-seeking behaviour of individuals&high cost of diagnost."
Disha Sanghvi @DishaRSanghvi
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Capacity building in cancer prevention and early detection through the ECHO model

Principal Investigator: **Prof. Ravi Mehrotra, Director & Sci G**

Team members: Dr.Roopa Hariprasad, Dr. Kavitha Dhanasekaran, Roshni Babu

Staff: Ms. Pratibha Jaiswal

Funding agency & Budget: Tata Trusts, Rs 26,50,000

Project Duration: Jun 2018- May 2019

Brief background & rationale: After establishing online certifiacte courses for medical offciers, gyencologists and dentists, we are now building capacity of medical offciers and specialists in the govt. sector as well as private sector

Objectives:

- Capacity building in the area of cancer prevention through tele-mentoring platform of ECHO

Work done during Jan 2018 – Dec 2018

The list of ECHO sessions held are as follows, under each course, during the period of Jan 01, 2018 to Dec 31, 2018:

Name of training program	Duration	No. of participants
Beginner's Cancer Screening Training Program - 1 (BCSTP-1)	Sep 7, 2017 – Jan 25, 2018	58
Advanced Cancer Screening Training Program (ACSTP-G)	Apr 5, 2018 – Jul 5, 2018	32
Beginner's Cancer Screening Training Program (BCSTP-2)	May 22, 2018 – Aug 21, 2018	67
Advanced Cancer Screening Training Program for Dentists (ACSTP-O)	Aug 16, 2018 – Nov 15, 2018	50
Cancer Screening Training Program for Medical Officers (CSTP-MO)	Sep 25, 2018 – Jan 25, 2019	81
Cancer Screening Training Program for Medical Officers (CSTP-MO2)	Dec 5, 2018 – Mar 6, 2019	62

Assisting Parties in addressing smokeless tobacco (SLT) use and the development of relevant policies on all WHO FCTC requirements
Principal Investigator: Prof. Ravi Mehrotra, Director & Sci G

Team Members: Dr. Sanjay Gupta, Dr. Amit Yadav, Anshika Chandra, Kumar Chandan

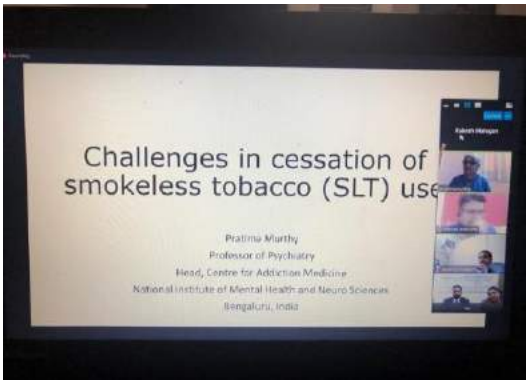
Funding Agency & Budget: Government of Norway through WHO FCTC Secretariat, Geneva, 20000 USD

Project Duration: Mar 2018 – Dec 2018

Work done during Jan 2018-Dec 2018:

7 webinars were conducted using the online platform for all WHO FCTC Knowledge Hubs on various topics pertaining to smokeless tobacco:

Title of webinar	**Speaker**	**Date of webinar**
Smokeless Tobacco- Global Scenario and Health Impact Introduction to the Report on Global Smokeless Tobacco Control Policies and their Implementation	Dr. Prakash C Gupta Prof. Ravi Mehrotra	June 1, 2018
Taxation and pricing of smokeless tobacco products	Dr. Nigar Nargis Dr. Rijo M John	July 11, 2018
Regulating Smokeless Tobacco Products The Scientific Basis for Smokeless Tobacco Product Regulation: Monitoring Product Types and Characteristics	Dr. Ghazi Zaatari Dr. Mark Parascandola	August 23, 2018
Education, training, public awareness and communication on SLT products	Prof. SamanWarnakulasuriya Dr. Amit Yadav	September 24, 2018
Research, monitoring and surveillance of smokeless tobacco use	Dr. Dhirendra N Sinha	November 30, 2018
Challenges in cessation of smokeless tobacco use	Prof. Pratima Murthy Prof. Kamran Siddiqi	December 12, 2018
Packaging / labeling and Advertising of Smokeless tobacco products	Dr. Sanjay Gupta	January 24, 2019



This activity was funded by a grant provided by the Government of Norway through the Secretariat of the WHO Framework Convention on Tobacco Control (WHO FCTC) and Government of India

Effective implementation of tax and TAPS measures for prevention and control of smokeless tobacco in South East Asia Region

Principal Investigator: Prof. Ravi Mehrotra, Director & Sci G

Team Members: Dr. Sanjay Gupta, Dr. Amit Yadav, Anshika Chandra, Kumar Chandan

Funding Agency & Budget: The UNION, 166,149 USD

Project Duration: Mar 2018 – Feb 2020

Rationale: The overall purpose of this proposal is to strengthen SLT control policies in India and other countries from South-east Asia which conform to FCTC and MPOWER. The proposal will build capacity of national and state level stakeholders in India to effectively contribute towards achieving high compliance of domestic policies and implementation of FCTC guidelines, specifically raising taxes on SLT products; enforcing a comprehensive ban on tobacco advertisements, promotion and sponsorships (TAPS) of SLT products. In addition, this grant will also support stakeholders to develop a comprehensive policy that complies with the mandates of Article 5.3 of the FCTC, and new innovative policies that will regulate the SLT sector.

Objectives:

- Monitor the SLT industry in India and focus countries, and map the regulatory processes, policies and legislation which govern the SLT industry.
- Monitor SLT taxation, compliance to health warnings, TAPS regulations for SLT products in India, and support partners in focus countries to collate, document and share good practices in policy implementation with key stakeholders.
- Institutionalize mechanisms to regulate SLT by building capacities of government officials, and support implementation to achieve compliance with FCTC guidelines and domestic legislation.
- Collate and compile evidence on tobacco industry interference in SEAR region and states of India, and support partners to draft guidelines in line with provisions under Article 5.3.

Work done during Jan 2018-Dec 2018:

- NICPR organized the National Consultation on SLT in collaboration with ICMR, July 2018.
- Held meeting with CEO FSSAI to discuss ways to curb sale and promotion of SLT products.
- Developed exclusive webpage on the website dedicated to SLT burden in India.
- Prepared factsheets on SLT taxation, SLT advertisement, promotion and sponsorship, pictorial health warnings, national and state-specific SLT factsheet from the GATS data.
- Multi-stakeholders meeting by the state tobacco control cell in Gujarat and Chhattisgarh
- Assisted high SLT burden states, Bihar and Jharkhand with flavored tobacco ban notifications

Development of a Low Cost Automated Screening System for Cervical Cancer (CerviSCAN II) – a collaborative project of CDAC(T) and RCC-T

ICMR-NICPR Team Members: Dr. Ravi Mehrotra, Dr. Sanjay Gupta, Dr. Roopa Hariprasad, Dr. Ruchika Gupta

Funding agency & budget approved: DHR and MeitY, 314 lakhs (NICPR: 17.25 lakhs)

Project Duration: June 2018 – April 2020

Brief background & rationale: Cervical cancer is the second most common cancer among females in India. It can be detected early during the precancerous phase by screening through one of the three methods – Pap smear, visual methods or HPV testing. Organized cytology-based cervical cancer screening program could not be implemented in India due to limited trained manpower, ie cytotechnicians and cytopathologists. The commercially available automated screening systems for cervical cancer are very expensive for resource-constrained countries. C-DAC(T) and RCC-T developed a low-cost automated system, CerviSCAN in their earlier project. However, the slide imaging was manual and wide variation in slide preparation was noted. Hence, this project aims to develop technology for low-cost automated slide scanning system, cyto-centrifuge and auto-stainer as a complete automated cervical cancer screening system with field trials at three centres, including NICPR.

Objectives:

- To develop a low cost and high throughput scanning system with automatic focus control for digitizing the slides
- To develop a low cost cyto-centrifuge for preparing monolayer slides using Mega Funnel Technique
- To develop a low cost auto-stainer for uniform staining of slides
- To enhance the existing algorithms of CerviSCAN and optimize for processing speed
- To conduct multi centre field trials of the complete system at RCC, Thiruvananthapuram and other three identified centres

Work done during Jan 2018 – Dec 2018:

- Memorandum of agreement between CDAC(T) and ICMR-NICPR signed on 13 Dec 2018
- Fund transferred from CDAC(T) to ICMR-NICPR
- Cervical sample collection in the preservative vials provided by RCC- T initiated and till date about 600 samples have been transported for further processing.

Prevalence of concurrent cervical and anal cytologic abnormalities and High-risk HPV infections in HIV infected women: An exploratory study

Principal Investigator: Dr. Sanjay Gupta, Sci-G, Division of Cytopathology

Team Members: Dr. Ruchika Gupta, Dr. Roopa Hariprasad, Dr. Vineeta Agarwal (District Hospital, Noida), Dr Pradeep K Das (District Hospital, Noida), Dr Showket Hussain, Prof. Ravi Mehrotra

Funding Agency& Budget: ICMR, Rs 27,26,290

Project Duration: 2 years 6 months

Brief background & rationale: High risk Human papillomavirus (HR-HPV), the primary cause of cervical cancer, is also associated with the development of anal cancers. Rates of cervical and anal human papillomavirus (HPV) infection and abnormal cytology are high in HIV-infected women. It is established that HPV infection can be transmitted to women through receptive anal intercourse. HR-HPV subtypes have been detected in 99% of cervical cancers and 80 to 90% of anal cancers It is possible that the pathogenesis of anal cancer is similar to that of cervical cancer, that is, anal HPV infection, in conjunction with other factors, leads to development of high-grade anal intra-epithelial neoplasia (HGAIN), a likely precursor to anal cancer. Despite the considerable data on cervical neoplasia and HPV infection in HIV- infected women in India, there is limited data on anal neoplasia and anal HPV infection in this population. Also, there is no Indian literature on concomitant cervical and anal HPV infections and cytological abnormalities in HIV positive women.

Objectives:

- To determine the prevalence of anal epithelial abnormalities in HIV-infected women, through cytology
- To determine the prevalence of anal HPV infection in HIV infected women
- To identify the risk factors associated with anal HPV infection in the study population.
- To determine the association of anal HPV infection with concurrent cervical HPV infection, and concurrent cytological abnormalities

Expected outcomes: The present study shall serve to determine the prevalence of concurrent anal and cervical cytological abnormalities and HR-HPV infection in HIV-infected women along with elucidation of risk factors for anal HPV infection in this population. These results might help in considering the feasibility of anal HPV testing and cytology in anal cancer screening for high-risk population in India.

Work done during Jan 2018 – Dec 2018: The project was returned for minor modifications after which it was approved by the Project Review Committee of ICMR. The funds are awaited.

Development of DNA vaccine constructs against India specific HPV-16 variant: Enhancement of Immunogenicity of L1 constructs and characterization of T-cell epitope based E6/E7 construct

Principal Investigator: **Dr. Mausumi Bharadwaj, Sci-G, Molecular Biology Group**

Team members: Prof. Ravi Mehrotra

Staff: Ms. Upma Sharma

Funding agency & budget: ICMR, 65.0 Lakhs

Project Duration: 2017 – 2020

Brief background & rationale: In India, cervical cancer is the most common cancer among females except in major metropolitan cities, where breast cancer is the top most. Infection with oncogenic HR-HPVs is associated with precancerous lesions and cervical cancer, with type HPV-16 being the most prevalent, followed by types 18, 31, 33, and 45. Two available vaccines Gardasil and Cervarix are currently in use but they are not effective with pre-existing of HPV infection. On the other hand, there may be a possibility that intra-typic HPV variant restrict the immune response by escaping consensus T-cell epitopes of the available vaccines. These variants may also provide some new epitopes for targeting a particular geographical population, which may not be presented by these available vaccines. To overcome the limitation of available vaccines, researchers are trying to refine Virus-like-particle (VLP) and some other groups are working with entirely different approach like development of plant based edible vaccines, recombinant live-vector vaccine, protein and peptide based vaccines and DNA-based vaccines.

Previously, (Indo-German Task force project - ICMR), we identified major variants in HPV-16 genome in Indian population. The effect of identified variations on immunogenicity was evaluated in mice model and observed the immune response was higher in compare to prototype. For improvement of efficacy of prepared DNA based vaccine constructs the current project has just initiated.

Objectives:

- Enhancement of immunogenicity of prepared DNA based vaccine constructs (HPV 16 L1) by using genetic and non-genetic adjuvents
- Preparation and characterization of the therapeutic DNA vaccine constructs (HPV 16 E6/E7)

Work done during Jan 2018 – Dec 2018

- **Molecular variant detection in HPV16 E6/E7 genes:** For variant analysis, the PCR products were directly sequenced on an automated DNA sequencer using ABI Prism^{TM}3130*xl* Automated DNA Sequencer (Applied Biosystem, U.S.A) and multisequence alignment was done to analyse the variant sequence in compare to the prototype. After multi sequence analysis six major variations were detected from E6 gene.

- **Prediction of potent epitopes for the MHC-I and MHC-II alleles:** It is important to know the majorly expressed MHC I and II alleles for prediction of good immune response by potent epitope(s) which will be covered by the majority of the population. Majorly expressed MHC-I and II alleles were selected from the dbMHC database.

- **Epitope prediction T-cell and B-cell**

T-cell epitopes: Epitopes for the reference and variant sequences was observed using Immune Epitope Database (IEDB): analysis resource (http://www.iedb.org/) supported by National Institute of Allergy and Infectious Diseases, a component of the National Institutes of Health in the Department of Health and Human Services. The epitopes for MHC class I alleles was predicted for open reading frame (ORF) of 151 amino acids in both the reference and variant E6 protein, using default server parameters. Comparison of reference and variant epitope was selected on the basis of the percentile value <1.0 in IEDB (lower the percentile value, good binding of predicted epitope).

B-cell epitopes: ABC pred server (http://www.imtech.res.in/raghava/abcpred/ ABC submission.html) was used for the prediction of B cell epitope(s) in E6 sequence. This server can able to predict epitopes with 65.93% accuracy using recurrent neural network.

Work is under progress to develope the epitope based vaccine construct and their characterisation.

Molecular Evaluation of Anticancer and Antiviral properties of Thuja Occidentalis

Principal Investigator: Dr. R. Suresh Kumar, Sci-E, Molecular Biology Group

Team Members: Dr. Ravi Mehrotra, Prof. Rana P Singh (JNU), Dr. Binit Dwivedi (CCRH)

Staff/Student: Dr. Narendra Singh (Senior Research Fellow)

Funding agency & budget: Ministry of AYUSH, 45 lakhs

Project Duration: 2016 – 2019

Brief background & rationale: Cancer is a disease of deregulated signaling that results from genetic alterations including mutation, deletion and epigenetic events of the genetic elements. Such alterations lead to loss or gain of functions of certain genes. Cervical cancer is one of virally associated cancers and been associated with Human papilloma virus (HPV). This virus infects the epithelium of cervix and induces cellular changes resulting in tumour/cancerous lesions according to the type of virus that infects i.e low risk or High risk. However the viral infection gets cleared by inherent immune system, but persistently infected epithelium develops into cancer. Thuja is an ornamental/herbal plant that has been used in homeopathy practices for treatment for warts, caused by low risk HPV viruses. The present work tries to find whether the Thuja extract can be utilized as therapeutic intervention in high risk viruses particularly HR-HPV 16,18 by using *in vitro* and *in vivo* methods.

Objectives:

- To study the anti cancer effect of active component extract/mother tinctureof Thuja occidentalis in cervical cancer cell lines infected with HPV.
- To study the phenotypic characteristics, candidate gene signatures, inductionof apoptosis, population doubling time in treated cell lines.

Work done during Jan 2018 – Dec 2018:

Thuja Occidentalis drug was prepared and validated with 30C, 90C, 200C doses and in addition 12C and 6C doses also validated. We found the cytotoxic activity of the Thuja Occidentalis in the cervical cancer cell lines with different dilutions of 6C, 12C, 30C, 90C.

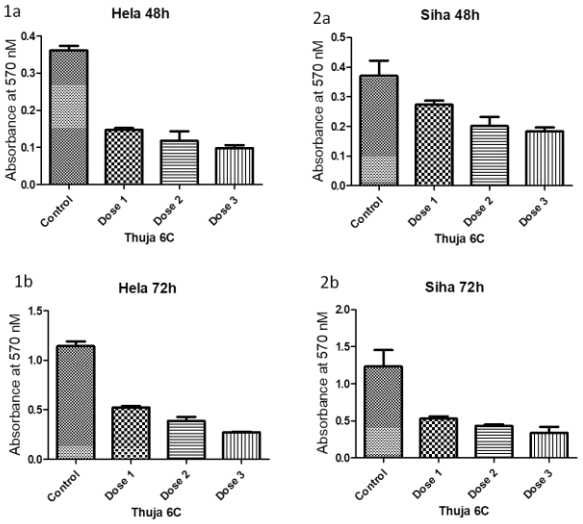
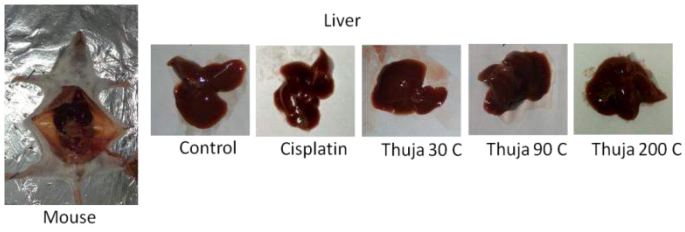
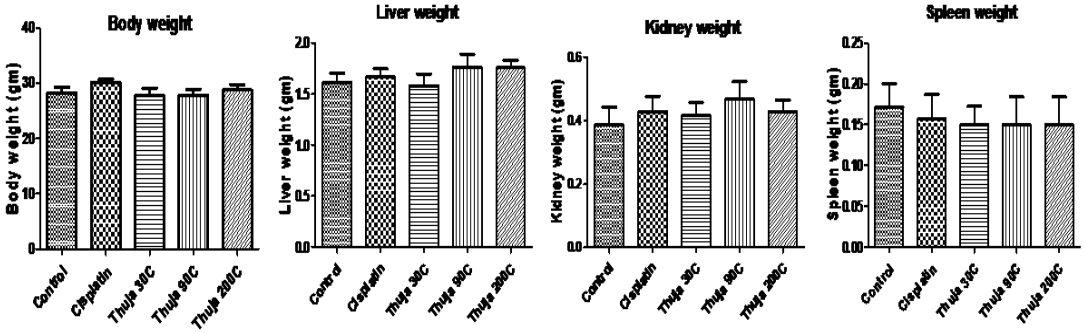


Fig:1 (a,b) Cytotoxicity doses at particular dilution of tHuja and its IC50 value in Hela Cells for 48 and 72 hrs respectively.Fig2 (a,b) the same doses and dilution of Thuja in SiHa cells.

Fig: Liver toxicity assessment of Drug in Thuja treated mouse model.





Further its organo toxicity was evaluated in mouse models Fig. We found there is no toxic effect of drug in the drug- treated mouse models with various doses.

Role of methylated CpG binding proteins and its involvement in the regulation of BRCAl, BRCA2 and p16 genes promoter in breast cancer cell lines.

Principal Investigator: Dr. Suresh T. Hedau, Sci-E, Molecular Biology Group

Funding agency & budget: DST – SERB; Budget Approved: 40.69 Lakhs

Project Duration: 2014 – 2018 (Concluded)

Brief background & rationale: Considering alarming incidence of breast cancer, there is urgent need of identifying markers that can be useful in interventional studies for effective clinical outcome in patients. In breast cancers the BRCA1, BRCA2, p16 genes are often silenced by DNA methylation mediated by methyl DNA binding suppressive complex (MBD1, MBD 2, MeCP2 etc) that initiates DNA methylation and maintain the genes in suppressive state.

The present study aims to observe the dynamic expression of BRCA1, BRCA2, p16 and MBD1, MBD2, MeCP2 proteins in cell lines of different hormonal status and promoter regulation of BRCA1, BRCA2, p16 by MBD1, MBD2 and MeCP2 proteins. A phytochemical resveratrol will be used as drug to destabilize the methylation-mediated silencing and its associated changes in MBD1, MBD2 and MeCP2 levels and regulation of BRCA1, BRCA2 and p16 genes.

Objectives

- In vitro DNA binding activity of methylated binding proteins MBD1, MBD2 and MeCP2 to the BRCA1, BRCA2 and p16 genes.
- To determine mRNA expression and protein expression of MBD1, MBD2, MeCP2, BRCA1, BRCA2 and p16 in breast cancer cell lines.
- Correlate the expression of methylated binding proteins and DNA methylation.

Work done during Jan 2018 – Dec 2018

MBD2 gene expression increases in the ER/PR positive breast cancer cell lines (MCF-7 & T-47D) up to 30μM concentration of resveratrol and negatively regulates BRCA1 gene expression. Whereas in MCF-10A normal cells and MDA-MB-231 triple negative breast cancer cells it decrease the expression of MBD2 and positively regulate BRCA1 gene. Overall results conclude that MBD2 has regulatory role in BRCA1 gene expression and this gene is mainly responsible for breast cancer development and progression due to it down regulation and up regulation. So MBD2 could be used as biomarker for epigenetic targeted therapy for breast cancer and targeted by drug combination therapy.

Setting up of Population Based Cancer registry at Institute of Cytology and Preventive Oncology covering Gautam Buddh (GB) Nagar

Principal Investigator: Dr Smita Asthana, Sci-E, Division of Epidemiology & Biostatistics

Team Members: Dr. Ravi Mehrotra, Dr L Satyanarayana

Funding agency & budget: ICMR-NCDIR, yearly budget of Rs 34.79 lakhs

Project Duration: 2017 - 2022

Brief background & rationale: Cancer registries are essential part of any national programme of cancer control ranging from etiological research through primary and secondary prevention to health care planning and patient care, to benefit individual and society at large. As there is no registry in Uttar Pradesh and ICPO is located at Gautam Buddh Nagar district of U.P and the mandate of ICPO includes primary and secondary prevention of cancer through etiological research, it is proposed to set up a population based cancer registry for covering GB Nagar district of Uttar Pradesh in UP.

Objectives:

- To set up a population based cancer registry at Institute of Cytology and Preventive Oncology (ICPO) covering the rural and urban population of GautamBudh Nagar (G.B. Nagar) district of Uttar Pradesh.

Work done during Jan 2018 – Dec 2018:

- Number of incidence cases of cancer patients of G. B. Nagar District (UP) recording and submitting for the year 2016 are 1100 while the mortality cases entered are 174.

Next generation EGFR inhibitor identification using ligand based QSAR technique

Principal Investigator: Dr Subhash M Agarwal, Sci-E, Division of Bioinformatics

Team members: Shehnaz Fatima (Research Assistant)

Funding agency & budget: Department of Health Research (DHR), 30 lakhs

Project Duration: 2016-2019

Brief background & rationale: EGFR is an important drug target in cancer. However ineffectiveness of first generation inhibitors due to occurrence of secondary mutation (T790M) results in relapse of the disease. Identification of reversible inhibitors against T790M/L858R double mutants thus is a foremost requirement.

Objectives:

- Identification of superior class of EGFR mutant inhibitors for developing QSAR model
- Development of 2D and 3D QSAR models

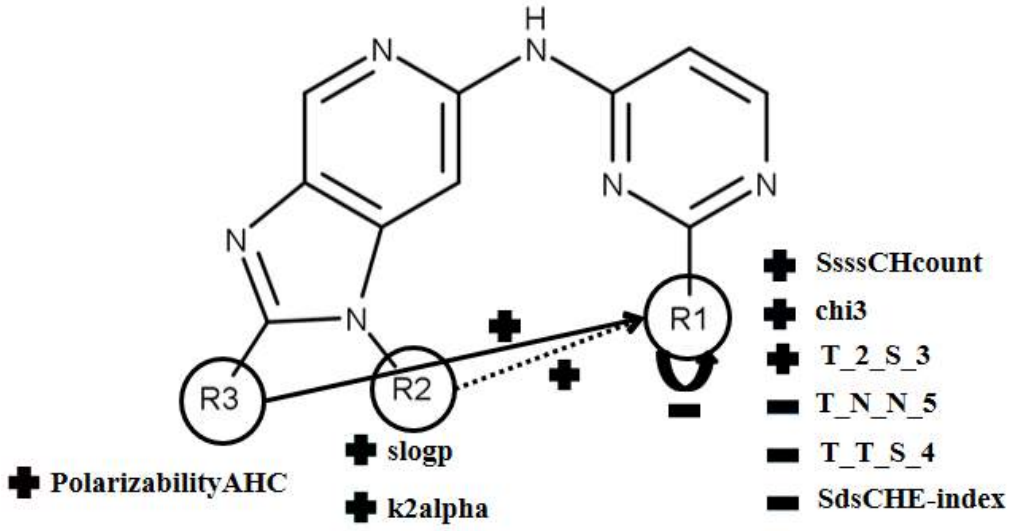
Work done during Jan 2018 - Dec 2018

- Various Fragment based QSAR (G-QSAR) models along with interaction terms have been studied for amino-pyrimidine derivatives having biological activity against TMLR mutant enzyme. The G-QSAR models developed using partial least squares regression via stepwise forward-backward variable selection technique showed the best results. The model showed a high correlation coefficient ($r^2 = 0.86$), cross-validation coefficient ($q^2 = 0.81$) and predicted correlation (predicted $r^2 = 0.62$), which indicated that the model is robust and predictive. The final PLSR model developed using SWFB is stated in the form of an equation as follows:

  $\mathbf{pK_i}$ = 0.46 (R1-SsssCHcount) + 0.75 (R2-slogp) + 0.40 (R1-chi3) – 0.97 (R1-T_N_N_5) + 0.14 (R3-polarizabilityAHC) – 0.47 (R1-T_T_S_4) + 4.69

- Based on the model, it was revealed that at R1 position increasing saturated carbon (number of –CH atom connected with 3 single bonds i.e. SsssCHcount) and retention index (chi3) is desired for enhancement of bioactivity. Additionally, at the R2 position, increasing lipophilic character (slogp) and at site R3, the polarizability of compound needs to be increased for better inhibitory activity. We also studied the contribution of interactions among significant descriptors in enhancing the activity of the compounds. It revealed that the presence of Sum((R1-SsssCHcount, R2-slogp) and Mult(R1-chi3, R3-polarizabilityAHC) are the most significantly influencing descriptors. Based on our analysis we concluded that (a) at R1 position, presence of 3-fluoro-4-methoxypiperidine and 3-fluoro-4-hydroxypiperidine substitution increases –CH count as well as retention index (b) presence of 3,3-difluoro-4-methoxypiperidine group at R1 increases retention index (c) at R2 position, presence of cyclohexane and trifluoro-isopropyl increases the hydrophobic or lipophilic character (i.e.

slogp), (d) presence of cyclohexane group at R2 position also increases the shape index value (i.e. k2alpha) as per G-QSAR_IT model, and (e) at position R3, presence of pyrazole, ethan-1-ol and hydroxyl-methyl group/substituent increases the polarizability of compound that results in the enhancement of the TMLR activity. We then compared the variation in the most and least active compounds which established that retention of the above properties are essential for imparting significant inhibitory activity to these molecules. The study provides site specific information wherein chemical group variation influences the inhibitory potency of TMLR amino-pyrimidine inhibitors, which need to be used by medicinal chemists for designing new molecules with the desired activity.



Legend:

✚ Positive contribution

▬ Negative contribution

⋯→ Sum(R1-SsssCHcount, R2-slogp)

⟶ Mult(R1-chi3, R3-polarizabilityAHC)

↻ Sum(R1-T_N_N_5, T_T_S_4)

Screening and early detection of cervical, breast and oral cancer in Cachar, Assam: A pilot project

Principal Investigator: Dr. Roopa Hariprasad, Sci-E, Division of Clinical Oncology

Dr Ravi Kannan, Site PI, Cachar Cancer Hospital and Research Center (CCHRC)

Team members: Prof Ravi Mehrotra, Dr Rajani Ved, Dr RiteshTapkire

Staff: Dr. Ashwini Kedar, Mr. Vipin Kumar

Funding agency & budget: ICMR, Rs. 2,17,45,590 (NICPR - 85,92,275)

Brief background & rationale: In North East India, there is a wide disparity in both the diagnosis and treatment of cancers, which is mostly due to lack of awareness, poor socioeconomic conditions, and difficulties in accessing the facilities for cancer diagnosis and treatment. We have selected North east district as our pilot project considering the high burden of cancer in the region. According to the latest ICMR's NCRP data, age adjusted rates (AAR) in males at Cachar is 125.4/1,00,000 for all sites of cancer and AAR among females 95.2/1,00,000. The three most commonly occurring cancers in India are those of the breast, uterine cervix and oral cavity, together accounting for approximately 34% of all cancers. These are usually detectable at early stage; malignancies of the oral cavity, breast and cervix have precancerous stages that are amenable to secondary prevention. As the level of cancer awareness rises, the health seeking behaviour towards early detection may increase and consequently the cancer load in the country will hopefully begin to decline.

Objectives

- Capacity building: To train the master trainers in screening of cervical, breast and oral cancer, work up of screen positive cases for referral and treatment.
- Initiate a systematic population based cancer screening at Cachar district and link the screening services to appropriate evaluation and treatment facilities.

Work done during January 2018-Dec 2018:

- Training of ASHAs by master trainers began in March 2018 at Dholai Basti subcenter. 102 ASHAs have been trained for cancer screening.
- Hands on training of Cachar project staff at NICPR: Two doctors working under the project at Cachar Hospital were given a comprehensive hand - on training for cancer screening at NICPR.

- Training of staff by ECHO: Weekly sessions were taken for training of Cachar project staff in the months of August and September 2018 via ECHO.
- Training videos were developed for capacity building of master trainers and ASHAs.
- Monitoring and Supervision visits: Five monitoring and supervision visits have been done in the month of March and November 2018. In these visits, the various activities of the project were monitored such as the training process, screening done by the ASHA, data collection on paper forms and in tablet app, appropriate referral of screen positive cases to Cachar Hospital, follow up and management of screen positive patients.
- Supervision was done of the master trainers and ASHAs during screening process and any deviations from the norms were corrected.
- A total number of 12929 subjects were screened till December 2018 (Male – 5330, Female - 7762, Gender information missing – 156) with 9.9% smoker, 24.0 % chewer, 66.1% Arecanut user, 7.5% alcohol user. As per screening, 6.6% Oral abnormalities, 2.9% Breast abnormalities and 4.1% Cervical abnormalities have been observed by ASHA workers.

Screening and early detection of cervical, breast and oral cancer in the Dibrugarh, Assam: a demonstration project in TATA Tea gardens

Principal Investigator: Dr HK Das, Scientist E, RMRC, Dibrugarh

Co- Principal Investigator: Dr. Roopa Hariprasad, Sci-E, Division of Clinical Oncology, NICPR, Noida

Team members: Dr Shalini Singh (ICMR Hdqrs), Dr Aizaz Hussain (TATA Research & Referral Hospital, Dibrugarh), Dr Rina Dutta Ahmed (Assam Medical College)

Funding agency & budget: ICMR, Rs. 1,36,30,421 (NICPR - 37,91,905)

Project Duration: Aug 2017 – Jul 2020

Brief background & rationale: As per the latest NCRP data (2012-2014), the leading cancer sites among females in Dibrugarh are: breast (19.0%), gall bladder (10.7%), oesophagus (9.4%), ovary (8.9%) and cervix uteri (6.4%). The leading sites of cancer in men are: oesophagus (15.3%), hypopharynx (11.6%), stomach (7.9%), mouth (6.8%) and lung (5.1%). Breast cancer accounts for 19% of all cancers in women in Dibrugarh. Currently, breast cancer is more common in the younger age group; 64.9% of all women suffering from breast cancer in Dibrugarh are below 50 years of age. Dibrugarh has numerous (144) tea gardens of different tea companies. The estimated total population of tea garden areas of Dibrugarh district in 2011 was 1,84,503 (males: 92,259, Females: 91,794).

We collaborated with TATA Amalgamated Plantations Ltd. to map out the local health problems and work towards health improvement of the tea garden workers. The TATA Referral Hospital & Research Centre (RHRC), Chabua is a secondary care hospital which provides quality, comprehensive and accessible healthcare to tea and local communities, at an affordable cost. It also caters to the medical needs of patients from upper Assam, Arunachal Pradesh and Nagaland. RHRC offers free treatment to all tea garden workers and their dependents and to the general public at minimal cost. The hospital works on a non-profit basis. There are 8 Primary health centers (PHC) located inside tea gardens and are staffed by a medical officer, nurse and others. The PHCs are the first point of contact for facility based care.

This proposed population-based screening program will be carried out in 2 phases. In the first phase, medical officers working in the tea garden health facilities will be trained for screening and early diagnosis of cervical, breast, and oral cancer cancers and will then be designated as ‘master trainers’. In the second phase, the master trainers will train the front line workers to implement community screening program in the tea garden population.

Objectives

- To assess the training needs of medical officers working in the tea garden health facilities for screening of cervical, breast and oral cancer
- To assess the effectiveness of training package in improving knowledge and building skills of medical officers of tea garden health facilities in detection, work up of screen positive cases for treatment and referral.

Work done during January 2018-December 2018:

- Developed a screening mobile application for the medical officers to screen the participants of age 30 to 65 or the tobacco users.
- Developed a Dashboard to provide a user interface that gives a current summary of the data, easy to read form, of key information relating to the progress and performance
- Site visits: Two visits were undertaken during this period

Visit-1: Dr. Shalini Singh, Dr.HK Das, Mr Rakesh Kumar and Ms.Jyotsana visited the seven tea estate hospitals and Referral Hospital.

i) Dr. Shalini briefed the Medical Officers (MO), welfare officer, CHVs and nurses, and others about the project and the progress made so far.
ii) The details and functioning of the CHV app was explained to all the CHVs and Health Assistants.
iii) The tablets were distributed to the CHVs and the health assistants have been requested to help the CHVs in using them.
iv) All the 7 PHC and the referral hospital was visited by the team and the details of all health staff have been recorded

Visit-2: Dr.Roopa and Dr. Ashwini visited six tea estate hospitals and Tata Referral hospital at Chabua.

i) A theoretical and hands on training on screening of oral, breast and cervix cancers was given, as some of the Medical officers posted at the tea estate hospitals had not attended the Master Training
ii) Hard copies of the proforma are provided ,as some of the health care providers and CHVs were not comfortable using the tablet and desktop for entry of data and at some sites desktops were not available
iii) Equipment procurement process for colposcope, Magnivisualizer, LEEP and cryotherapy is underway. The vendor has been identified and specifications have been provided to them.

S No.	Tata Estate Hospital	Name of Community Health Volunteer	Total Households Under CHV'S	Households Covered	Total Household Member Covered	Total no. Of participants with NCD Score>=4	% (NCD>=4)
1	Naharkotia	Narmada Garh	413	109	176	45	25.6%
2	Namroop	Pushpa Tanti	424	37	132	19	14.4%
3	Achabam	Sangeeta Kumar	447	52	219	07	03.2%
4	Powai	Jyoti Orang	1563	41	190	28	14.7%
		ArunjyotiBorgohain		23	100	15	15.0%
5	Chabua	Saraswati Baidya	900	84	219	79	36.1%
		Reena Heereh		162	799	48	06.0%
6	Nahartoli	Sunita Joshi	641	123	587	177	30.2%
		Sahida Begum		108	468	40	08.5%
7	Borhat	Amar Tasha	709	22	70	14	20.0%
	Total		5097	761	2960	472	15.9%

Role of cellular Transcription Factor NF-κB and HPV in the development of esophageal carcinogenesis

Principal Investigator: Dr. Showket Hussain, Sci-D, Molecular Biology Group

Team members: Prof. Ravi Mehrotra, Prof. B. C. Das (Amity University, Noida), Prof. G.K. Rath (AIIMS), Dr Mausumi Bharadwaj, Dr Haresh K.P. (AIIMS), Dr Subhash Gupta (AIIMS), Dr. N.R. Dash (AIIMS), Dr. Anoop Saraya (AIIMS), Dr. Mohd. Akbar Bhat (SKIMS, J&K)

Project Staff: Ummi Ammarah (SRF)

Funding agency & budget: ICMR, Rs 33,70,400

Project Duration: Mar 2017 – Mar 2020

Brief background & rationale: Esophageal cancer (EC) is a leading cause of cancer-related deaths in India. The incidence of EC is very high in specific regions of India and is often associated with distinct food and drinking habits which contains carcinogenic compounds. In addition, tobacco smoking is also very common and is an impending risk factor for increased incidence of EC. Although, reports have documented alterations in some of the oncogenes and tumor suppressor genes however the exact molecular and genetic basis of esophageal carcinogenesis still remains unclear. In addition, it is well established that high-risk Human Papilloma viruses (HR-HPVs) cause cervical cancer. Due to their epithelitropic nature, HPVs particularly HPV16 has been found to be associated with many other cancers including esophageal cancer. However, does it follow the same pattern in other cancers? Since, HPV does not have its transcriptional machinery; the expression of viral onco proteins (E6/E7) has to depend on host transcription factors that control viral promoters through binding to their corresponding conserved cis-acting sites on upstream regulatory region (URR). Our recent investigations have demonstrated potential carcinogenic role of transcription factor NF-κB, in the HPV-associated malignancies, which may influence expression of viral oncogenes and subsequent carcinogenic events. The present study has been designed to provide a rationale for drug targeting host cellular transcription factor NF-kB and to understand its synergism with HPV either alone or in cooperation with other known risk factors in esophageal carcinogenesis.

Objectives:

To elucidate the role and molecular mechanism of transcription factor NF-kB and HPV in the development of oesophageal carcinogenesis

Work done during Jan 2018-Dec 2018:

Altogether, 100 esophageal squamous cell carcinoma and equal number of adjacent normal tissue samples were collected and analysed for HPV infection, NF-kB expression and its DNA binding activity using Western blotting, EMSA and Super-shift assays. Experiments from tumour samples indicate strong correlation between HPV infection and increased NF-kB expression and DNA binding activity. As demonstrated in the figure below HPV infection induced differential expression and altered dimerization of NF-kB subunits in the active complex. Further these findings need to be explored in esophageal cell lines using NF-kB inhibitor and siRNA approach in the presence and absence of HPV specific proteins.

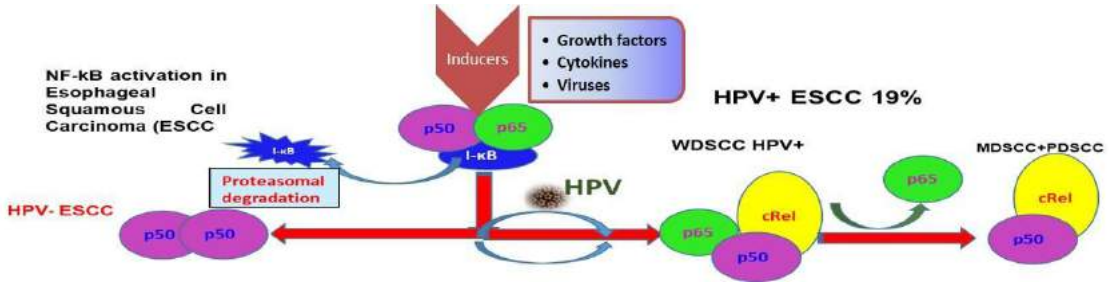


Fig: Pictorial representation of NF-κB subunit composition as observed in the presence and absence of HPV infection in ESCC

Comparative study of Genetic, Clinical and Epidemiological factors of Breast Cancer in Indian population (National Task Force project)

Principal Investigator: Dr. Showket Hussain, Sci-D, Molecular Biology Group

Team members: Prof. Ravi Mehrotra, Dr. Pranay Tanwar (AIIMS), Dr. Usha Agrawal (NIP), Dr. Paul Sebastian (RCC-T), Dr. Aleyamma Mathew (RCC-T),

Project Staff: Dr. Banashree Bondhopadhyay (RA), Amritpal Kaur (SRF)

Funding agency & budget: ICMR, Rs 1,01,45,200

Project Duration: Mar 2017 – Mar 2022

Brief background & rationale: Breast cancer is a leading cause of cancer related deaths among women in India. The incidence of breast cancer is high in urban India where as it is low in rural areas. There are a number of reasons for breast cancer although the exact cause is not known. It is likely to be due to differences in lifestyle, hormonal, reproductive and nutritional habits that differ between rural and urban India. Various reports have documented alterations in some of the oncogenes and tumor suppressor genes; however the exact molecular and genetic basis of breast cancer still remains unclear.

In India the incidence of breast cancer is increasing day by day while the cases of cervical cancer are decreasing; so in near future it will be major health issue among women. The proposed study will help in bringing awareness about breast cancer in India. In addition, it will help in framing the policies for breast cancer prevention and also for the discovery of efficient biomarkers.

Objective: To study of various clinical, hormonal and other factors associated with breast cancer, and identification of the mutational landscape of breast cancer.

Work done during Jan 2018-Dec 2018:

The sample collection is still in continuation from AIIMS and NIP, New Delhi. In the present study exome sequencing is bieng done at AIIMS, New Delhi, transcriptome analysis is being performed at NIP, New Delhi and validation will be done at NICPR, Noida; after receiving the data of exome sequencing and transcriptome analysis. So mean while we have started; (i) meta-analysis to study the status of PML and RB1 in breast cancer; and (ii) effect of Plan B drug in breast cancer.

Meta-analysis to study the status of PML and RB1 in breast cancer: We have done a meta-analysis utilizing TCGA and METABRICS datasets in different subtypes of breast cancer to check the correlation of different tumor suppressor genes such as PML and RB1. These genes are inversely correlated to each other, following validation we have done immunohistochemistry (IHC) for PML and Rb in breast carcinoma samples. The IHC data is also supporting the meta-analysis results. The original article regarding the meta-analysis study has been communicated in "Molecular Carcinogenesis" and other three papers are in pipeline.

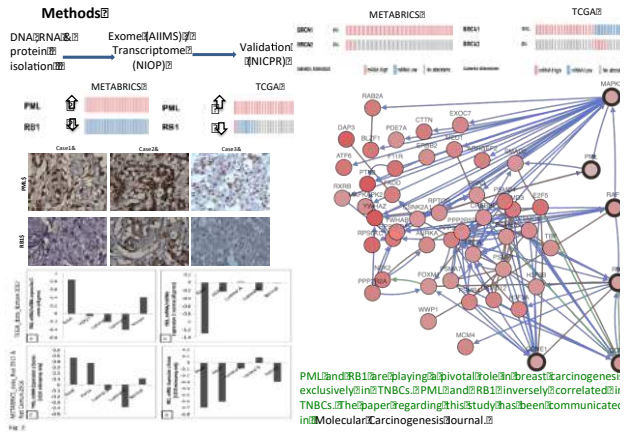


Fig 2: (A) Fig1: Meta-analysis for case to case comparison of RNA expression of PML and RB1, (B) Correlation of PML and RB1: PML and RB1 is negatively correlated, (C) immunohistochemistry for case to case comparison of RNA expression of PML and RB1 in TNBC cases for validation of meta-analysis, (D) In TNBC/Basal subtypes, PML expression is high and RB1 expression is low, (E) In basal subtypes of breast cancer the RFS decreases with high expression of PML and low expression of RB1, (F) ROC curve of PML and RB1 in TNBCs, and (G) pathway

Effect of Plan B drug in breast cancer: In addition to this, we sought to investigate the effect of Plan B drugs in vitro human breast cancer cell lines, MCF-7 (ER+PR+Her2-), T47D (ER+PR+Her2-), MDA-MB-231 (ER-PR-Her2-) and MDA-MB-468 (ER-PR-Her2-). We found that the Plan B drug is causing apoptosis in the MCF-7 cell line and interstingly enhacing the cell population in triple negative cell lines (MDA-MB-231 and MDA-MB-468).

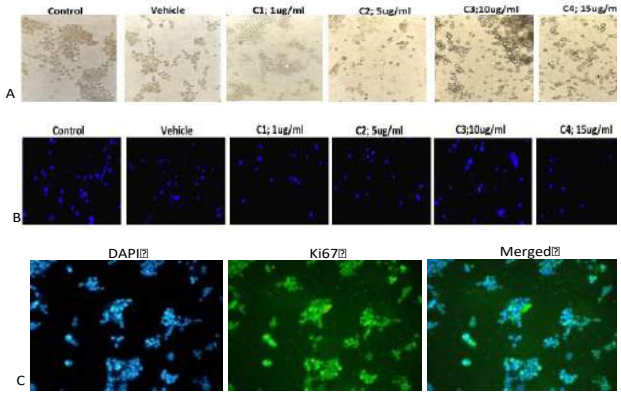


Fig 3: (A) Effect of drug on cell growth: Cell morphology analysis showing gradual decrease in cell number with increasing dose, (B) Effect of drug on cell adhesion: Cell adhesion assay showing gradual decrease in adhered cells with increasing dose, (C) Immunocytochemistry showing the effect of drug on the expression of Ki67.

Landscape of genomic alterations in Human Papilloma Virus Infection associated cancers- a genomics, bioinformatics and computational approach

Principal Investigator: Dr. Showket Hussain, Sci-D, Molecular Biology Group

Team members: Prof. Ravi Mehrotra, Dr. Neha Singh (Sweden), Dr. Bjorn Olsson (Sweden), Prof. S.K Singh (PGIMER, Chandigrah), Prof. Jonas Hugosson (Sweden), Dr. Andreas Josefsson (Sweden), Dr. RC Sobti (Lucknow), Prof. Tamkin Khan (AMU, Aligarh)

Project Staff: Atul Chikara (SRF)

Funding agency & budget: Joint Indo-Swedish (DST-VR), Rs 34,01,400

Project Duration: Jul 2017 – Jul 2019

Brief background & rationale: The increased number of cases in HPV association among different grades of cancers is an important factor to determine the tumor biology. Among many variants, E6 and E7 oncogenes present in HPV genome basically target tumor suppressor genes of the host for its integration. The present study involves identification of key genomic alterations and comparing the molecular landscape by Next-generation sequencing (Exome Sequencing) with respect to HPV infection. Bioinformatics and computational analysis of the data will be done to generate a database of altered genes for diagnostic purposes in future.

Objectives: To study and compare the key genomic alterations among HPV associated cancers by exome sequencing and generating a database of altered genes for therapeutic use.

Work done during Jan 2018-Dec 2018:

The QC passed HPV positive samples have been processed for exome sequencing with 40X coverage. The PCR enriched libraries were analyzed using High Sensitivity D1000 Screen-Tape assay, which shows the mean peak size of library for a sample at 357 bp ranging (228 - 534 bp) as shown in figure. Sequencing was carried out on Illumina NextSeq 500. The raw reads were filtered out and high quality reads were selected from the dataset. We have got approximately 10 GB of data from all the samples including approx. 60 to 70 million of high quality reads per sample. We have completed somatic mutation calling and annotation in sequenced samples, where overall target alignment was ranging from 59 - 72%. We have found more than 26,000 total Exonic variants per sample with almost 13,000 synonymous and non-synonymous mutations. The sequencing data is under assessment for computational/statistical analysis where Hierarchical clustering using Kaplan-Meier analysis and mutated gene analysis with MuTect is ongoing.

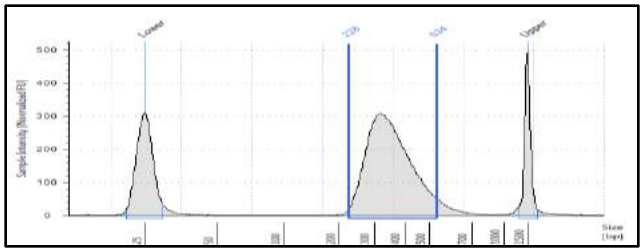


Fig: NGS library profiling

Knowledge and Awareness about Cervical Cancer and its Prevention amongst rural women- An Intervention study

Principal Investigator: Ms Sarita Sardana, Scientist B, Division of Epidemiology & Biostatistics

Team members: Dr Roopa Hariprasad, Dr Shashi Sharma**,** Dr Ashok Sehgal (**Superannuated**), Prof.Ravi Mehrotra

Funding agency & budget: ICMR, Rs 4,97,000

Project Duration: Apr 2017 – Mar 2018 (Concluded)

Brief background & rationale: Cervical cancer is one of the leading causes of morbidity and mortality worldwide. Cervical cancer is a preventable disease, as it has a well- defined pre-malignant phase which can be detected by regular screening tests and follow up. Unfortunately, most women in India are not aware about the screening and thus die from this disease than in any other country. The incidence of cervical cancer is higher in rural areas when compared to cities. Developing an intervention requires working with a specific community in order to bring about directed change. It is necessary to make women aware of cervical cancer, so that they can impart knowledge regarding cervical cancer and its prevention to the general public.

Broad Objective*:*

- To bring awareness among women about cervical cancer.

Specific objectives:

1. To assess the knowledge of rural women on etiology, awareness level regarding symptoms, risk factors, prevention and screening of cervical cancer.
2. To find out behaviour of respondents regarding prevention and screening of cervical cancer.
3. To increase awareness about cervical cancer through educational intervention.

Work done along with results of the study:

A survey was conducted among 521 married women aged 21-65 years of rural settings in the city of Gautam Buddha Nagar, Uttar Pradesh. A Multistage sampling was employed for the selection of villages and women were selected randomly from each household of village. Consented women were interviewed using a pre-tested structured questionnaire to know their knowledge about cervical cancer, cancer cervix screening and prevention. For bringing change in knowledge, attitude and practice (KAP) regarding cervical cancer an intervention programme was implemented by trained medical social worker on the same day using information education

& counselling (IEC) material and given lectures through power point presentation. The women were educated for symptoms, risk factors, prevention and importance of screening for cervical cancer. Pre–Post intervention, the same questionnaire was administered. A Univariate analysis was done and appropriate statistical tests were used using SPSS software.

Results: Of the 521 women, knowledge of the women about cervical cancer was found to be very low as only 9.6% had heard of cervical cancer, 4.3% knew about Pap test and about 4% were aware of symptoms and risk factors. There was significant increase in the awareness, level of knowledge about symptoms and factors associated with cervical cancer, perception regarding cervical cancer and its screening procedures among the women after the intervention ($p < 0.0001$). The average scores of knowledge, attitude and practices significantly improved from 0.43, 2.3, and 2.0 at pre intervention to 14.4, 33.0, and 7.7 respectively at post intervention ($p < 0.0001$). It was encouraging to note that the average KAP score of post- intervention (55.0) was significantly higher than that of the pre- intervention average score (4.8) ($p<0.001$). The knowledge of women post intervention showed a significant association with the educational qualification and monthly family income ($p<0.001$).

The planned education programme was found effective in increasing the knowledge of women regarding cervical cancer. Educating women about cervical cancer and emphasizing importance of screening should prove beneficial as post education attitude of women in our study was positive towards screening and were more likely to execute positive practice of screening for cervical cancer. The results of this study might prove beneficial in the development of public health policies to control cervical cancer in the country.

INTRAMURAL STUDIES

Comparative evaluation of conventional cytology and a low-cost liquid based cytology technique, Eziprep, for cervicovaginal smear reporting: a split sample study

Team: Dr. Sanjay Gupta, Dr. Ruchika Gupta, Prof. Ravi Mehrotra, Mr. Ravi Yadav, Mr. Akhileshwar Sharda, Mr Dinesh Kumar, Mr. Sandeep

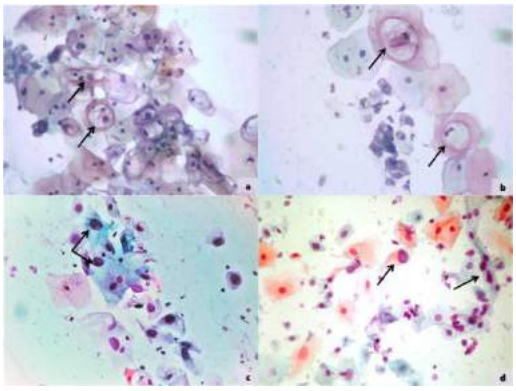
Background: Liquid-based cytology (LBC) for cervical cancer screening offers several advantages over conventional cytology such as reduced rates of unsatisfactory smears and higher pick-up rate of lesions. However, the extremely high cost of the current commercially approved devices precludes the widespread application of LBC technique in resource-constrained countries. This study evaluated the performance of an indigenous low-cost LBC technique, EziPREP™ (EP), against conventional preparations (CP) for cervical cancer screening.

Objectives: To evaluate a low-cost indigenous LBC technique vis-a-vis the conventional technique for cervical cancer screening in a low-resource setting.

Work done during the period:

Consecutive cervical sampling was done on 515 women attending the health promotion clinic of our Institute. Conventional Pap (CP) smears were prepared as per the standard technique followed by detaching the head of the brush into the fixative vial of EziPREP™ (EP). The EP samples were processed as per the manufacturer's protocol. Both conventional and EP smears were stained using the standard Pap stain protocol. Both sets of smears were evaluated blindly for staining quality, morphologic details, and cytologic diagnoses. Cytologic diagnoses were correlated with cervical biopsy findings, wherever available

The unsatisfactory rate for CP was 1.0% while on EP, 1.3% smears had inadequate cellular material. The staining quality, cytoplasmic and nuclear details were comparable in both the CP and EP smears. The detection of infections and low-grade lesions was more, though not statistically significant in EP smears. There was a 98% concordance in cytologic diagnosis between CP and EP smears. Cyto-histologic concordance was observed in 96% of cases for both CP and EP smears. Three CIN1 and one CIN2 case were missed on CP while one CIN2 case went undetected on EP.



Corresponding conventional (a, Papanicolaou x400) and EziPREP™ smears (b, Papanicolaou x400) showing similar features in a case of LSIL with HPV changes. A case of HSIL with atypical cells in conventional (c, Papanicolaou x400) and EziPREP™ smear (d, Papanicolaou x400b)

Designing of new irreversible inhibitorstargeting clinically important EGFR double mutant

Team: Dr Subhash M Agarwal, Shehnaz Fatima, Divyani Pal

Brief background & rationale: EGFR is a well-established therapeutic target of clinical relevance in cancer. However, acquisition of secondary mutation (T790M) makes first generation inhibitors ineffective. Therefore, to circumvent the problem of resistance new double mutants TMLR inhibitors are required.

Objectives:

- Understanding of structure-activity relationship ofpyridinylimidazole based irreversible EGFR mutant inhibitors
- Designing more potent inhibitors using knowledge generated from known inhibitors

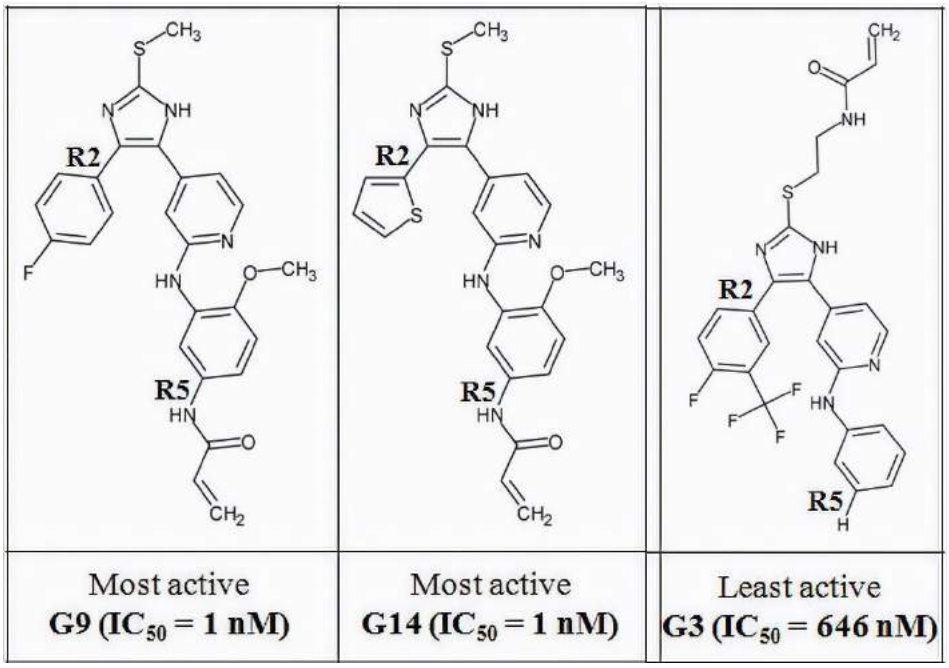
Work done during Jan 2018 - Dec 2018:

In the present study, various QSAR models were developed with the aim to find out the particular sites which are necessary for improving the TMLR activity ofpyridinylimidazoles derived irreversible inhibitors.Amongst the different models, the best model was obtained using partial least squares regression (PLS) via stepwise forward-backward (SWFB) variable selection method. The best PLS model possesses the highest r^2, q^2 as well as predicted r^2. The correlation coefficient (r^2 = 0.90), internal cross- validation (q^2 = 0.85) as well as externally predicted r2 (pred_r^2 = 0.82) were found to be statistically better than the other studied models. Additionally, the applicability domain of the studied compounds was also verified by leverage approach (i.e. Williams plot), which indicated that the predicted data is reliable.The model developed in this study can be stated in the form of an equation as follows:

pIC50 = − 3.75 (R5-XlogP) − 0.60 (R2-RotatableBondCount) + 0.06 (R2-SaaCHE-index) + 6.79

According to GQSAR the three descriptors namely R5-XlogP, R2-RotatableBondCount and R2-SaaCHE-index were found to be important for determining the activity of the compounds. It established that presence of groups which decrease the logP at R5 position (eg: acyrlamide) and increase aromaticity at R5 position (eg: 4-flourophenyl) are required for enhancing the potency of the molecules. Structural analysis further revealed that positioning of acrylamide at R5 location is important for establishing the covalent linkage with Cys797 and presence of 4-flourophenyl orients the substitution in the hydrophobic region of the mutant EGFR protein near to gatekeeper residue (Met790) thereby forming favourable interactions.We alsoanalysed the most and least active compounds with reference to fragment based QSAR model. According to this model, variation at position R2 and R5 is important in deciding the biological activity. Presence of 4-fluorophenyl (G9) and thiophene (G14) in most active compounds at position R2 decreases the number of rotatable bonds as well as increases the electronic and topological index for number of –CH group connected with two aromatic bonds hence increases the activity. While G3 has 3-CF3-4-fluorophenyl due to which it exhibits higher number of rotatable bond and lesser value of index for –CH group connected with two aromatic bonds. This is in accordance with the literature, wherein it has been also stated that presence of 4-fluorophenyl and thiophene at R2 position leads to compounds with higher activities while the occurrence of 3-CF3 group in G3 is

not tolerated and leads to a decrease in activity. In addition, at R5 position in most active compounds there is an acrylamide group which results in increase in hydrophilic character and thus negative value of XlogP descriptor while in G3 there is a −H atom which results in positive value (lipophilic character) for this descriptor and thus leading to its inactivity. In summary, the presence of –CH group connected with two aromatic bonds and absence of rotatable bonds at position R2 and hydrophilic character at R5 is favored for increasing inhibitory TMLR potency of the molecule.



Based on the structural, the most active TMLR inhibitors (G9 and G14; IC50 = 1nM) from the series were used as the reference structures to design new molecules. We designed few compounds possessing inhibitory activity values similar or better than the experimentally known most active molecules. Overall, the sequence of alterations has allowed us to design a highly potent compound with a very low nanomolar activity i.e. nearly 300 fold better predicted inhibitory activity as compared to the previously known most active synthetic compounds of this class. These findings as well as compounds thus could be used for synthesis and analysis by the experimentalist in order to develop more potent double mutant anti-EGFR irreversible inhibitors.

Exploration of National Cancer Registry Project (NCRP) Data and Statistical Modelling

Team: Dr. Smita Asthana, Dr. L Satyanarayana

Objectives:

The project was initiated in the year 2005 with an aim to explore the NCRP data, to recognize any pattern or structure that require explanation and to attempt statistical modelling of data to understand the significant hidden trends.

Work done during Jan 2018 – Dec 2018:

- Sharma S, Labani S, Asthana S, Shivalingesh KK, Goutham BS, Ramachandra S. Oral cancer statistics in India on the basis of first report of 29 population-based cancer registries. J Oral Maxillofac Pathol. 2018; 22: 18-26.
- Asthana S, Labani S, Mehrana S, Bakhshi S. Incidence of childhood leukemia and lymphoma in India. Pediatric Hematology Oncology Journal 2018: 2468-1245
- Labani S, Rawat D, Asthana S. Incidence of Urogenital Neoplasms in India. Indian J Med Pediatr Oncol. 2018;39(4):446-451 .
- Mohan S, Asthana S, Labani S, Popli G. Cancer trends in India: A review of population-based cancer registries (2005–2014). Indian J Pub Health 2018; 62(3): 221-223.

Evaluation of Acceptance and Satisfaction of Cancer Screening Services among attendees, motivated by ASHA workers, in a semi-urban population of Uttar Pradesh

Team: Dr. Kavitha Dhanasekaran, Dr. Roopa Hariprasad, Prof. Ravi Mehrotra, Ms. Roshani Babu, Dr. Priyanka Ravi, Dr. Ashwini Kedar, Mrs. Chandresh Pragya Verma, Mrs. Reena Dwivedi

Background: In 2016, Government of India framed the Operational Framework: Management of Common Cancers, where guidelines for screening and management of common, preventable cancers like cervical, breast and oral cancer has been elaborated for population-based screening for common cancers. Screening program is said to be successful if it is able to capture 70% of the eligible population. The success and failure of screening programs are known to be multi-factorial. Many studies have proved that the acceptance and satisfaction of the screening program by the participants plays a pivotal role in the success of any screening program.

Since cancer prevention is the mandate of National Institute of Cancer Prevention and Research (NICPR), it runs a health promotion clinic, where female participants are screened for common cancers like cervical, breast and oral cancer and male participants are screened for oral cancer. Since population based cancer screening has been proposed for the country recently, the community is not sensitized enough to take up these services. Thus, ASHAs play a major role in motivating the participation of the individuals from the neighbouring village for screening. Due to the rapport ASHA has with the members of the community due to the maternal and child health services she provides, it was easy for us to train her on cancer screening and request her to build awareness in the community. Hence, this study was conducted to evaluate the acceptance and satisfaction of the cancer screening program (CSP), among both the ASHAs and participants. The goal of such a study was to understand the merits and challenges of such a program as well as to look into the feasibility of ASHAs motivating the participants to uptake cancer screening services, nationwide.

Objectives:

- To evaluate the level of acceptance and satisfaction among participants motivated by ASHA workers attending cancer screening services at NICPR.
- To evaluate the satisfaction and acceptance of the cancer screening services at NICPR from ASHA's perspective
- To evaluate the feasibility of ASHA workers to motivate participation of the community in cancer screening services

Work done during the period:

- Total of 200 participants were interviewed for this study.
- Total of 10 ASHAs were motivated

Role of complement regulatory proteins in the etiopathogenesis of Human Cervical Cancer

Team: Dr. Showket Hussain, Prof. Ravi Mehrotra, Prof. Anil Kaul, Prof. Rasmi Kaul, Prof. Doris Benbrook

Background: The complement system plays a crucial role in host defense mechanisms against microorganisms and tumor cells to protect themselves from autologous complement mediated damage. Normal cells continuously express cell-membrane associated complement regulatory proteins (CRPs), but less is known about CRP expression on cervical cancer cells.

Work done during the period:

To investigate the expression of these CRPs on cervical cancer cells, we examined the profile of complement regulatory proteins - membrane cofactor protein (MCP, CD46), Decay- accelerating factor (DAF, CD55) and protectin (MACIF, CD59) on HPV negative & HPV positive cervical cancer cell lines. The study demonstrates for the first time differential expression of complement regulatory proteins in cervical cancer cells. We also observed a preferential dichotomy of complement regulatory proteins between HPV positive & HPV negative cells.

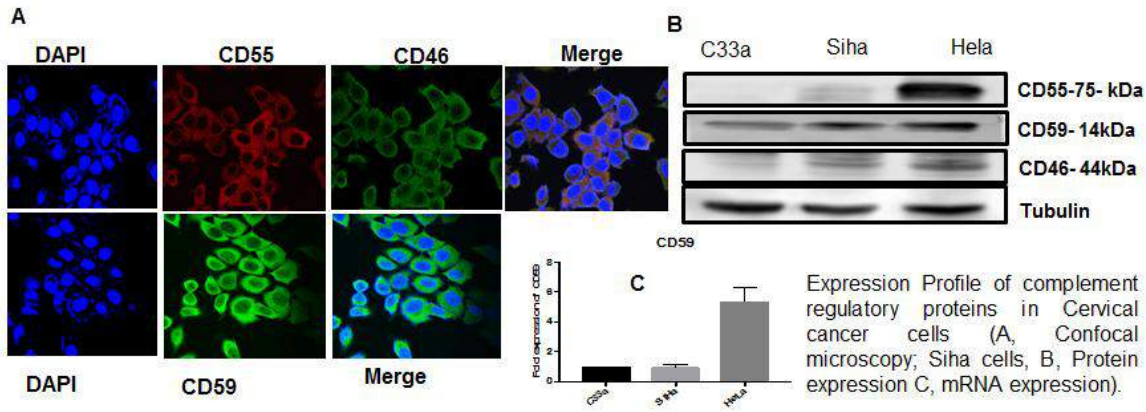


Fig: Expression profile of CRP in HPV positive & HPV negative cervical cancer cells

OTHER RESEARCH STUDIES

Synthesis, Characterization and Biological evaluation of few novel 2-oxindole derivatives

Principal Investigator: Dr. Alpana Kumar Gupta
Mentor: Prof. Ravi Mehrotra

Funding Agency: DST, Women Scientist Scheme (WOS-A)
Duration of Project: Oct 2015 – Mar 2019

Background: Cancer is one of the main causes of high rate of human mortality worldwide. Metastasis is the stage of cancer which is fatal and anticipated deaths from cancer across the globe will rise to over 11 million by 2030. The focus of the present study is to synthesize and screen few new 2-oxindole derivatives that can alleviate cancer using in vitro/ in vivo models.

Objectives:

- Design, eco-friendly synthesis and characterization of some new 3-methylene-2-oxindole and new spiro [pyrazole-oxindoles] and spiro [isoxazole-oxindoles] solvent free microwave methods.
- Design and synthesis of some novel 3-imino-2-oxindole derivatives by reaction of isatins with various amino derivatives using grindstone and microwave irradiation methods.
- Evaluation of cytotoxicity of novel compounds using MTT assay in various cancer cell lines. Estimation of cells undergoing apoptosis by using Annexin V FITC/PI assay by flow cytometry and selected apoptotic markers by confocal imaging analysis.

Work done during Jan 2018 – Dec 2018

- KF/Al_2O_3 as catalyst and PEG 400 as green solvent have been utilized for the first time to synthesize a library of isatin- based biologically potential chalcones and their 3-substituted derivatives using eco-friendly solvent free methods like open vessel microwave system.
- One-Pot multistep synthetic strategy for efficient synthesis of new spiro [pyrazoleoxindoles] and spiro [isoxazole-oxindoles] under microwave using PEG 400 as green solvent has been developed. Developed methodologies have been compared with conventional thermal methods and found to be superior in terms of simplicity, product yield and reaction time.
- The developed methods are likely to find extensive application in the field of combinatorial chemistry, diversity-oriented synthesis, large scale preparation and drug discovery.

The studies on cytoprotective/cytotoxic, apoptosis modulatory and anticancer activities of synthesized compounds on different types of cancer cell lines will pave the way to identify their anticancer activity.

To elucidate the complex mechanism of Notch-3 induced altered Notch Signaling in HPV associated cervical cancer: Invitro study

Principal Investigator: Dr Richa Tripathi
Mentor: Prof. Ravi Mehrotra

Funding Agency: DST, Women Scientist Scheme (WOS-A)

Background: Cervical cancer is the fourth most common cancer among women worldwide with an incidence of about 528 000 new cases every year and is still leading cancer in India. It is suggested that HPV infection particularly HPV type 16 and 18 is a central causative factor, but infection alone is not sufficient to generate the malignant phenotype. A major lacuna of cervical cancer research is to identify and validate the altered signaling pathway(s) and to understand the underlying mechanisms involved in malignant transformation in cervical cells. Notch signaling pathway is one of the candidate signaling pathways that has been recently being explored in cervical carcinoma. It has also been observed that Notch signaling pathway is a key functioning pathway in the development and progression of several malignancies including Breast cancer, colorectal, gastric and melanoma and plays a role in phenomenon like EMT, metastasis and plays important roles in maintaining the balance between cell proliferation, differentiation. Our previous findings have revealed that 86.7% (85/98) of cervical tumor biopsies were infected with HPV. Subsequent PCR based HPV typing using type specific primers further revealed that 96% (82/85) of HPV-L1 positive cervical tumors harbored high risk HPV (HR-HPV) type 16. Hence, results of our study suggested that Notch signaling pathway plays critical role in the pathogenesis of HPV associated cervical cancer and abnormal activation of this pathway may provide legitimate targets for cervical cancer therapy. However, despite these studies it remains unclear how the cell's transcriptome responds to presence/absence of Notch-3.

Hence, we aim at further elucidating the complex mechanism of Notch-3 induced altered Notch Signaling in HPV-16 positive (SiHa) and HPV negative (C-33A) cell lines.

Objectives

- Identification of altered gene (s) or pathway (s) after loss of function of Notch-3 in SiHa (HPV-16 positive) and C-33A (HPV negative) cervical cancer cell lines.
- Functional validation (altered genes or pathways) and understanding its regulatory roles in above cell lines of cervical cancer.

Work done during Jan 2018 – Dec 2018

- HPV-16 positive (Caski) and HPV negative (C-33A) cervical cancer cell lines were maintained in DMEM supplemented with 5% fetal bovine serum, 100 U/mL penicillin, and 100 µg/mL streptomycin at 37ºC in an atmosphere of 5% CO2. Notch-3 siRNA and scrambled siRNA (Negative control) were used for transfection using the Lipofectamine 2000 (Invitrogen, Carlsbad, CA) reagent according to the manufacturer's protocol.
- Total RNA was extracted with the Trizol reagent as per the manufacturer's instructions (Invitrogen). RNA samples were reverse transcribed using commercially available Reverse Transcriptase kit according to the manufacturer's protocol. Real time PCR with suitable primers was done using SYBR Green PCR master mix (Applied Biosystems, Foster City, CA).18S rRNA (AB Assay ID 4333760F) was used for normalization. The reaction was incubated in a 7500 Real-Time PCR System (Applied Biosystems) in 96-well plates.
- Western blot analysis of above mentioned cervical cancer cell lines were performed. Cells were trypsinized and cell pellets were lysed with modified RIPA buffer {50 mM Tris-HCl, pH 7.4, 150 mM NaCl, 1 mM EDTA, 1% NP40, 0.25% Na deoxycholate, 1 µg/ml aprotinin, 1 µg/ml leupeptin, 1 µg/ml pepstatin, 1 mM phenylmethylsulfonyl fluoride (PMSF), 1 mM sodium orthovandate, and 1mM sodium fluoride} and kept in ice for 30 min. Lysates were centrifuged at 12000 rpm for 30 min, and after collecting supernatant, protein estimation will be done. Protein concentration was determined using the BCA method. Primary antibody of Notch-3 and appropriate secondary antibody, HRP-conjugated rabbit anti-IgG (1:5000) were used. Protein bands were detected by Enhanced chemiluminescence method.
- The activities of Poly caspases (caspase-3, caspase-7,caspase-8 and caspase-9) from Invitrogen were determined according to manual's instructions.
- Three biological replicates of untransfected HPV-16 positive (Caski) and HPV negative (C-33A) cells and transfected Caski and C-33A with Notch-3 siRNA (for 48 h) were used for RNA Seq experiemnts. Samples were given for outsourcing RNA Seq from Sandor Lifesciences. Results are under statistical analysis and publication.

Expected Outcomes

This Notch-3 inhibiting siRNA study in HPV positive and negative cervical cancer cells will aid to understand Notch-3 mediated various downstream regulatory roles in activating other cellular events and signaling pathway interactions underlying the development and progression of HPV associated cervical squamous cell carcinoma. This may facilitate identification and development of therapeutic strategies for the treatment of cervical cancer which may be sufficient to abolish the neoplastic phenotype.

Somatic mutational landscape of Gallbladder Cancer in North Indian patients

Principal Investigator: Dr. Sonam Tulsyan (ICMR-PDF)
Mentor: Prof. Ravi Mehrotra

Funding Agency: ICMR
Project Duration: 2018 – 2020

Background: Little is known about the pathogenesis and etiology of gallbladder cancer. Most of the studies reported so far have limited their research on candidate genes. However, the landscape of somatic mutations in GBC in India still remains vague. Therefore, a better understanding of the molecular characteristics of GBC is essential for the improvements in the treatment protocols and personalized therapy for this malignancy. This is possible through high throughput screening methods such as Whole Exome sequencing. In the present study, we aim to explore the somatic mutational status in 25 gall bladder cancer tissues as well as matched blood samples, using Illumina platforms. Validation of detected somatic mutations will be performed by Sanger sequencing. Furthermore, association of all the detected mutations with clinico-pathological characteristics and survival status will be performed using SPSS software version 21.0 (SPSS, Inc.).

Objectives:

- Detection of somatic mutation profile of Gallbladder Cancer by Whole Exome Sequencing.
- Association of mutations with clinical and histopathological parameters of tumor.

Work done during Jan 2018 – Dec 2018

- Fresh gall bladder cancer tissue, adjacent non-cancerous tissue and blood samples were collected from 14 patients.
- Out of 14, Whole exome sequencing of 2 paired tissue and blood samples had been completed while sequencing report of 1 paired sample is awaited.

Bioinformatics based fine-mapping of oral cancer linked genes, in silico function prediction and development of methods for diagnostic and therapeutic purposes

Principal Investigator: Dr. Vishwas Sharma (ICMR-RA)
Mentor: Prof. Ravi Mehrotra

Funding Agency: ICMR
Project Duration: 2016 – 2019

Background: The project involved the fine-mapping of oral cancer genome so as to understand the association of polymorphism/s at genome level.

Objectives:

1. To fine-map the genes associated with oral cancer using the information available from 1000 genomes database.
2. To identify putative functional polymorphisms linked to oral cancer.
3. To putatively validate the putative functional polymorphism.

Work done during Jan 2018 – Dec 2018

- A systematic literature search in the PubMed database was performed to identify the loci associated with OC by exclusive CGS-based, GWAS-based, and NGS-based study approaches. The information of loci associated with OC is made online through the web based resource ORNATE (http://bmi.icmr.org.in/ornate/) which gives a snapshot of genetic loci associated with OC.
- Next, screening of the loci validated by CGS and NGS approach or by two independent studies within CGS or NGS approaches was performed. A total of 264 loci were identified to be associated with OC by CGS, GWAS, and NGS approaches. In total, 28 loci, that is, 14q32.33 (AKT1), 5q22.2 (APC), 11q22.3 (ATM), 2q33.1 (CASP8), 11q13.3 (CCND1), 16q22.1 (CDH1), 9p21.3 (CDKN2A), 1q31.1 (COX-2), 7p11.2 (EGFR), 22q13.2 (EP300), 4q35.2 (FAT1), 4q31.3 (FBXW7), 4p16.3 (FGFR3), 1p13.3 (GSTM1-GSTT1), 11q13.2 (GSTP1), 11p15.5 (H-RAS), 3p25.3 (hOGG1), 1q32.1 (IL-10), 4q13.3 (IL-8), 12p12.1 (KRAS), 12q15 (MDM2), 12q13.12 (MLL2), 9q34.3 (NOTCH1), 17p13.1 (p53), 3q26.32 (PIK3CA), 10q23.31 (PTEN), 13q14.2 (RB1), and 5q14.2 (XRCC4), were validated to be associated with OC.
- We fine-mapped these loci on human chromosomes so as to give its exact position. Bioinformatic analysis revealed that most of the polymorphisms in 28 validated loci are of putative functional relevance.

Correlative Assessment of Cost Effective Liquid-Based Cytology (LBC) with the Putative Exosomal miRNAs Expression in Early Detection of Oral Pre-Cancer and Cancer Cases from Saliva/Oral Rinse Samples

Principal Investigator: Dr. Gaurav Verma
Mentor: Prof. Ravi Mehrotra

Funding Agency: DST-SERB, N-PDF
Project Duration: 2017 – 2019

Background: Oral cancer is the second most prevalent cancer in India, accounting for an estimated 1,19,992 new cases and 72,616 deaths in 2018. India alone accounts for 34% of incidence and 40% of mortality of oral cancer world-wide (Globocan 2018). Despite substantial improvements in treatment strategies, the prognosis of oral cancer patients in clinically advanced stages remains unsatisfactory owing to the late presentation of patients and loco-regional recurrence. Given the poor prognosis of oral cancer, there is an urgent need to discover/develop a rapid, sensitive and specific technology/method for early detection of oral cancer.
This study is initiated to investigate the correlative assessment of non-invasive and cost effective technology methods for detection of oral cancer by analyzing data obtained from two techniques viz. liquid-based cytology (LBC) and salivary exosomal miRNA differential expression in normal and oral pre-cancer and cancer cases.

Objectives:

- To screen the collected samples for oral cancer by Liquid Based Cytology (LBC).
- Quantitative analysis of the miRNA expression for active oncogenic participation in oral cancer.
- To statistically analyze and correlate data obtained of both the methods and its clinical relevance.

Work done during Jan 2018 – Dec 2018

During the period respective LBC and saliva/oral rinse samples were collected following Institutional Ethical Approval and formal informed consent from two oral health clinics: Health Promotion Clinic, ICMR-NICPR, Noida, U.P., India and Dr. Goel's Dental Clinic, Hapur, UP, India. Samples were processed for LBC and salivary exosomal miRNA differential expression analysis as per standardized protocols. The data obtained from both methods were correlated statistically to find out the utility of respective technique with respect to diagnosis of oral cancer. Results illustrated a promising approach of using salivary exosomal miRNA as a bio-molecular diagnostic marker for non-invasive early detection of oral cancer.

Evaluation of miR-892b, miR-500, miR-888, miR-505 and miR-711as potential therapeutic targets in the development of cervical carcinoma

Principal Investigator: Dr. Pallavi Singhal (DST-N-PDF)
Mentor: Dr. Mausumi Bharadwaj

Funding agency: DST (2017-2019)

Aim: To analyze the effect of signature miRNAs miR-892b, miR-500, miR-888, miR-505 and miR-711 along with their targeted proteins on the development of cervical cancer, and also further explore the underlying mechanism of the targeted gene regulation by corresponding miRNAs in cervical cancer cells.

Objectives: Identification of targeted proteins of miR-892b, miR-500, miR-888, miR-505 and miR-711 and their expression analysis.

Work done during January 2018 - Dec 2018: A total of 50 cases (Cervical cancer) and 40 controls were collected, HPV detection was done.Target miRNAs have been identified by using miRWalk, TargetScan and miRBase Databases and functional enrichment Analysis has been done. Moreover transfection of cancer cell line was done and Protein and RNA expression were checked.

Carcinogenic role of HPV-16 oncoprotein E6 and E7 on Extrinsic Apoptosis of Different Head and Neck Cancer Cells

Principal Investigator: Dr. Sathishkumar Arumugam (ICMR-RA)
Mentor: Dr. Mausumi Bharadwaj

Funding agency: ICMR (2017-2019)

Aim: To evaluate role of HPV-16 oncoproteins on extrinsic apoptosis of different HNSCCs.

Objectives: To check the role of E6, E7 oncoproteins in extrinsic apoptosis proteins expression in HNSCCs and TRAIL-R1 and TRAIL-R2 expression (TNF-α Related Apoptosis Inducing Ligand- Receptor 1/2) analysis.

Work done during January 2018 - Dec 2018: The sequence of HPV16 p97 was retrieved from the literature, The conserved region of P97 sequence was used for siRNA design by DSIR, siRNA Whitehead and pssRNAit. Totally 23 sets of siRNA were obtained, based on thermodynamic parameters and free energy required for binding, only two sets of siRNA were chosen for in vitro studies. Cytotoxicity effect of siRNA1 and siRNA2 was checked on HPV16 infected SiHa cells, IC_{50} was found around 55nM in both siRNA and the same concentration was used for further transfections. The protein expression was also checked in treated cells.

Mechanism of regulation of cancer stem cell markers by Th17 cells in lung cancer: Immunotherapeutic approach

Principal Investigator: Dr. Ayaz Shahid (ICMR-PDF)
Mentor: Dr. Mausumi Bharadwaj

Funding agency: ICMR
Project Duration: 2018 – 2020

Aim: To understand the mechanism of cancer stem cell markers that promote lung cancer pathogenesis.

Objectives: To develop *in vivo* lung cancer mice model for the study of Th17 cell cytokines and cancer stem cell markers and Establishment of *in vitro* culture of Th17 cells isolated from spleen.

Work done during January 2018 - Dec 2018: Developed the lung tumor in the Balb/c mice by urethane,Blocked the IL-17 cytokine function by injecting IL-17 antibody in the Balb/c mice, Also, enhanced the level of IL-17 concentration in the Balb/c mice by injecting IL-17 cytokine.

Functional evaluation of Toll like receptors and Interleukin SNPs in association with Reproductive tract infections

Principal Investigator: Dr. Vineeta Sharma (ICMR-RA)
Mentor: Dr. Mausumi Bharadwaj

Funding agency: ICMR
Project Duration: 2018 – 2021

Aim: Evaluating the role of genetic variations in proinflammatory cytokines in symptomatic and asymptomatic women with Reproductive tract infections (RTIs). Mutation or polymorphism in TLR gene can make the host more susceptible to various infection or inflammatory diseases. And study will be conduct to explain the variation in such susceptibility by genetic polymorphism in TLR and IL genes in association with RTIs.

Objectives: To detect (RTIs) from cervical samples**,** evaluate the role of toll like receptor and interleukin in RTIs and analyse the expression of TLR and interleukin.

Work done during January 2018 - Dec 2018: Total 80 cervical scrapes samples were collected from Gynecology clinic of NICPR. DNA was extracted from cervical scrapes and digested with Proteinase-K followed by the standard phenol-chloroform isolation and ethanol precipitation (Das et al., 1992). The DNA was quantified using Nanodrop spectrophotometer or by running in 1% agarose gel electrophoresis stained with Ethidium Bromide.

Mechanistic insights into NF-κB interactome in HPV and/or tobacco induced tongue squamous cell carcinoma: role of mutations in shaping protein-protein interactions for identification of therapeutic targets

Principal Investigator: Dr. Shilpi Gupta (ICMR-PDF)
Mentor: Dr. Mausumi Bharadwaj

Funding agency: ICMR
Project Duration: 2018 – 2020

Aim: To map NF-κB-associated PPIs and identify non-canonical and/or *de-novo* interactions in TSCCs. Analysis of NF-κB-associated PPIs in relation to HPV status and/or addiction habits may contribute towards identification of potential therapeutic target(s) for highly aggressive and treatment-resistant TSCCs.

Objectives: To identify non-canonical and/or de-novo interactions and associated mutations in HPV and/or tobacco-induced TSCCs and to identify new potential therapeutic target(s).

Work done during January 2018 - Dec 2018: *In-silico* meta-analysis identified a significant number of non-canonical NF-κB-associated protein-protein interactions (HDAC1/2, YY1, Notch1, Sin3A, EGFR, PIK3/AKT and AP-1/JUN/FOS etc.) by utilizing Human Protein Reference Database (HPRD) and GENEMANIA datasets. Standardization of various cell culture related assays related to the project work. Tongue cancer sample collection from collaborative hospital has been initiated.

Molecular and Clinico Epidemiological Studies on Oral pre-cancer and Cancer among Tobacco users in India

Principal Investigator: Dr. Mausumi Bharadwaj
Research Scholar: Mrs. Upma Sharma

Funding agency: DST

Aim: The current study was designed for profiling of SNPs of immunomodulatory genes of both Th1/Th2 types as well as microRNAs together with evaluation of role of NF-kB for identification of high risk group among tobacco users.

Objectives: To investigate the Single Nucleotide Polymorphisms (SNPs) in immunomodulatory genes (Th1/Th2) with reference to interaction with NF-kB signalling pathway in leukoplakia and oral cancer cases,Detection of levels of Cytokines in blood of pre-cancer and cancer cases of oral mucosa, Identification of panel of SNPs / haplotype as predisposition markers and analysis of SNP rearrangement / haplotype in leukoplakia and cancerous lesions, Correlation of above findings with clinico-pathological variables of the disease.

Work done during January 2018 - Dec 2018: We found three Novel SNPs in IL-10 gene promoter region and gotten the accession number for these three variations (accession numbers - KT291743.1, KT153594.1 & KT291742.1)., Expression of IL10 and IL6 in oral premalignant and malignant lesions were analyzed.Serum Concentration of IL-10 and IL6 were also evaluated..

Identification of novel phytochemicals for drug resistance reversal property against lung cancer stem cells

Principal Investigator: Dr. Narendra Singh (ICMR-PDF)
Mentor: Dr. R Suresh Kumar

Funding agency: ICMR
Project Duration: Apr 2018 – Apr 2020

Brief background & rationale: Multi drug resistance is one of the major challenge in cancer treatment, MRP1 is one the member of super family ATP binding cassette (ABCs) is found responsible for efflux of drugs, that leads to relapse and multiple drug resistance in cancers. Many approaches have been exploited to overcome drug resistance including combination therapy, targeted therapy. Still effective reversal of drug resistance has not been achieved. In the present study, many phytochemicals (1500) from databases were screened against MRP1 by *in silico* methods followed by *in vitro* approaches in non small cell lung carcinoma cells (NSCLC).

Objectives:

- To investigate cytotoxic effect of novel phytochemicals on growth of lung cancer stem cells and its associated mechanism.
- To evaluate the population of cancer stem cells through biomarkers including CD44, CD133.

Work done during Jan 2018 – Dec 2018:

The 1500 phytochemicals were screened by *in silico* approach, from which seven compounds with best binding affinity (-8.2 to -8.6 kcal/mol) were selected for further analysis and one compound (UA) was tested for preliminary study. The selected drug showed strong inhibition against spheroid culture growth. The Cells which were pretreated with selected compound have shown increased drug retaining potential of treated cells when compared to untreated cells.

Expression of important ABC transporters and cancer stem cell markers were determined. Strong down regulation in the expression of CD44, CD133, ABCC1 and ABCG2 were observed in treated cells. Thus the study shows these phytochemicals would inhibit the growth and reverse the multi drug resistance in cancer.

Study on Reversal of Multidrug Resistance (MDR) and role of P-gp.in different cancer cell lines Using Natural Chemo preventive agent

Principal Investigator: Indu Kumari (DHR-WOS)
Mentor: Dr. R. Suresh Kumar

Funding agency: DHR
Project Duration: Feb 2018 –Feb 2021

Brief background & rationale: Drug resistance has been a major problem in cancer therapy. Usage of multiple drug combinations in the treatment of cancer can result in development of multidrug resistance. Drug resistance is elicited by over expression of multidrug resistance family proteins, generally induced by over exposure of drugs. To circumvent the MDR and cancer recurrence, the present study attempted to reverse the MDR by targeting pGlyco Protein(pGP) that are induced by standard chemotherapy, using novel phytochemicals. Insilico screening of phytochemical library fetched four compounds that had shown high binding affinity, and subsequently to be tested in vitro in different cancer cell lines.
We predict this study would be a step forward towards improving the treatment for cancer patient with MDR and reversing MDR for positive outcome.

Objectives: To screen & analyse pharmacological activity of selected phytochemicals (polyphenolic compounds) as modulators to reverse the activity of MDR in different cancer cells.

Work done during Jan 2018 – Dec 2018: For *in silico* based study of phyotochemical we have retrieved 300 anticancer phyto-compounds from databases and docked with an ABC transporter protein. Compound 1 having affinity score -12.1kcal/mol strongly binds with 3 hydrogen bond at target protein residues Lys1181, Arg 905, Glu 476, Compound 2 having binding affinity score -11.2 kcal/moI binds at Ile 901 and Phe163, Compound 3 having binding affinity -11.1kcal/mol binds at Arg 905 of target protein and Compound4 having binding affinity score-8.5kcal/mol and binds at Lys 1000 residue of target protein. These selected 4 ligands compound will use further for in vitro analysis.

The drug 5- Fluorouracil is selected as chemotherapy agaaent to induce MDR. Cytotoxicity of 5-Fluorouracil were evaluated. using MTT assay. The selected drug dose will be used for further experiment.

Further the selected compounds will be tested for invitro binding affinities and in cellular systems.

In silico analysis of CYP1A1 gene variants affecting the protein structure and stability in oral cancer

Principal Investigator: Ms. Swetha (ICMR-SRF)
Mentor: Dr. R Suresh Kumar

Funding agency: ICMR

Project Duration: Jul 2018 – Jul 2020

Brief background & rationale: Oral cancer is one of the major health concerns due to its alarmingly increased incidence due to consumption of tobacco and life style factors and cultural habits. Carcinogenic potential of tobacco along with host genetic factor play important role in increasing the risk of carcinogenesis in certain population (having distinct genetic factors). Cytochrome P450 enzymes are heme containing mono oxigenases play role in phase-I metabolism & detoxification system particularly metabolism of tobacco and its allied products. Many molecular factors play role in bio transformation process of tobacco, one of them is polymorphisms in CYP1A1 Gene. There are certain polymorphisms of CYP1A1 have been found to be associated with increased risk of head and neck cancers.

Objectives:

- To identify Indian population specific SNPs associated with oral cancer using bioinformatics databases.
- To analyze the chromosomal targets, defining the locations of the SNPs utilizing the available databases.

Work done during Jan 2018 – Dec 2018: The present study explored the all SNPs of CYP1A1 and delineated the functional significance of selected SNPs in altering the functional and structural variation there by altering the xenobiotic metabolism. In this study, polymorphic variants of CYP1A1 gene were taken from the NCBI dbSNP database and from Published resources. From the databases, 1,693 SNPs were reported for CYP1A1 gene, out of which 155 coding synonymous SNPs, 217 variants in 3'UTR region, 37 in 5'UTR region, 765 intronic position, and 437 SNPs were Non synonymous (nsSNPs). The coding region 24 ns SNPs were selected for the further analysis. Various *in silico* methods were used such as, Polyphen, I-Mutant suite, SNPs GO etc programs, to predict and identify the variants that elicit changes in structure and function of the protein. Two substitutions I462F (rs1048943) and T461N (rs1799814) were found to be deleterious and functionally significant and structurally variant that was deduced by molecular simulation. Eventually, this nsSNPs in CYP1A1 would provide prior information in identifying the functionally valid SNPs as a genetic risk factor and for possible therapeutic interventions for cancer prevention.

Charting Histone Modifications in Indian Breast Cancer Patients

Principal Investigator: Dr. Ankita Singh **(PDF)**
Mentor: Dr. Showket Hussain

Funding agency: DST

Brief background & rationale: Metastasis, which is the most lethal aspect of cancers, presents a continuing therapeutic challenge and is responsible for more than 85% of cancer related deaths. Developing an epigenetic map using samples from patients across several stages of the disease would help in achieving this and would probably open ways towards better understanding of the disease, might give us new markers to detect breast cancer at early stages and also would help us in designing new and better therapeutics to target the disease.

Objectives:

- To generate an epigenetic profile highlighting the changes in histone patterns in different breast cancer stages
- Select unique changes and clustering them to check if they could be employed to work as biomarkers.

Work done during Jan 2018 – Dec 2018:

- **Differential binding of H3K4me3 and H3K27me3 in breast cancer patients:** We performed ChIP assays in 25 collected samples of breast cancer using antibodies against H3K4me3. We performed ChIP – PCR using GAPDH specific primers as a positive control set to test if ChIP assay was successful. Samples have been sent for ChIP-Sequencing to fetch the various genes which show differential binding of histones across different cancer stages.

- **Case Study: mRAS & FOXA1**: Using ENCODE ChIP-Seq data sets, we identified mRAS and FOXA1 as target genes of H3K4me3. Levels of H3K4me3 were checked on FoxA1 across the stages I, II, and III of breast cancer patients in Indian population. Some light bands were visible after the amplification, indicating that H3K4me3 levels vary in different stages of breast cancer in Indian patients.

- **Inhibitor use in MCF-7 & MDAMB-231 led to decreased cell invasion**

We treated MCF-7 and MDA MB-231 cells with a histone demethylase inhibitor. We treated both the breast cancer cell lines with the drug & checked the expression of mRAS and FOXA1.We noticed a marked increase in the expression levels of both the genes in both the cell lines when quantified through PCR.

A molecular understanding of the role of oral contraceptives in the pathogenesis of cervical cancer

Principal Investigator: Dr. Anamika Priyadarshini Sil
Mentor: Dr. Showket Hussain

Funding agency: Department of Health Research (DHR), Women Scientist (WOS)

Brief background & rationale: Cervical cancer is caused by the persistent infection with high-risk Human papillomaviruses that leads to the development of carcinoma in situ from normal epithelial cells, but not to invasive cancer. Cofactors seem to be necessary for this last step. In this context, a detailed study is ongoing to find out an interplay between viral and cellular genes, and also the role of oral contraceptives (cofactors) in HPV positive and HPV negative cervical cell lines which ultimately lead to malignancy.

Objectives:

- To study the role of on 17β-estradiol and progesterone in three cervical cell lines in HPV^+ (HeLa /SiHa/CaSki) cell lines and HPV^- (C33a) cell lines.

Work done during Jan 2018 – Dec 2018:

- The LD50 of both the drugs 17β estradiol and progesterone on HPV positive and HPV negative cervical cell lines was done and the dose of 10^{-6} to 10^{-8}M for both drugs were used for further experiments. The expression pattern of E6 protein was verified in treated cells followed by the invasion assay on cervical cell lines treated with both the drugs. To check the differential expression of E6/E7 gene, RNA of treated and controlled samples were isolated for RNA sequencing.

Role of Ets-1 Transcription Factor in Breast Carcinogenesis

Senior Research Fellow: Mr. Sheeraz Un Nazir (ICMR-SRF)
Mentor: Dr. Showket Hussain

Team members: Dr. Ramesh Kumar, Dr. Dil-Afroze, Dr. Anurag Srivastava

Brief background & rationale: Breast cancer is the most common cancer among females in both developed and developing countries. Various factors are responsible for this disease which include various exogenous and endogenous factors which cause changes in structure and function of various genes such as tumour suppressor genes, oncogenes, DNA repair genes and cell cycle control genes. Role of transcription family Ets-1 which share a unique DNA binding domain has been proposed in various cancers and has shown its role in the regulation of various genes which include invasion promoting and various ECM-degrading proteases. The aim of our study was to understand the role of Ets-1 and its downstream target gene MMP-9 in Breast carcinogenesis.

Objectives:

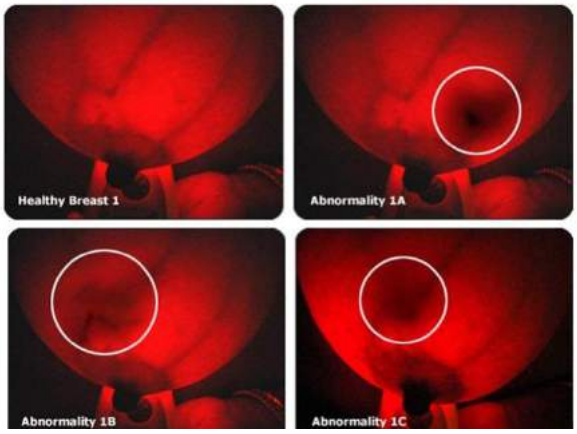
To check the role of Ets1 transcription factor and its downstream target gene MMP-9 in breast cancer carcinogenesis

Work done during Jan 2018 – Dec 2018:

Role of transcription factor Ets-1 was studied in breast cancer tissue biopsies. The findings revealed an overexpression of Ets-1 gene in 75 breast cancer tumors as compared to their normal adjacent tissues. The findings significantly established a co-relation between Ets-1 expression in breast cancer tissue with different histological grades, hormonal receptor profiles and ductal lobular histological subtypes in Indian population.

Further role of Ets-1 and its downstream target gene MMP-9 MCF-7 and MDA-MB-231 breast cancer cells was studied by RNA-interference in combination with pull down and ChIP assays. The results showed that transfection of Ets-1 siRNA in breast cancer cell lines resulted in downregulation of MMP-9. Ets-1 knock down also showed reduced cell invasion and altered expression of EMT markers. Moreover, we could also predict that MMP-9 gene promoter harbors a binding site for Ets-1 transcription factor, suggesting its involvement in its direct transactivation. Therefore, these findings may suggest a possible role of Ets-1 mediated effect on MMP-9 gene, and may have a significant impact on breast cancer patients.

VALIDATION OF INNOVATIVE TECHNOLOGIES



BREAST LIGHT™

BreastLight™ (model BL 801, PWB Health, Huddersfield, United Kingdom) is a handheld device that trans-illuminates the breast with a visible harmless red-light (617 nm). The light is absorbed by haemoglobin, hence areas with high vascularity (such as in most of the malignant tumors) appear black. It has to be used in a darkened room and held tightly to the skin of the breast. Normal breast, on examination with BreastLight™ shows a pattern of veins that appear dark. However, if there is a dark area in the breast, this could be a potential abnormality that should be evaluated by the health practitioner. This device can be used by the woman herself too to be aware of her breasts and visit the health facility whenever she notices a dark area on examination by BreastLight™.

The early clinical studies evlauting BreastLight™ have its ability to detect malignant tumors in women of all ages. A cross-sectional study performed among women attending the mammography clinic at Cairo University Hospital for screening, diagnosis or follow up found BreastLight™ to have a sensitivity of 93% and a specificity of 73.7% in detection of breast cancer.[1]. Benign lesions (e.g. fibrous cysts) generally do not show up as positive with BreastLight™. However, blood-filled cysts may appear dark.

ICMR-NICPR is currently evaluating BreastLight™ for its accuracy in detection of breast cancer.

1. *Labib NA, Ghobashi MM, Moneer MM, Helal MH, Abdalgaleel SA. Evaluation of BreastLight as a tool for early detection of breast lesions among females attending National Cancer Institute, Cairo University. Asian Pac J Cancer Prev. 2013;14(8):4647-50.*

TRUENAT™ - A REAL TIME MICRO PCR-BASED ASSAY

The Truelab™ Uno Dx Real Time micro PCR Analyzer offers rapid, simple and user friendly HPV detection capability that can be used in resource limited settings. The system utilizes four processes: sample collection, sample preparation using the Trueprep™ AUTO Universal Cartridge Based Sample Prep Kit, automatic analysis with the test specific Truenat™ Real time quantitative micro PCR chip followed by reporting. The portability of the system ensures that even the peripheral laboratories with poor infrastructure and minimally trained technician can perform these tests routinely in their facilities and report PCR results in less than an hour. Moreover, with these devices PCR testing can also be initiated in the field level, on site.

This device is being evaluated at ICMR-NICPR for its efficacy in HPV detection vis-à-vis the FDA-approved HPV detection method, Hybrid Capture II.

CERVISCAN-II

Cervical cancer screening through cytology achieved a phenomenal success in the developed countries through organized screening programs. However, the same has not been implemented in India due to the relative lack of trained cytotechnicians and cytopathologists as well as the infrastructure required for such a program. In this regard, automated cervical smear screening systems are considered to be helpful since these can potentially filter out the cases that do not have discernible precancerous or cancerous cells, thereby reducing the workload of the cytopathologists. The current commercially available automated screening systems for cervical cancer are very expensive for resource-constrained countries like India.

C-DAC(T) and RCC-T had developed a low-cost automated system, CerviSCAN in their earlier project which could screen the digitized images of a cervical smear and classify the case as negative or requiring further review. However, the slide imaging in this prototype was manual and a wide variation in the slide preparation methods was noted. Hence, another prototype has been developed using indigenous technology for low-cost automated slide scanning system, cyto-centrifuge and auto-stainer as a complete automated cervical cancer screening system with field trials at three centres, including ICMR-NICPR.

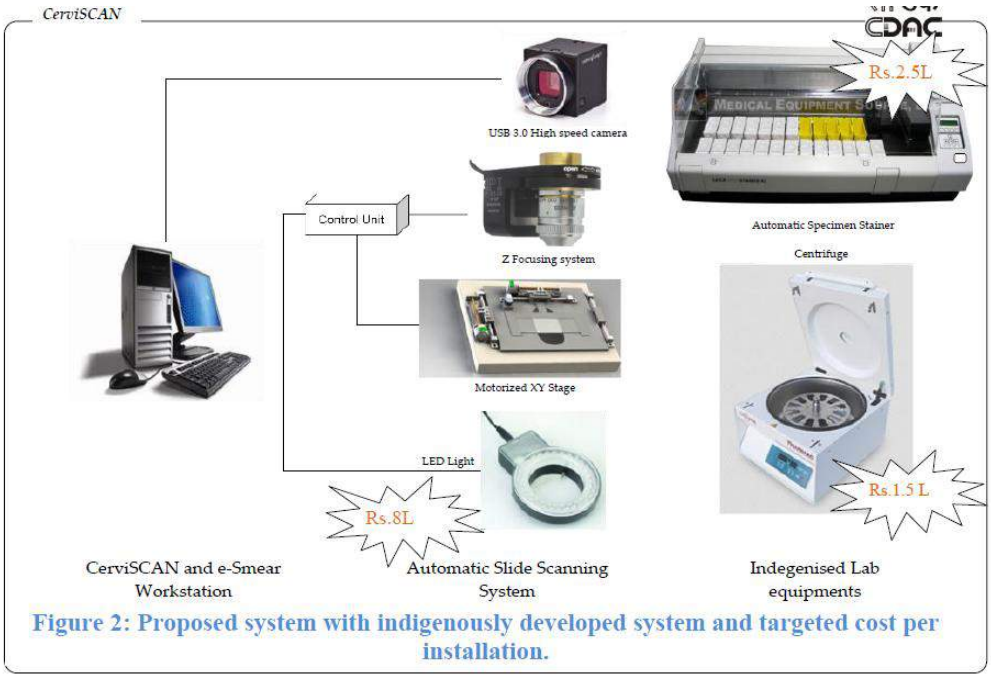


Figure 2: Proposed system with indigenously developed system and targeted cost per installation.

ACADEMIC ACTIVITES

COLLOQUIA

Date	Speaker	Topic
22.01.2018	**Emeritus Prof Newell W Johnson**	Epidemiology of oral potentially malignant disorder(OPMD) and of oral cancer: changes in etiology and role of oral microbiome
27.02.2018	**Dr. Minaxi Desai**	Cervical cancer screening: Is it time to bid adieu to Pap test?
12.03.2018	**Dr. Malcolm Anthony Moore**	Cancer epidemiology in Southeast Asia
10.04.2018	**Dr Mira B Aghi**	Genesis of tobacco control in India
14.05.2018	**Dr. Preet K Dhillon**	Collaborations between NICPR and PHFI in cancer prevention and control
03.07.2018	**Dr. Amitabh Ray**	Leptin in cancer progression
10.08.2018	**Bio-Rad group**	Droplet digital PCR
24.10.2018	**Sigma-Merck group**	The new technologies and innovations in the field of Life Sciences

FORTNIGHTLY DIVISIONAL SCIENTIFIC PRESENTATIONS

Date	Division
23.01.2018	Epidemiology and Biostatistics Division
06.02.2018	Molecular Biology Group
20.02.2018	Data Management Laboratory
06.03.2018	Division of Clinical Oncology
20.03.2018	Division of Cytopathology
03.04.2018	Division of Preventive Oncology
17.04.2018	WHO FCTC Global Knowledge Hub on Smokeless Tobacco

JOURNAL CLUBS

Date	Topic of presentation
24.07.2018	Effects of green tea on miRNA and microbiome of oral epithelium Marine actinomycete crude extracts with potent TRAIL-resistance overcoming activity against breast cancer cells
31.07.2018	TRX-E-002 induces c-Jun dependence in ovarian cancer stem cells and prevents recurrence in vivo
07.08.2018	Interaction of WBP2 with ERα increases doxorubicin resistance of breast cancer cells by modulating MDR1 transcription Interleukin-22 promotes triple negative breast cancer cells migration and paclitaxel resistance through JAK-STAT3/MAPK/AKT signaling pathway
14.03.2018	Early breast cancer detection programme based on awareness and clinical breast examination
21.08.2018	Common genetic variation and risk of gall blader cancer in India Comprehensive miRNA-sequencing of exosomes derived from head and neck carcinoma cells in vitro reveals common secretion profiles and potential utility of salivary biomarkers
28.08.2018	Epigenetic silencing of PTPRR activates MAPK signaling, promotes metastasis and serves as a biomarker of invasive cervical cancer CDK-7 dependent transcription addition in triple negative breast cancer
04.09.2018	Evaluating the utility of syndromic case management for three sexually transmitted infections in women visiting hospitals in Delhi, India The promotion of transformation of quiescent gastric cancer stem cells by IL-17 and underlying mechanisms
18.09.2018	PML/RARα inhibits PTEN expression in hematopoietic cells by competing with PV-1 transcriptional activity
25.09.2018	Population-based screening program for reducing oral cancer mortality in 2334299 Taiwanese cigarette smokers and / or betel quid chewers Incidence of CIN in women infected with HIV with no evidence of disease at baseline: results of a prospective cohort study with upto 6.4 years of followup
09.10.2018	An efficient molecular probe for usual detection of adenosine triphosphate in aqueous medium
16.10.2018	Lsd-1 ablation stimulates antitumor immunity and enables checkpoint blockade Disulfiram inhibits TGF-β-induced epithelial mesenchymal transition and stem-like features in breast cancer via ERK/NF-kB/Snail pathway
23.10.2018	Training future leaders: experience from China-SEAN cancer control training programme
30.10.2018	Oncogene ATAD2 promotes cell proliferation, migration and invasion in cervical cancer
06.11.2018	Health effects of trace metals in electronic cigarette aerosols: a systematic review
20.11.2018	Stereoselective solvent-free highly efficient synthesis of aldo- and keto-N-acylhydrazones applying grindstone chemistry

PhD/ MD/ MS Thesis Enrolled/ Completed

Dr. Sanjay Gupta, Div. of Cytopathology

- **MD (Pathology) Thesis**

S.No.	Name of student	Title of Thesis	
1	Dr Lalrinzuali Sailo, LHMC	A comparative analysis of conventional Pap smear and Liquid Based Cervical Cytology in women attending Gynecology OPD	Thesis submitted in 2018

Dr Mausumi Bharadwaj, Molecular Biology Group

- **PhD Thesis**

S.No.	Name of student	Title of Thesis	
1	Upma Sharma	Role Of Immuno Modulatory Genes In Oral Squamous Cell Carcinoma (OSCC) In Indian Population	2014-2019
2	Rajeshwar Patle	Study of the expression of miRNAs in the development of oral cancer	2017-2022
3	Mohd Mabood Khan	Study on expression profile of miRNA in Prostate Cancer	2017-2022

Dr. Suresh T Hedau, Molecular Biology Group

- **MD/ DNB Thesis**

S.No.	Name of student	Title of Thesis	
1	Dr Saloni Chadha, LNJP (MD)	Comparison of HPV16/18 genotyping and P16/Ki67 dual staining for detection of high-grade cervical lesions in patients with low-grade cervical smears	Ongoing
2	Dr. Milind Babanrao Zade (DNB)	Correlation of p53 and Ki-67 immunoexpression with stage, grade and prognosis of urinary bladder lesions	Ongoing

Dr. Showket Hussain, Molecular Biology Group

- **PhD Thesis**

S.No.	Name of student	Title of Thesis	
1	Sheeraz Un Nazir	Role of Ets-1 Transcription Factor in Breast Carcinogenesis	Ongoing
2	Dev Jyoti Dalal	Optical characterization of breast cancer	Ongoing

- **MD Thesis**

S.No.	Name of student	Title of Thesis	
1	Dr. Manisha Yadav	Evaluation of expression of extracellular signal regulated kinase-1 in oral cancer	Ongoing
2	Dr. Aadarsh Kumar Meena	Expression of FOXP3 marker in oral and oropharengeal carcinoma	Ongoing

Dr. Ruchika Gupta, Division of Cytopathology

- **MD (Obstetrics & Gynecology) Thesis**

S.No.	Name of student	Title of Thesis	
1	Dr Saloni Chadha, LNJP	Comparison of HPV16/18 genotyping and P16/Ki67 dual staining for detection of high-grade cervical lesions in patients with low-grade cervical smears	Ongoing

POST-DOCTORAL FELLOWS/ TRAINEES/ DISSERTATIONS

Dr Mausumi Bharadwaj

S. No.	Name of student	PDF/ RA	Project
1.	Dr. Pallavi Singhal	DST-N PDF	Evaluation of miR-892b, miR-500, miR-888, miR-505 and miR-711as potential therapeutic targets in the development of cervical carcinoma
2.	Dr. Sathishkumar Arumugam	ICMR-RA	Carcinogenic role of HPV-16 oncoprotein E6 and E7 on Extrinsic Apoptosis of Different Head and Neck Cancer Cells
3.	Dr. Ayaz Shahid	ICMR-PDF	Mechanism of regulation of cancer stem cell markers by Th17 cells in lung cancer: Immunotherapeutic approach
4.	Dr. Vineeta Sharma	ICMR-RA	Functional evaluation of Toll like receptors and Interleukin SNPs in association with Reproductive tract infections
5.	Dr. Manikankana Bandopadhyay	ICMR-RA	Role of hepatitis B virus genotype specific X protein (HBx) in TGF-β mediated regulation of liver inflammation in hepatocellular carcinoma: an in vitro study
6.	Dr. Shilpi Gupta	ICMR-PDF	Mechanistic insights into NF-κB interactome in HPV and/or tobacco induced tongue squamous cell carcinoma: role of mutations in shaping protein-protein interactions for identification of therapeutic targets

Dissertation Trainees under Dr. Mausumi Bharadwaj:

S. No.	Name of student	University enrolled	Duration
1.	Kavya Bisaria	Amity University	6 months
2.	Anusha Sharma	Banasthali University	6 months
3.	Rohit Pathak	IP – PG College, Bulandshar, Meerut	6 months
4.	Rani Jaiswal	ITS Paramedical College, Modi Nagar, UP	6 months
5.	Rukhsar	IILM, Gr.Noida	10 months
6.	Govind Narayanam	IILM, Gr.Noida	10 months

Summer Training: 2 Months (under Dr. M. Bharadwaj)

S. No.	Name	Name of University
1.	Jahanvi Deep	IILM, Gr.Noida, UP
2.	Shivani Rana	Krishna college
3.	Gazia Roushan	IILM,Gr. Noida, UP
4.	Pooja Chand	NIIT, Greater Noida
5.	Nidhi Rai	IILM, Noida
6.	Sufiyan Khan	IILM, Noida
7.	Meena Dangwal	ILM, Gr. Noida, UP
8.	Ayushi Sharma	Amity University
9.	Priya Yadav	Amity University

Dr. Harpreet Singh

S. No.	Name of student	Degree pursuing	University enrolled	Duration of training
1	Anjula Chauhan	B.Tech	NIIT	6 months
2	Priyam	M.C.A	Banasthalli	6 months
3	Anjali	M.C.A	Banasthalli	6 months
4	Tripti	M.C.A	Banasthalli	6 months
5	Shristi	M.C.A	Banasthalli	6 months
6	Subhadra	B.Tech	Banasthalli	6 months
7	Sonia	B.Tech	Banasthalli	6 months
8	Uma	B.Tech	Banasthalli	6 months
9	Sudipti	B.Tech	Amity University	2 months

Dr R Suresh Kumar

S. No.	Name of student	PDF/ RA	Project
1.	Dr. Narendra Singh	ICMR-PDF	Identification of novel phytochemicals for drug resistance reversal property against lung cancer stem cells
2.	Ms. Indu Kumari	DHR-WOS	Study on Reversal of Multidrug Resistance (MDR) and role of P-gp.in different cancer cell lines Using Natural Chemo preventive agent
3.	Ms. Shweta	ICMR-SRF	*In silico* analysis of CYP1A1 gene variants affecting the protein structure and stability in oral cancer

Summer trainees (under Dr. R Suresh)

S. No.	Name of student	Degree pursuing	University enrolled	Duration of training
1.	Ms.Divya Singh	BTech Biotech	Jaipur National University	6months
2.	Mr. Al Kamran Ali	MSc Biotech	Amity Institute of Biotechnology (AIB),	2 months
3.	Mr.Satendra singh	BTech Biotech	Amity Institute of Biotechnology (AIB),	2 months
4.	Ms.Apoorva Mishra,	BTech Biotech	Amity Institute of Biotechnology (AIB),	2 months
5.	Ms.Tanya Singh Bhardwaj	BTech Biotech	Amity Institute of Biotechnology (AIB),	2 months
6.	Ms.Isha Dhakad	BTech Biotech	Amity Institute of Biotechnology (AIB),	2 months
7.	Ms.Janova Anbarasai	BTech Biotech	Jaypee inst of Information Technology	2 months
8.	Ms.Shristi	BTech Biotech	Amity Institute of Biotechnology (AIB),	2 months

Dr Suresh T Hedau

	Name of student	Degree pursuing	Project/ Study title
1	Dr. Shariq Qayyum	N-PDF	Mutation, expression and proteomic studies of PIK3CA gene in triple negative breast cancer patients: Proteomics for discovery of candidate TNBC cancer biomarkers
2	Dr. Binayak Kumar	ICMR-PDF	Identify the Mechanisms Involved in Developing Resistance against Abemaciclib and Palbociclib in ER +ve, PR +ve and HER-2 –ve Breast Cancer
3	Dr. Soni Kumari	ICMR-PDF	Lysine Specific Demethylase 1 mediated regulation of metabolic stress-induced molecular signaling in Gastric cancer cells
4	Ram Krishna Sahu	ICMR-SRF	Role of HDAC1 in the regulation of BRCA1 & p16 gene expression by methyl-CpG binding protein MBD2 in breast cancer cell lines

Summer trainees under Dr. S T Hedau

S. No.	Name of student	Degree pursuing	University enrolled	Duration of training
1.	Vipul Bhardwaj	M.Sc. (Cellular & Molecular Oncology)	Amity University, Noida	2 months
2.	Ayushi Srivastava	M.Sc. (Stem Cell Science & Technology)	Amity University, Noida	2 months

Dr. Subhash Agarwal

S.No.	Name of student	Degree pursuing	University enrolled	Duration of training
1	Mr. Aayush Kumawat	B.Tech Biotechnology	Jaipur National University	6 months
2	Ms. Anamika	B.Tech Biotechnology	Jaipur National University	6 months
3	Ms. Nistha Singh	B.Tech Biotechnology	Noida Institute of Enginnering& Tech.	6 months
4	Ms. Srishti Singh			

Dr Showket Hussain

S. No.	Name of student	Degree pursuing	Project/ Study title
1	Dr. Ankita Singh	Post Doc	Charting Histone Modifications in Indian Breast Cancer Patients
2	Dr. Anamika Priyadarshini Sil	DHR Women Scientist	A molecular understanding of the role of oral contraceptives in the pathogenesis of cervical cancer
3	Dr. Banashree Bondhopadhyay	Research Associate	Comparative study of Genetic, Clinical and Epidemiological factors of Breast Cancer in Indian population
5	Dr. Isha Goel	SRF	Role of cellular Transcription Factor NF-κB and HPV in the development of esophageal carcinogenesis
6	Sandeep Sisodiya	SRF	Comparative study of Genetic, Clinical and Epidemiological factors of Breast Cancer in Indian population
7	Atul Chikara	SRF	Landscape of genomic alterations in Human Papilloma Virus Infection associated cancers-a genomics, bioinformatics and computational approach

PUBLICATIONS

1. Asthana S, Labani S, Kailash U, Sinha DN, Mehrotra R. Association of Smokeless Tobacco Use and Oral Cancer: A Systematic Global Review and Meta-Analysis. Nicotine Tob Res. 2018 May 22. doi: 10.1093/ntr/nty074. [Epub ahead of print] **IF 4.293**
2. Asthana S, Labani S, Mehrana S, Bakhshi S. Incidence of childhood leukemia and lymphoma in India. Pediatric Hematology Oncology Journal 2018 Jan 31 (online).
3. Asthana S, Labani S, Rawat D. Incidence of Urogenital Neoplasms in India. Indian J Med Paediatr Oncol 2018;39:446-51.
4. Bharali D, Banerjee BD, Bharadwaj M, Husain SA, Kar P. Expression analysis of apolipoproteins AI & AIV in hepatocellular carcinoma: A protein-based hepatocellular carcinoma-associated study. Indian J Med Res 2018; 147: 361-368. **IF 1.508**
5. Bhartiya D, Kumar A, Kaur J, Kumari S, Sharma AK, Sinha DN, Singh H, Mehrotra R. In-silico study of toxicokinetics and disease association of chemicals present in smokeless tobacco products. Regul Toxicol Pharmacol. 2018;95:8-16. **IF 2.815**
6. Chauhan SR, Bharadwaj M. Gearing up T-cell immunotherapy in cervical cancer. Curr Probl Cancer. 2018;42(2):175-188. **IF 1.609**
7. Devarapalli P, Labani S, Nagarjuna N, Panchal P, Asthana S. Barriers affecting uptake of cervical cancer screening in low and middle income countries: A systematic review. Indian J Cancer. 2018;55(4):318-326.
8. Fatima S, Agarwal SM. Unraveling structural requirements of amino-pyrimidine T790M/L858R double mutant EGFR inhibitors: 2D and 3D QSAR study. J Recept Signal TransductRes. 2018;38(4):299-306. **IF 2.20**
9. Fatima S, Gupta P, Agarwal SM. Insight into structural requirements of antiamoebic flavonoids: 3D-QSAR and G-QSAR studies. ChemBiol Drug Des. 2018;92(4):1743-1749. **IF 2.33**
10. GBD 2016 Healthcare Access and Quality Collaborators. Measuring performance on the Healthcare Access and Quality Index for 195 countries and territories andselected subnational locations: a systematic analysis from the Global Burden of Disease Study 2016. Lancet. 2018;391(10136):2236-2271. **IF 53.254**
11. GBD 2017 DALYs and HALE Collaborators. Global, regional, and national disability-adjusted life-years (DALYs) for 359 diseases and injuries and healthy life expectancy (HALE) for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2018;392(10159):1859-1922. **IF 53.254**
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13. GBD 2017 Population and Fertility Collaborators. Population and fertility by age and sex for 195 countries and territories, 1950-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2018;392(10159):1995-2051. **IF.53.254**

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56. Srivastava AN, Misra JS, Srivastava S, Das BC, Gupta S. Cervical cancer screening in rural India: Status & current concepts. Indian J Med Res. 2018;148(6):687-696. **IF 1.508**
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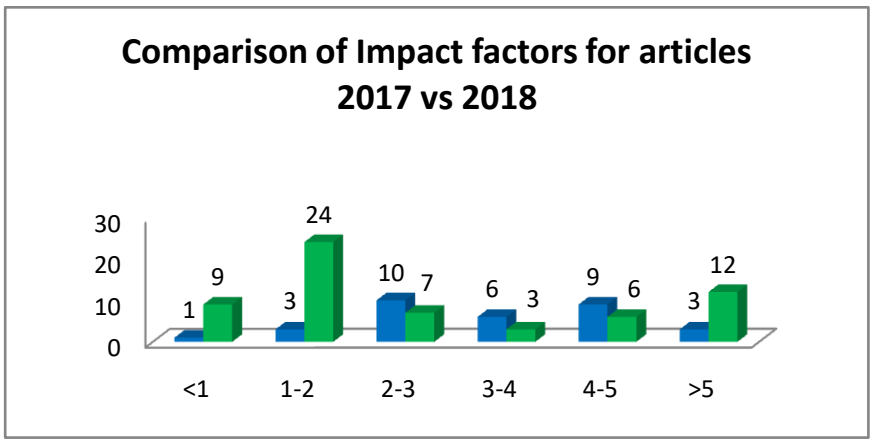

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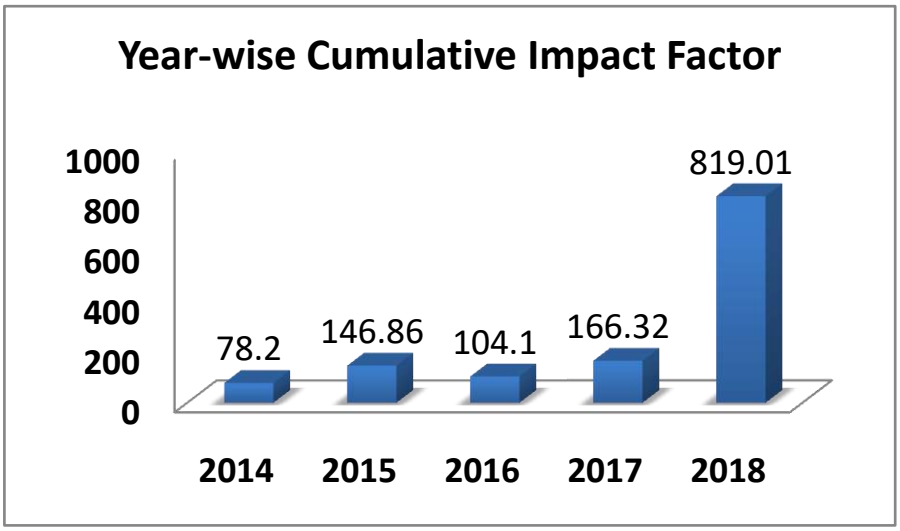
Highest Impact Factor in 2017: 44.002 (Lancet)



Books/ Chapters/Monographs

- Contributed as technical expert and internal reviewer for **'Report on Global Smokeless Tobacco Control Policies and their implementation'** released in April 2018 **(SG, RG, RM)**

- Contributed a chapter on "Introduction to cervical cancer screening" in the **Module on Screening and Management of Cervical Cancer at Secondary level**.-to be published by NHM (SG, RH, RM)

WORKSHOPS ORGANIZED

DIVISION OF EPIDEMIOLOGY AND BIOSTATISTICS

- **Protocol & Scientific Paper Writing –**
    - January 8-9, 2018
    - April 23-24, 2018
    - September 10-11, 2018

- **Bio-Statistical Analysis on SPSS & Research Paper Writing -**
    - January 8-12, 2018
    - April 23-27, 2018
    - September 10-14, 2018

- **One-month hands-on Training Course on Research Methodology & Bio-Statistical Analysis -**
    - January 1-31, 2018
    - April 1-30, 2018
    - September 1-30, 2018

- Organized workshop on "**Application of Statistical Softwares in Medical Research**" from Jan 30 to Feb 02 , 2018. A total of forty students participated.

- Organized workshop on "**Application of Statistical Softwares in Medical Research**" from August 1-3, 2018. A total of forty students participated.

DIVISION OF CYTOPATHOLOGY

- **7th Hands on Workshop on Cervical Cancer Screening for pathologists**, February 19-21, 2018 Participants: 35
- **CME on gray zones and diagnostic challenges in Breast, Thyroid, Broncho-pulmonary and cervical cytology**, June 4-5, 2018 Particpants: 50
- **8th Hands on Workshop on Cervical Cancer Screening for pathologists**, August 29-31, 2018 Particpants: 36

DIVISION OF CLINICAL ONCOLOGY

1. Cancer Screening training for medical officers in Rajasthan in association with Tata Trusts in Churu from 3-4th April 2018
   Participants: 20

2. Hands on workshop on Cervical and Breast Cancer Screening for Gynecologists from 24-26th July 2018
   Participants: 25

3. Hands on workshop on Screening for Common Cancers from 18-20th September 2018
   Participants: 30

4. Workshop on screening for common cancers for ASHAs' on 25th October 2018
   Participants: 49

5. Workshop on screening for common cancers for ANMs' on 26th October 2018
   Participants: 37

6. Cancer Screening training for medical officers in Rajasthan in association with Tata Trusts in Hanumangarh from 11-13th December 2018
   Participants: 20

7. Training for Detection of Oral, Cervical and Breast Cancer under NCD cell of Karnataka in association with Biocon Bengaluru from 5-6th December 2018
   Participants: 24 (12 Doctors: 12 Staff nurses)

8. Cancer Screening training for medical officers in Rajasthan in association with Tata Trusts in Churu from 18-20th December 2018
   Participants: 20

GLOBAL KNOWLEDGE HUB ON SMOKELESS TOBACCO

- **Stakeholders Meeting and National Consultation on Smokeless Tobacco Control**, ICMR Headquarters, July 18, 2018

- **Cancer and media: workshop for health journalists,** ICMR Headquarter, November 14, 2018

AWARDS & FELLOWSHIPS

AWARDS & FELLOWSHIPS

- Dr Subhash Agarwal received certificate for one of the most cited paper in Current genomics.

- Dr Subhash Agarwal received Outstanding Reviewer Recognition for several Elsevier Journalsincluding Gene, Genomics, Journal of Molecular Graphics and Modelling

- Dr. Ruchika Gupta received the 2nd Best Poster Prize at the 7thAnnual Conference of Delhi Chapter of IAC, organized by Army Hospital RR, 15th Sept 2018 for the poster entitled "Cervical Cytologic-histologic correlation as per ASC guidelines: a quality assurance exercise at a cancer research centre".

CONFERENCES/ WORKSHOP ATTENDED

Prof. Ravi Mehrotra

- Bloomberg Initiative to Reduce Tobacco use Grantee meeting, Cape Town, South Africa, Mar 5-6, 2018
- 17th World conference on Tobacco or Health, Cape Town, South Africa, Mar 7-9, 2018
- Knowledge Hub's meeting, Cape Town, South Africa, Mar 10, 2018
- Addressing Smokeless Tobacco and Building Research Capacity in South Asia, University of Sterling, United Kingdom, May 21-25, 2018
- Stakeholders meeting on implementation of cervical cancer screening and cervical cancer control. ICMR July 10, 2018
- Stakeholders meeting for addressing smokeless tobacco and developing research capacity in South Asia (ASTRA) and national consultation on SLT, ICMR, July 18, 2018
- Participation in meeting establishment of "NTTL", CDC, Atlanta, USA, Sept 10-14, 2018
- "World Cancer Congress 2018", Kuala Lampur,Malaysia, Oct 1-4, 2018
- "BHGI Global Summit of International Breast Health and Cancer Control", Washington, USA, Oct 15-18, 2018
- "2nd Expert Meeting for Evaluation of India Against Cancer" website, NICPR, Oct 23, 2018
- Workshop on Prevention of Cervical Cancer, World Trade Centre, Mumbai, Oct 29, 2018
- Cancer and Media workshop for health journalists, ICMR, Nov 14, 2018
- 27th National conference of Indian Association of Oral & Maxilofacial Pathologists, Amritsar, Punjab, Nov 16-18, 2018
- 66th Annual Conference of the Indian Association of Pathologists & Microbiologists, Bareilly, U.P., Dec 1, 2018

Symposium: Cytology of body fluids

- “Cancer Prevention and use technologies to improve its efficiency”, Cochin Cancer Research Centre, Kerala, Dec 7, 2018

Dr. Satyanarayana

- Invited as Faculty for workshop on "Biostatistics and Research Methodology" during the International Conference JCON 4, February 26-28, 2018 at Aligarh
- Attended workshop on Population Based Cancer Registry, National Centre for Disease Informatics and Research (NCDIR), Bengaluru, March 26, 2018
- Attended a one-day workshop on Cancer Registration organized by Delhi Cancer Registry in collaboration with NCDIR, Bangalore at AIIMS, May 2, 2018
- Attended Symposium on the topic of "Data Collection & Summarization and Analysis & interpretation of data" for promoting research among dental and medical students at ESIC Dental College and Hospital, New Delhi May 18, 2018
- Invited as faculty on the Annual Hardinge Conference – Medicus Conventus 2018 at Lady Hardinge College, New Delhi, June 16, 2018
- Conducted workshop on "Applied Research Methodology & Biostatistics for medical Professionals" at Shri Shankaracharya College of Nursing, Bhilai, July 12-14, 2018.
- Invited to North India Pediatric Oncology Forum at Max Hospital, Saket, August 25, 2018.

Dr. Sanjay Gupta

- Workshop on Ethics and Good Clinical Practices at NICPR, Jan 8, 2018
- 7th Hands on Training Workshop on cervical cancer screening for pathologists, NICPR, Feb 19-21, 2018
  Lectures: Screening Recommendations for cervical cancer
  Squamous epithelial cell abnormalities of cervix
- CME on Cervical Cytology and HPV organized by NAPM, May 5, 2018 at Fortis hospital Noida
  Lecture: Conventional versus Liquid based Cytology
- NICPR-ECHO training program on cancer screening for beginners, NICPR, May 22, 2018
  Talk: Introduction to cancer screening
- CME on gray zones and diagnostic challenges in Breast, Thyroid, Broncho-pulmonary and cervical cytology. June 4-5, 2018
  Talk: Patterns and pitfalls in squamous epithelial cell lesion of cervix
- Stakeholders meeting on implementation of cervical cancer screening and cervical cancer control. ICMR July 10, 2018
- Stakeholders meeting for addressing smokeless tobacco and developing research capacity in South

Asia (ASTRA) and national consultation on SLT, ICMR, July 18, 2018

- Workshop on cervical and breast cancer screening for Gynecologists, NICPR, July 22-24, 2018
  Talk: Cervical cytology and interpretation of Pap smear results

- 8th Hands on Training Workshop on cervical cancer screening for the pathologists. NICPR, Aug 29-31, 2018
  Lectures: Screening Recommendations for cervical cancer
  Cytology of Squamous epithelial cell abnormalities of cervix

- Bio-Statistical Analysis on SPSS & Research Paper Writing, NICPR, Sept 10-14, 2018
  Lecture: Writing a research paper for a Biomedical journal

- 7th Annual Conference of Delhi Chapter of IAC, organized by Army Hospital RR, Sept 15, 2018
  Paper presented: Cervical Cytologic-histologic correlation as per ASC guidelines: a quality assurance exercise at a cancer research centre.

- 'Hands-on workshop on Screening for common cancers' NICPR, Sept 18-20, 2018
  Talk: Cervical cytology- Interpretation of Pap smear results.

- "2nd Expert Meeting for Evaluation of India Against Cancer" website, NICPR, Oct 23, 2018

- Cancer and Media workshop for health journalists, ICMR, Nov 14, 2018

- NICPR-ECHO advanced training program on cancer screening for medical officers
  Talk: Cervical cancer screening strategies

- Evidence to policy lecture and Symposium on Women cancers, organized by The George Institute of Global Health, Dec 10, 2019, India Habitat Centre
  Panelist in Panel Discussion on women cancers.

- PATHCON and Lab Expo, New Delhi, Dec 15-16, 2018
  Conducted Workshop on LBC and HPV
  Invited as Judge for Poster session

Dr. Shashi Sharma

- 37th IACR Conference at Bose Institute, Kolkata from February 23-25, 2018.

- 36th Annual Conference of Indian Society for Medical Statistics (ISMSCON-2018), NIMHANS, Bengaluru, November 1-3, 2018

Dr. Mausumi Bharadwaj

- 37th IACR Convention-2018, Kolkata, February 23-25, 2018
- Chitkara University, June 28-30, 2018, Chandigarh, Punjab.
- Converting Research into Value through Technology Transfer and Commercialization Workshop sponsored by ICMR-FICCI, held at Goa, November 11-16, 2018
- Role of Probiotics in Promoting Healthy Microbiome For Health and Immunity, Le Meridian, New Delhi, December 6, 2018

Dr.Smita Asthana

- Invited as Faculty for workshop on "Biostatistics and Research Methodology" during the International Conference JCON 4, February 26-28, 2018 at Aligarh
- Attended workshop on Population Based Cancer Registry, National Centre for Disease Informatics and Research (NCDIR), Bengaluru, March 26, 2018
- Attended a one-day workshop on Cancer Registration organized by Delhi Cancer Registry in collaboration with NCDIR, Bangalore at AIIMS, May 2, 2018
- Attended Symposium on the topic of "Data Collection & Summarization and Analysis & interpretation of data" for promoting research among dental and medical students at ESIC Dental College and Hospital, New Delhi May 18, 2018
- Invited as faculty on the Annual Hardinge Conference – Medicus Conventus 2018 at Lady Hardinge College, New Delhi, June 16, 2018
- Conducted workshop on "Applied Research Methodology & Biostatistics for medical Professionals" at Shri Shankaracharya College of Nursing, Bhilai, July 12-14, 2018.
- Invited to North India Pediatric Oncology Forum at Max Hospital, Saket, August 25, 2018.

Dr Subhash Agarwal

- 37th Annual Conference of Indian Association of Cancer Research, Kolkata. Feburary 23-25, 2018.
- Invited lecture: Bioinformatics and its role in drug designing. Jaipur National University, Jaipur. September 17, 2018

Dr R Suresh Kumar

- Lecture on "Essentials of Research Protocol Development & requirement of Funding Agency (ICMR, DST, DBT etc)" in Bio-Statistical analysis on SPSS and Research paper writing, NICPR, January 8, 2018.

- Lecture on "Writing Results and Discussions for Bio-Medical students" in Bio-Statistical analysis on SPSS and Research paper writing, NICPR, January 12, 2018.

- Lecture on "Essentials of Research Protocol Development & requirement of Funding Agency (ICMR, DST, DBT etc)" in Bio-Statistical analysis on SPSS and Research paper writing, NICPR, April 25, 2018.

- Lecture on "Writing Results and Discussions for Bio-Medical students" in Bio-Statistical analysis on SPSS and Research paper writing, NICPR, April 26, 2018.

- Lecture on "Essentials of Research Protocol Development & requirement of Funding Agency (ICMR, DST, DBT etc)" in Bio-Statistical analysis on SPSS and Research paper writing, NICPR, September 10, 2018.

- Lecture on "Writing Results and Discussions for Bio-Medical students" in Bio-Statistical analysis on SPSS and Research paper writing, NICPR, September 14, 2018.

- Lecture on "Role of Epigenetics in Cancer" in 2nd National Workshop Cum Hands-on-Training on Advance Techniques in Molecular Biology, Medical Biotechnology, Industrial Microbiology and Bioinformatics, Amity University, Gwalior, October 10-16, 2018.

- Lecture on "Role of Epigenetics in Cancer" in Emerging Trends in Non-Communicable Diseases: Road to Prevention and Cure, November 17, 2018.

Dr. Suresh Hedau

- Role of methyl-CpG binding protein MBD2 in BRCA1 and p16 gene expression in MCF-7 breast cancer cell line" at International Conference on Cell Death in Cancer and Toxicology, King George's Medical University, Lucknow, February 20-22, 2018.

- Effect of Reactive Oxygen species in BRCA1 and p16 gene expression and its modulation by curcumin in MCF-7 breast cancer cell line". 37th Indian Association for Cancer Research Convention was held at Bose Institute, Unified Academic Campus, Salt Lake, Kolkata, February 23- 25, 2018.

Dr. Roopa Hariprasad

- Workshop on "Research Ethics and Good Clinical Practice" by ICMR Bioethics Unit, National Center for Disease Informatics and Research (NCDIR), Bengaluru, January 9, 2018.
- Expert Group Meeting on Screening Programme on NCD, Nirman Bhawan, January 12, 2018
- Capacity Building meeting for Screening of Common Cancers at Primary and Secondary level, organized by NHSRC, February 22, 2018
- National congress on Cervical cancer organised by Assocham in association with NICPR, February 2018
- Executive Committee meeting of Indian Society of Colposcopy and Cervical Pathology (ISCCP), MAMC, Feb 28, 2018
- CME cum Workshop on "Cervical lesions and management guidelines", Department of Obstetrics and Gynecology, Hamdard Institute of Medical Sciences, April 10, 2018
- AICC-RCOG-NZ Comprehensive Colposcopy Workshop, Sant Parmanand Hospital, May 27-28, 2018.
- FOGSI International Women's Health Summit, Leela Ambience Gurgaon Hotel, June 1-3, 2018.
- Stakeholders meeting on cervical cancer control, ICMR Hqrs, July 10, 2018.
- Meeting to review the progress of IT system developed for population based screening of NCDs, Nirman Bhawan, June 29, 2018.
- Orientation meeting organized by ECHO Institute, Surya Hotel, July 4-6, 2018
- Training workshops for Training of ASHA Trainers orientation meeting organized by NHSRC at NIHFW, July 23-28, 2018.
- World Cancer Congress 2018, Kuala Lumpur, Malaysia, October 1-4, 2018
- Workshop on prevention of cervical cancer organised by the "TATA TRUSTs" in Mumbai, Oct 29, 2018
- External review meeting in field appraisal of Community Empowerment Lab in Lucknow organized by NHSRC, November 2, 2018.
- Comprehensive Colposcopy Course with Hands-On LEEP Workshop at 32nd AICC RCOG Annual conference held at Vardhmaan Mahaveer Medical College & Safdarjung Hospital, November 5, 2018

Dr. Kavitha Dhanasekaran

- National congress on Cervical cancer organised by Assocham in association with NICPR, February 2018
- 13th National ISCCP conference in Bengaluru, March 10-11, 2018
- CHW training session of the ECHO India Immersion training, July 6, 2018
- Workshop on prevention of cervical cancer organised by the "TATA TRUSTs" in Mumbai, Oct 29, 2018
- CICAMS-IARC Joint Training Course on 'Planning & Implementing Cancer Control Programs', Nanning, Guangxi Province of China, November 5-9, 2018
- Workshop on Ethics organised by PHFI in Gurugram, December 17-19, 2018

Dr. Showket Hussain

- Participated in National Post Doctoral Symposium held at CCMB, Hyderabad (Nov 2018) and gave a chalk talk and poster presentation – MRAS and FOXA1 are epigenetically regulated in Breast Cancer

Dr Ruchika Gupta

- Workshop on Research Ethics and Good Clinical Practice, ICMR-NICPR, January 9, 2018
- Induction-cum-Laboratory Training Program, NTTL, ICMR-NICPR, January 29 – February 1, 2018
- CME on Pulmonary Cytology, Sir Ganga Ram Hospital, February 3, 2018
- 2nd National Conclave on Virtual Teaching, AIIMS, New Delhi, February 8-9, 2018
- 7th Hands on Training Workshop on cervical cancer screening for pathologists, NICPR, Feb 19-21, 2018
  Lectures: Uniform approach to reporting cervico-vaginal smears
  Emerging biomarkers in cervical cancer screening
- Co-author in posters presented at the 17th World Conference on Tobacco Or Health, Cape Town, March 2018
  - Global policy progress in Article 20 of World Health Organization's Framework Convention on Tobacco Control (WHO FCTC) on Smokeless Tobacco (SLT)
  - Network analysis to detect gaps in research on smokeless tobacco: implications for future policy

- Symposium on 'Biomedical Communication and Menace of Predatory Journals: Lesson for Scientists', ICMR Headquarters, March 27, 2018

- CME on Gynecologic Cytology organized by the Noida Association of Pathologists and Microbiologists, Fortis Hospital, May 5, 2018
  Invited Lecture: HPV testing in cervical cancer screening

- CME on gray zones and diagnostic challenges in Breast, Thyroid, Broncho-pulmonary and cervical cytology. June 4-5, 2018
  Talk: Diagnostic pitfalls in glandular lesions of the cervix

- Stakeholders' meeting and National Consultation on Smokeless Tobacco Control, ICMR Headquarters, July 18, 2018

- 8th Hands on Training Workshop on cervical cancer screening for pathologists, NICPR, August 29-31, 2018
  Lectures: Uniform approach to reporting cervico-vaginal smears
  Emerging biomarkers in cervical cancer screening

- VIIIth Annual Conference of the Delhi Chaperter of Indian Academy of Cytologists, Manekshaw Centre, New Delhi, September 15, 2018
  Poster presented: Cervical cytology-histology correlation as per ASC guidelines: A quality assurance exercise at cancer research centre. (Awarded 2nd Best Poster Prize)

- Co-author in a poster presented at the Annual Conference of the Indian Academy of Cytologists, Goa, Nov 1-3, 2018
  Aspiration Cytology findings of Riedel's thyroiditis: A rare diagnosis

- Workshop on "Cancer and Media: Workshop for Health Journalists", ICMR Headquarters, Nov 14, 2018

- Crisis Communication Training Workshop, ICMR-NIOP, New Delhi, November 29-30, 2018

- Evidence to policy lecture and Symposium on Women cancers, organized by The George Institute of Global health Dec 10, 2019, India Habitat Centre

- PATHCON & LAB EXPO 2018, The Lalit, New Delhi, December 15-16, 2018

Ms Sarita Sardana

- 37th IACR Conference at Bose Institute, Kolkata from February 23-25, 2018.

- 36th Annual Conference of Indian Society for Medical Statistics (ISMSCON-2018), NIMHANS, Bengaluru, November 1-3, 2018

EVENTS ORGANIZED

Visit by Sri Lankan delegation- orientation on Screening for Oral Potentially Malignant Disorders/ Oral Cancers and KH-SLT activities, Dec 7, 2018

Cancer and Media: Workshop for Health Journalists organized by ICMR-NICPR and WHO FCTC Global Knowledge Hub on Smokeless Tobacco on November 14, 2018

Workshop on screening for common cancers for ANMs, October 26, 2018 and ASHAs, October 25, 2018

8th Hands-on Workshop on Cervical Cancer Screening for Pathologists organized by Division of Cytopathology, ICMR-NICPR, August 29-31, 2018

Independence Day celebration at ICMR-NICPR, August 15, 2018

Application of Statistical Softwares in Medical Research, organized by Division of Epidemiology and Biostatistics, ICMR-NICPR, August 1-3, 2018

Hands on workshop on Cervical and Breast Cancer Screening for Gynecologists, July 24-26, 2018

Observance of International Yoga Day, June 21, 2018

CME on Gray Zones and Recent Updates in Breast, Thyroid, Bronchopulmonary and Cervical Cytology, ICMR-NICPR, June 4-5, 2018

Release of World No Tobacco Day Posters and Infocan Magazine on the occasion of World no tobacco day, May 31, 2018

Inauguration of National Tobacco Testing Laboratory at ICMR-NICPR, May 31, 2018

Student awareness on cancer program for a group of students from Khaitan School, Noida, ICMR-NICPR, May 18, 2018

Release of book titled "Global Smokeless Tobacco Control Policies and their implementation", ICMR-NICPR, April 25, 2018

SWACH BHARAT ABHYAAN, April 9, 2018

International Women's Day celebration, March 8, 2018

7th Hands-on Workshop on Cervical Cancer Screening for Pathologists, February 19-21, 2018

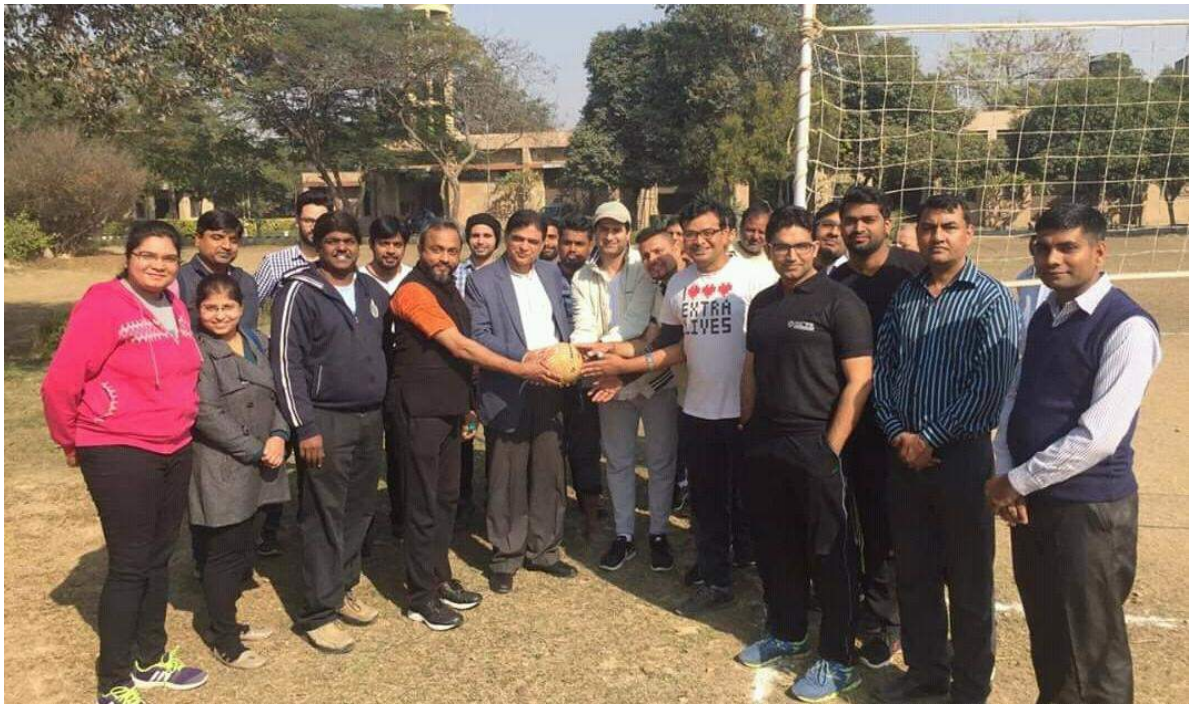
Can support Walk for Life, Februrary 4, 2018

First Induction-cum-training workshop for NTTLs' staff, January 29-February 1, 2018

Republic Day celebration, January 26, 2018

Annual Day celebration of ICMR-NICPR, January 19, 2018

Sports meet on Annual Day of ICMR-NICPR, January 19, 2018



ICMR-NICPR STAFF

(AS ON MARCH 31, 2019)

SCIENTIFIC STAFF

	NAME	DESIGNATION
1.	Prof. Ravi Mehrotra	Director
2.	Dr. L. Satyanarayana	Scientist –G
3.	Dr. Sanjay Gupta	Scientist –G
4.	Dr. Shashi Sharma	Scientist –G
5.	Dr. Mausumi Bharadwaj	Scientist –G
6.	Dr. Smita Asthana	Scientist –E
7.	Dr. Subhash M. Agarwal	Scientist –E
8.	Dr. R. Suresh Kumar	Scientist –E
9.	Dr. Roopa Hariprasad	Scientist –E
10.	Dr. Suresh T. Hedau	Scientist –E
11.	Dr. Raj Narain	Scientist –D
12.	Dr. Kavitha Dhanasekaran	Scientist –D
13.	Dr. Aditya Parashari	Scientist –D
14.	Dr. Prashant Kumar Singh	Scientist – D
15.	Dr. Showket Hussain	Scientist –D
16.	Dr. Malasha Kumari	Scientist –C
17.	Dr. Ruchika Gupta	Scientist - C
18.	Dr. Ravi Kaushik	Scientist –C (resigned wef Feb 2019)
19.	Ms. Sarita Sardana	Scientist –B
20.	Dr. Anuj Kumar	Scientist – B
21.	Dr. Dinesh Kumar	Scientist - B

NON- SCIENTIFIC STAFF

	DIRECTOR'S OFFICE	
1.	Mr. Sanjeev Kumar	Private Secretary
2.	Mr. Kunjoomon PV	LDC (ad-hoc)
	ADMINISTRATIVE STAFF	
3.	Mr. Rajesh Sharma	Admn Officer
4.	Mr. Kumar Gautam	Accounts Officer
5.	Mr. Dalipa Ram	Section Officer (Store)
6.	Mr. Mohanan T.	Section Officer
7.	Mrs. Chanderkanta Sharma	Assistant
8.	Mr. Ashok Kumar	Assistant
9.	Mr. Monu Sharma	Assistant
10.	Mr. Vijay	Assistant
11.	Mr. Harsh Agnihotri	Assistant
12.	Mrs. Krishna Magoo	Personal Assistant
13.	Mr. Ramesh Kumar	UDC
14.	Mr. Sant Ram	UDC
15.	Mr. Avinash Malhotra	UDC
16.	Mr. Siddarth Yadav	UDC
17.	Mr. Neha Kaushik	LDC
18.	Mr. Roopchand	MTS (Gen)
19.	Mr. Rajesh Solanki	MTS (Gen)
20.	Mr. Jai Prakash	MTS (Gen)
21.	Mr. Mohinder Singh	MTS (Gen.)
22.	Mrs. Anoop Devi	MTS (Gen.)

	TECHNICAL STAFF	
9.	Mrs. Latha Sriram	Principal Technical Officer
10.	Dr. Anita Sharma	Sr. Technical Officer
11.	Dr. Pragya Sharma	Sr. Technical Officer
12.	Mrs.Rajshree	Technical Officer-C
13.	Mr. C.V. Joshi	Technical Officer-C
14.	Dr. (Mrs) Uma Kailash	Sr. Technician-1 (transfer to NIN, Hyderabad, Feb 2019)
15.	Dr. Nisha Thakur	Technical Officer-B
16.	Mrs. Amita	Technical Officer-B
17.	Mrs. Reena Diwedi	Technical Officer-B
18.	Mrs. Chandresh Verma	Technical Officer-B
19.	Ms. Pushpa Bhadola	Technical Officer-A
20.	Mr. Himanshu Rohilla	TO-A– AE (ES)
21.	Mr. Deep Kumar	Technical Officer-A
22.	Mr. Akhileshwar Sharda	Technical Officer-A
23.	Mr. Dinesh Kumar	Technical Officer-A
24.	Mr. Bishan Singh	Technician-C
25.	Mr. Bhopal Singh	Technician-C
26.	Mr. Daniel Das	Lab Assistant-1
27.	Mrs. Asha Rani	Lab Assistant-1
28.	Mr. D. K. Roy	MTS (LT)
29.	Mr. Brij Pal	MTS (LT)
30.	Mr. Ram Prakash	Sr. Technician-3
31.	Mr. Adarsh Kumar	Driver
32.	Mr. Kailash Kumawat	Driver
33.	Mr. Tarachand Gurjar	Driver
34.	Mr. Dheeraj Rajaura	Driver

SUPERANNUATED TECHNICAL & ADMN STAFF

Mr. Ram Bhajan – January 2018

Mrs. Kavita Magon – April 2018

Mrs. Satvinder Kaur – August 2018

Mr. Kishan K. Sharma – December 2018

Mr. R. Manjhi – February 2019

LIST OF SAC MEMBERS

Prof. Maqsood Siddiqi, Chairperson **Chairman MC and Managing Director** **Cancer Foundation of India** **1120, Tagore Park** **Tiljala, Kolkata-700 039** **West Bengal.**
Dr R Sankarnarayanan Advisor, Reserch Trinagle International 43, Padma Nabha Nagar, Airport Road, Coimbatore - 641014
Dr. Shubada V Chiplunkar Director, Advanced Centre for Treatment, Research and Education in Cancer (ACTREC) Tata Memorial Centre, Mumbai
Prof. Abraham Peedicayil Department of Gynaecologic Oncology Christian Medical College & Hospital Vellore, Tamil Nadu
Dr. P.C. Gupta Healis Sekhsaria Institute for Public Health 601/B Great Eastern Chambers Plot No.28, Sector 11 CBD Belapur Navi Mumbai-400 014
Dr. Suneela Garg Director Professor & Head, Department of Community Medicine Maulana Azad Medical College and associated hospitals New Delhi - 110002
Dr. Shyama Jain Director Professor, Department of Pathology Maulana Azad Medical College New Delhi - 110002
Dr. RS Dhaliwal **Scientist- G and Head** **NCD** **Indian Council of Medical Research** **Ansari Nagar** **New Delhi-110 029.**
Member Secretary - Prof. Ravi Mehrotra Director ICMR-NICPR, I-7, Sector 39, NOIDA.

DIVISIONS AT NICPR

DIVISION OF EPIDEMIOLOGY & BIOSTATISTICS

From Left to Right: Mr. Shailendra Gupta, Dr. Raj Narain, Dr. L. Satyanarayan, Prof. Ravi Mehrotra, Ms. Sarita Sardana, Dr. Smita Asthana, Dr. Shashi Sharma

DIVISION OF CYTOPATHOLOGY

From Left to Right: Mr. Dinesh, Mr. Akhileshawar Sharda, Mr. Ravi Kumar, Dr. Ruchika Gupta, Prof. Ravi Mehrotra, Dr. Sanjay Gupta, Mr. Bhopal Singh, Mr. Daniel, Mr. Sandeep

DIVISION OF CLINICAL ONCOLOGY

From Left to Right, Standing: Mrs. Rajshree, Dr. Roshni Babu, Mrs. Lata Sriram, Dr. Ashwini, Mrs. Amita, Dr. Kavitha Dhanasekaran, Dr. Roopa Hariprasad, Mrs. Chandresh Verma, Mr. Vipin Kumar, Mrs. Reena Diwedi, Mrs. Asha Rani, Dr. Amrita, Dr. Suzanne T. Nethan
Sitting, left to right: Mrs. Preeti, Mrs. Tanuja, Ms. Priya, Ms. Pratibha, Ms. Sunita

DIVISION OF BIOINFORMATICS

From Left to Right: Dr. Subhash M Agarwal, Ms. Shehnaz Fatima

DIVISION OF PREVENTIVE ONCOLOGY

From Left to Right: Dr. Ravi Kaushik, Dr. Vishwas Sharma, Dr. Richa Tripathi, Prof. Ravi Mehrotra, Dr. Prashant Singh, Dr. Alpana K Gupta, Dr. Sonam Tulsyan, Dr. Gaurav Verma

GLOBAL KNOWLEDGE HUB ON SMOKELESS TOBCCO

Left to right, Standing: Mr. Kumar Chandan, Dr. Priyanka Ravi, Dr. Amit Kumar, Dr. Suzanne T. Nethan
Sitting: Ms. Anshika Chandra, Dr. Shekhar Grover, Dr. Dhirendra Sinha, Prof. Ravi Mehrotra, Dr. Amit Yadav, Ms. Harleen Kaur

MOLECULAR BIOLOGY GROUP

Upper left: Left to right - Mr. Rajeshwar Patle, Ms. Vineeta Sharma, Dr. Pallavi Singhal, Dr. Shilpi Gupta, Dr. Mausumi Bhardwaj, Ms. Upma Sharma, Dr. Manikankana Bandopadhyay, Mohd Mabood Khan, Dr. Satish Kumar Arumugam
Upper right: Left to right - Dr. Narendra Singh, Ms. P Sweta, Mrs. Indu Kumari, Dr. R. Suresh Kumar
Lower left: Left to right - Mr. Ram Krishna Sahu, Dr. Binayak Kumar, Dr. Suresh T Hedau, Dr. Soni Kumari
Lower Right: Left to right – Mr. Atul Chikara, Mr. Sandeep Sisodiya, Mr. Sheeraz Un Nazir, Dr. Showket Hussain, Dr. Ankita Singh, Dr. Anamika Priyadarshini Sil, Dr. Banashree Bondhopadhyay

DATA MANAGEMENT LABORATORY

Left to right: Mr. Harish Buttolia, Dr. Suyash Agarwal, Ms. Jasmine Kaur, Ms. Neetu Tyagi, Dr. Amit Singh, Mr. Vinit Kumar, Mr. Vedvrat Verma, Mr. Ajay Singh Dhama

ADMINISTRATION

From Left to Right, Standing: Mr. Ramesh, Mr. Deep, Mr Vijay, Mr. Radha Krishna, Mr. Avinash, Mr. Roop Chand, Mr. Santosh, Mr. Rajesh Solanki, Mr. Ashok Kumar, Mr. Mohanan T, Mr. Mohinder, Ms. Neha Kaushik, Mrs. Anoop Devi
Sitting: Mrs. Alice Mathew, Mr. Rajesh Sharma

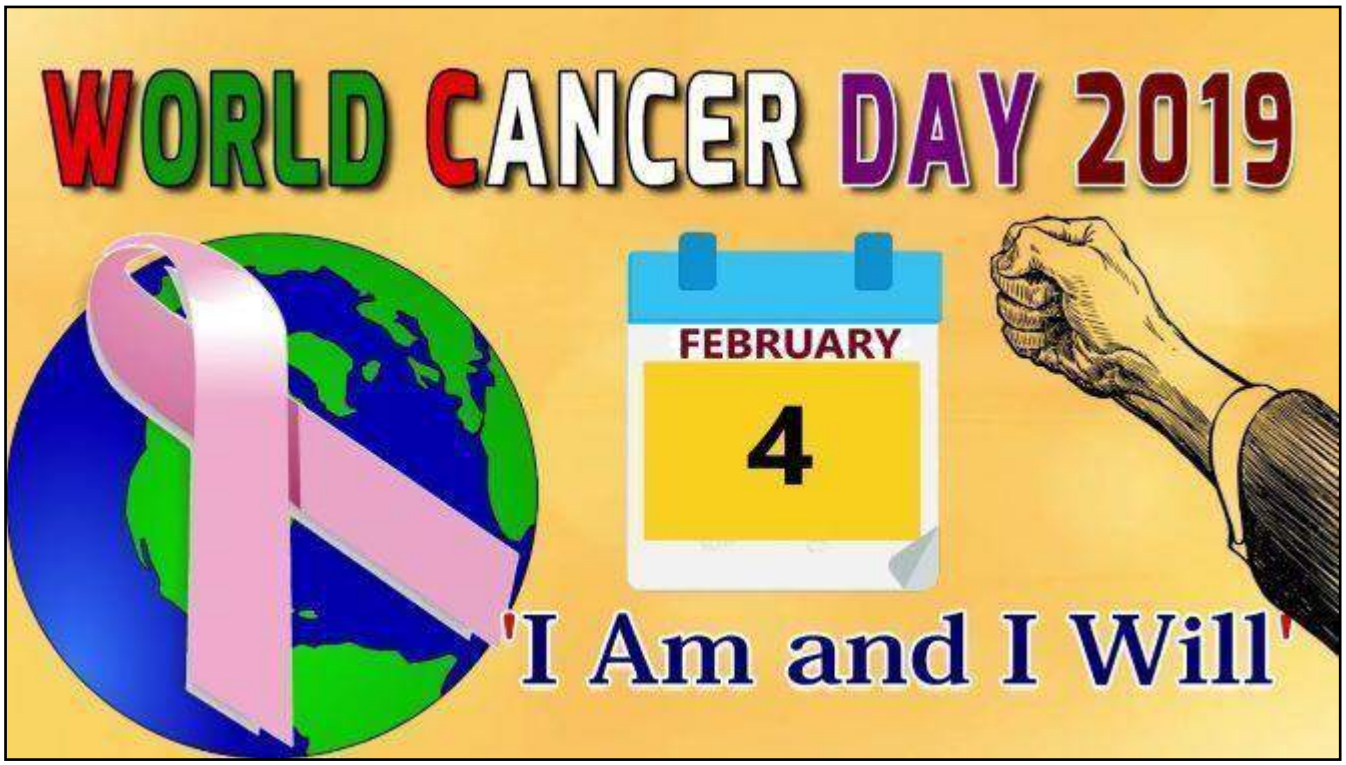
STORE SECTION

From Left to Right, Standing: Mr. Bhagwati Prasad, Mr Naveen, Mr. Sant Ram, Ms Jyoti Karke, Mr. Dalipa Ram, Mr. Harsh, Mr. Deepak
Sitting: Mr. Kumar Gautam, Mr. Rajesh Sharma

ACCOUNTS SECTION

Standing From Left to Right): Mr. Vipin Kumar, Mr. Monu, Mr. Siddarth, Mr. Sanjeev, Mr. Kumar Gautam, Mrs. Kusum Soni, Ms. Geetika, Mr. Jai Prakash, Mr. Akash
Sitting: Mrs. Chandrakanta Sharma, Mrs. Jaishree Nathani

TEAM ICMR-NICPR


WORLD CANCER DAY 2019
FEBRUARY
4
'I Am and I Will'

ICMR-National Institute of Cancer Prevention & Research
An Autonomous Institution of Ministry of Health & Family Welfare, Government of India
I-7, Sector-39, NOIDA, Uttar Pradesh – 201301, INDIA
Phone: +91-120-2446900, FAX: +91-120-2579473
www.nicpr.res.in