NEWSLETTER

October 1986

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NEWSLETTER

Contents

Editorial

Dear friends,

Your letters of appreciation received in response to the previous issue of I. A. C. Newsletter, my maiden venture, made me feel elated and now I proudly present to you this issue.

As mentioned earlier, I am introducing two new items from this edition onwards. One is " Invited Article" and secondly " Spot the diagnosis". There has been a good response from the members to contribute for these columns in the Newsletter. If you have come across an interesting slide, please send a black and white photograph taken from a representative area along with short history.

Members are most welcome to write me, if they have any constructive suggestions for further improvement of our Newsletter.

I thank our Secretary Dr. Kusum Verma and past President Dr. Usha Saraiya and other office bearers for their constant guidance rendered to me.

Dr. Prakash V. Patil.

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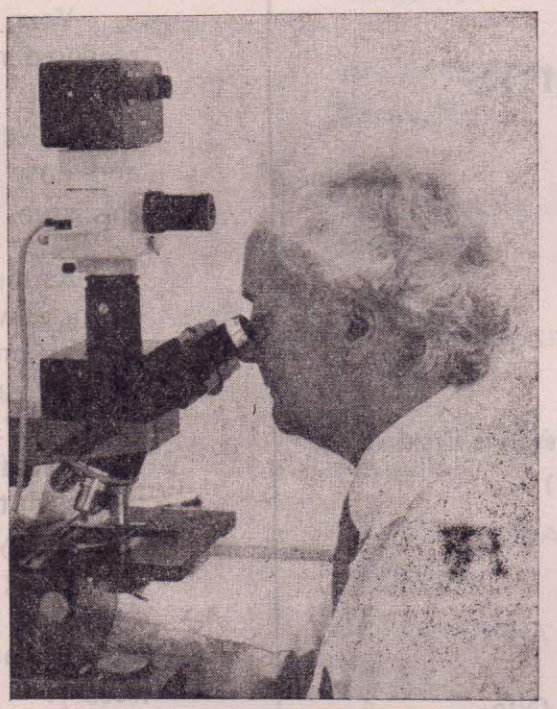
Our Guest



Dr. Robert Yule, M.B , Ch.B. (With Honours) Edin.
F.R.C.S. (Edin), M.R.C.O.G., F.R.C.O.G.

Dr. Robert Yule describes himself as a 'renegade gynaecologist'. After national service in north–west Africa, he specialized in gynaecology in Scotland. There after a 'consuming interest' in the cervix led him into cytopathology and he now runs what he believes to be the largest cytology laboratory in Europe, employ–ing over 100 women and doing over 250,000 tests a year, at the Christie Hospital & Holat Radium Institute In 1969 he was formally appointed Hon. Lecturer in Pathology at Manchester University and in addition to training the technical staff in cytology screening he takes part in the Regional Cytology Training courses held in Manchester. His lecturing experience is consider-able and he enjoys lecturing to students, nurses, medical practitioners and increasingly, to the lay-public.

From Organizing Secretary's Desk
(XVI Annual I.A.C. Conference)

The XVI annual conference of the Indian Academy of Cytologists will be held on 29th and 30th October 1986, preceeded on 28th by a pre-conference workshop on 'Fine Needle aspiration cytology of thyroid.' It will be conducted by Dr. Mohini Nayar, assisted by cytologists from various parts of India. The Academy Oration by Dr. Sneh Lata Mittal will be on "The Role of Cytology in the diagnosis of Head and Neck lesions." The highlights of the conference will be the symposium on Colposcopy which will be conducted by Dr. Usha Saraiya and Diagnostic slide seminar to be conducted by Dr. K. R. Harilal. Guest lecture will be delivered by Dr. R. Yule, consultant Cytopathologist, Christie Hospital, Manchester. The Nalini Bai Thakkar prize and Jwala Devi prize are awarded for the best papers presented. This I hope will motivate more junior members and cytotechnologists to participate.

The Scientific session will provide opportunities for all those who wish to present their papers.

The organisers wish to make this conference a great success and we hope your stay at Pondicherry will be pleasant and memorable.

— Dr. VANAJA SANKARAN
Pondicherry

Announcements

I **From Secretary, I.A.C., Dr. Kusum Verma, Dept. of Pathology, A.I.I.M.S., New Delhi :-**

1. Life members of I.A.C., who have not received their life member certificates, may write to Secretary. They should send a self addressed envelope, size 10" x 9" with stamps worth Rs. 1=60 to the Secretary's office Life membership certificates will then be sent to these members.
2. Membership Roster of I.A.C. Members has been brought out and was distributed to members. Those members who have not received their copies, may write to Secretary with a 13" x 9" size self addressed envelope with stamps worth Rs. 3=80 for their copy.

II **From Chairperson, Committee for Accreditation and Examination, Dr. Usha K. Luthra, Sr. Dy. Director General and Director, Cytology Research Centre, I.C M.R., New Delhi :-**

The Indian Academy of Cytologists is planning to conduct an examination for cytotechnicians on October 20th, 1986 in New Delhi. Application forms have been sent to all institutions. They may be obtained from Chairperson. Duly filled applications must reach Dr Kusum Verma, Convenor, Examination Committee, before 26th Sept. 1986.

INVITED ARTICLE

Human Cytogentics Present Status and Future Prospects

Dr. Sukta Das

Head, Department of Experimental Leukaemia, Chittaranjan National Cancer Research Centre, Calcutta.

The discovery of Tjio and Levan[1] in 1956, that human chromosome number is 46, and not 48 as believed earlier, may be considered as the beginning of modern human cytogenetics. This was followed by a series of spectacular developments, which have enabled the scientists of today to think in terms of genetic engineering.

Hsu[2] while tracing the history of human cytogenetics, described four eras —

1) The dark ages (prior to 1952)
2) The hypotonic period (1952-1958)
3) The trisomy period (1959-1969) and
4) The chromosome banding era (1970-todate)

To these may be added, the prophase or high resolution banding era, which has opened up new avenues in human cytogenetics[3].

Throughout these periods a gradual progress was made in the development of techniques for visualization and characterization of the chromosomes along with an understanding of the function and behaviour of the chromosomes. The extent of expansion of this branch of science in about 30 years seems miraculous. Earlier, most of the cytogenetical studies were in plants, insects and animal. Today, man is perhaps the most extensively studied organism.

The first autosomal trisomy was described by Lejeune et al[4], which was found to be the cause of a congenital defect in man known as Mongolism or Down's syndrome. The following year, Patau's syndrome[5] and Edward's syndrome[6] were described. These studies formed the basis of detection of human congenital defects by chromosomal analysis.

One of the yery important outcome of cytogenetic studies was the single active hypothesis of Lyon[7], according to which one of the X-chromosomes in the mammalian female cell is i activated. In cases where a cell has more than one X-chromosome all but one is inactivated. The inactivated X-chromosomes can be visualized as the Barr-body which is helpful in detecting certain sex-anomalies in man.

Since Boveri Theodor[8] advanced the theory that mutation in genetic constitution of cells, particularly in chromosomes, may explain the change from normal to malignant status, much interest has been generated for the study of chromosomal changes in cancer. To date, the most characteristic and consistent karyotypic change observed in human cancer is the Philadelphia chromosome described in chronic myelogenous leukaemia[9]. The list of chromosome aberrations, specific for specific types of cancers is growing continuously. Observations on nonbanded chromosomes have been replaced to a large extent by studies on variously banded chromo somes. Over 2000 bands have been delineated in the chromosomes of a cell and such bands are also being studied in different forms of leukaemia, lymphoma and other solid tumours [10] [11] & [12]. There is little doubt that the future of cytogenetics in cancer, particularly leukaemias, resides in even further resolution of chromosomal detail and structure. This would be made possible by the development of new method ologies for study of chromosomes by electron microscopy[13] & [14]. Such studies would also help to bridge the gap in our knowledge between DNA and chromosome structure,as seen in the light microscopic level.

Chromosome breakage hasbeen used for a long time as an indicator of mutagenic effects of various agents. A growing awareness of the dangers of environmental radiation and chemicals, and of the increased cancer incidence, have given a new impetus to the studies on chromosome breakage. There has been a considerable improvement in the resolu-

tion of such studies by the introduction of chromosome banding technique and methods in sister-chromatid exchanges[15]. Identification of "micronuclei" form another means of detecting mutagenic effect on cells[16].

Cytogenetic studies in man are assuming an ever increasing diagnostic and prognostic significance in many physiological and pathological disorders. is It now possible to detect or determine, by chromosomal analysis, various birth defects, foetal abnormalities, spontaneous abortions, mental retardates, infertility in man gonadal dysgenesis in women, sex of foetus etc. The possibility of diagnosing many of these defects at an early stage of pregnancy offers scope for genetic councelling to a vast majority of the population.

A complete genetic mapping of human chromosomes and localization and mapping of oncogenes is one of the major goals of human cytogenetics. This should be possible in the future by the use of highly sophisticated methodologies that are rapidly developing in recent times These include linkage studies, in vitro fusion of human cells, hybridization of nucleic acids among others.

The base sequencing of the totol DNA of human genome and correction of structure and function at the genetic level, should be another future goal of human cytogenetics. The task is no doubt herculean and there would be a long way to go before achieving such accomplishments. However, Science has shown much dramatic events in the past and hopefully will continue to do so in the future.

REFERENCES

1. Tjio, J. H. and Levan, A. The chromosome number in man. Heriditas 42 : 1-6 1956.
2. Hsu, T. C. Human and mammalian cytogenetics - An historical perspective. Springer, Heidelberg, 1979
3. Yunis J. J. High resolution of human chromosomes. Science 191 : 1268-1270, 1976.
4. Lejenue J., Gautier, M., Turpin, R. Etude des chromosomes somatiques de neuf enfants mongoliens. Compt. Rend. 248 : 1721-1722, 1959.
5. Patau, K. The identification of individual chromosomes especially in man. Am. J. Human Genet. 12 : 250-276, 1960.
6. Edwards, J. H., Harnden, D. G. Cameron, A. H. A new trisomic syndrome. Lancet 1 : 787-790, 1960
7. Lyon, M. F. Gene action in the X-chromosome mouse. Nature 190 : 372-373, 1961.
8. Boveri, T. The origin of malignant tumors. Lond. Bailliere, Tindall & Cos, 1929.
9. Nowell, P. C. and Hungerford, D. A. Chromosome studies on normal and leukaemic human leukocytes. J. Natl. Cancer Inst 25 : 85-109, 1960.
10. Yunis, J. J Midprophase human chromosomes. The attainment of 2000 bands. Human Genet. 56 : 293-298, 1981.
11. Sandberg, A. A. Chromosomes in human cancer and leukaemia, New York, Elsevion, 1980.
12. Yunis, J. J. The chromosomal basis of human neoplasia. Science 221 : 227-236, 1983.
13. Gall, J. Chromosome fibres from an interphase nucleus. Science 139 : 120-121, 1963.
14. Du Praw, E. J. Evidence for a "folder fibre" organization in human chromosomes. Nature 209 : 577-581, 8966.
15. Sharma, A. K. and Sharma, A. Chromosome Techniques - Theory and Practice. Lond. Butterworths, 1980.
16. Iskandar O. An important method for detection of micronuclei in human lymphocytes. Stain Technol. 54 : 221-223, 1979.

I.C.M.R. Cytology Projects

Dr. Usha K. Luthra
Sr. Dy. Director General

Completed Ad-hoc project :

Title :- *"Detection of cervical dysplasia in ante-natal women."*

Under Dr. (Mrs.) P. R. Vaidya, at Dept of Gynaecology and Obsterics, L T.M.G. Hospital and L.T. M. M. College, Bombay, from 1-4-1983 for 2½ years.

Highlights of the Project :

a) Antenatal Screening of 4448 women in 2½ years revealed dysplasia in 40 (0.89%).

b) Dysplasia was thrice more common in the age group of 31 to 35 years when compared with 21 to 30 years. It was also twice more common in primiparas compared to primigravidas and thrice more common in para 2-4

c) Dysplasia was twice more common in women with cervical erosion when compared to the women without erosion and it was 2½ times common in women with big or bleeding on touch erosion and when compared with women having small erosions.

d) Incidence of other special infections such as chlamydiosis and condyloma was 0.29 and 0.7% respectively.

In conclusion, routine antenatal screening is not a cost effective programme for early detection and reduction of invasive cervical carcinoma in our country.

Ongoing Ad-hoc Projects :

a) Title :- *"Cytogenetic studies in patients with solid tumours."*

Under Dr. Siddharth G. Adhvaryu, at Gujarat Cancer and Research Institute, Ahmedabad, for 3 years from 1-10-1983.

Highights of the projects

In the first year—

a) Twenty healthy individuals were studied as controls. The mean spontaneous SCE value was 6.80 $\pm$ 0.20 ($\bar{x} \pm$ S. E.).

b) For twenty patients with cancer of Oesophagus, mean spontaneous SCE frequency was 8.63 $\pm$ 0.43, which was significantly higher than control value ($P < 0.001$).

c) For ten patients with cancer breast, the mean spontaneous SCE frequency was 8.14 $\pm$ 0.32, which was significantly higher than the control ($P < 0.01$).

d) Frequency of cells in I, II and III cycle were almost simiplar in controls and patients with cancer of Oesophagus and Breast.

In the second year –

a) 52 more individuals were studied against a proposed target of 50.

b) In all, 35 healthy individuals were studied as controls. The mean spontaneous SCE value was 6.77 + 0 14 and MMC induced SCE value was 21.21 $\pm$ 0.46 ($\bar{x} \pm$ S.E.).

c) For total 30 patients with Ca. Oesophagus, the spontaneous and MMC induced SCE/cell values were, 8.36 $\pm$ 0 35 and 21.83 $\pm$ 1.12, respectively. Spontaneous SCE value was significantly higher compared to controls ($P < 0.001$).

d) For total 30 patients with Ca. Breast, the SCE/cell vaiues were, 7.64 $\pm$ 0.30 and 23.26 $\pm$ 1.34 respectively for normal (spontaneous) and MMC treated cultures. The spontaneous SCE value was significantly higher compared to control value ($P < 0.02$).

e) For total 7 patients with Ca. ovary/Ca. bladder/ Retinoblastoma, spontaneous and MMC induced SCE/cell values were 7.32 $\pm$ 0.65 and2 0.61 $\pm$ 1.35, respectively.

f) Slides of the controls and patients with various malignancies were stained for C-banding according to the method detailed in original proposal. Diffe rence in the size of D-band region between the hom-logues of chromosome number 1 of patients with Ca. Oesophagus and in cancer patients included in mi cellaneous group were significantly higher compared to similar values obtained in the controls. Size of C-band region is significantly larger for chromosome 1 in Ca. Oesophagus patients and for chromosome 1 and 9 in Ca. Breast patients.

b) Title :- *"Feasibility of utilising the female health workers in detection of early cancer of the cervix."*

Under Dr. S. Panda, S. C. B. Medical College, Cuttack, for 2½ years from 1-7-1985.

Fellowships in Cytology

I. Completed Projects :

a) Title :- *"Cytogenetic studies on mouse ascites tumour with reference to therapeutic stress,"*

By Shri. Ashok Kumar Pal, Jr. Research Fellow. Under guidance of Dr. S. Chakraborti, at Section of Cytology and Molecular Genetics, Dept. of Zoology, Burdwan University, Burdwan, West Bengal, from 1-6-1981 to 31-5-1985.

Highlights of the project

Comparative cytogenetic effects of two common antineoplastic agents viz,, mytomycin C (MC) and Endoxan (a cyclophosphamide : CP) have been studied on tumor and host's haemopoietic cells during the course of therapy upto 'complete regression' of the tumour, using S 180 murine tumour as model, and considering chromosome aberrations and sister chromatid exchanges (SCE's) as end points.

An identical trend in aberration production was noted in two drug treated series, both in tumour and in the bone marrow of the mouse host Quantitative analysis, however, revealed a different kinetics in two different tissues. The incidence of aberrated metaphases with complex exchange configurations increased in tumour with the increase in the latency period of drug administration at therapeutics done. A reverse trend was noted in the host's bone marrow where a rapid recovery (more pronounced in CP therapy) in chromosome aberrarion was recorded at late hours of therapeutic schedule along with rapid decrease in tumour volume. Comparative SCE analysis revealed that the genotoxic potentiality of MC continues to a significant extend for a longer duration in host s somatic cells while the SCE rate ceased very quickly in specimens subjected to CP therapy. Non-random involvement of chromosome 15 and 9 in Robertsonian translocation was noted in a high frequency in both tumour and bone marrow of the host subjected to MC or CP therapy. Analysis of data obtained from chromosome aberration studies, dead-cell kinetics, metaphase index frequency and some biochemical parameters indicated that complex chromosome aberrations in the form of multiple configurations upon accumulation caused dead-lock in tumour cell division at late hours of therapy which in turn played an important role in MC/CP induced SI80 tumour regression.

Host interaction studied at cytological level also pointed out that CP as single therapeutic agent is more effective and less toxic so far as its effact on SI80 tumour and on host's haemopoietic system is concerned.

Induction of DNA strand breakage equivalent true break type chromosome aberrations in a high frequency within few hours of CP administration has casted shadow on the concept that metabolic activation of CP is essential for its mutagenic/clastogenic potentiality.

b) Title : *"Urothelial Malignancy : Studies on Role of cytology in early detection, recurrence, prognosis and study on the hospital based epidemiology."*

By Dr. Rakesh P. Srivastava, Sr. Research Fellow, Under guidance of Dr. P. B. Singh, at Dept. of Surgery, Institute of Medical Sciences, Banaras Hindu University, Varanasi, from 11-12-1981 to 10-12-84.

Highlights of the project

Objectives were : (1) To assess the role of cytology in urothelial malignancies by examining catheterised urine specimens and bladder washings :-

a) by comparing positivity rate of above two specimens.

b) by evaluating the cytologic positivity rate with histology.

c) by employing different cytologic stains/ namely papanicolaou, methylene blue and M.G.G., and

d) status of unstained preparation Vis-a-vis a stained one.

2) Evaluation of urinary cytology in detecting tumour recurrence after surgery and/or irradiation.

3) A close follow-up of patients with abnormal uninary cytology without any detectable tumour

Results were : 1) Urinary specimen was positive in 73.4% cases while bladder wash yielded positivity of 77.5%

2) Cytology yielded 77.5% frank positivity. Suspicious cases on further examinations have produced positive results. Overall positivity, therefore, was 87.7% against histologically 100% proven cases.

3) Methylene blue provided maximum 77.5% positive results Papanicolaou stain yielded 74.4% positive results. MGG stain could not succeed with our set up.

4) With unstained preparation overall positivity was achieved in 69.3% of cases.

5) Out of 98 treated genito-urinary malignancy cases, only few (23) reported for follow up.

For two to three visits they were regular but later on they were also lost to follow-up.

During those few negligible follow-up examinations cytologically and cytoscopically these cases did not reveal any lesion recurrence.

6) All eleven cases with benign lesions proved otherwise were followed up every three monthly.

No lesion could be diagnosed in these cases and they were declared as false positive.

II. Ongoing projects :

a) Title : *"Metabolic studies on precancerous lesions of the uterine cervix using Vitamin 'A' and its precursors (analogues)."*

By Dr. Praveen Khosla, Jr. Research Fellow, under guidance of Dr. T. A. V. Subramanian, Dept. of Biochemistry, V. P. Chest Institute, University of Delhi, Delhi, from 7-6-1984 for 3 years.

b) Title : *"Cytogenetic studies on cancer of human alimentary tract,"*

By Dr. (Miss) Chandrika Sreekantiah Sr, Research Fellow, under guidance of Dr. M. Krishna Bhargava at Kidwai Memorial Institute of Oncology, Bangalore, from 31-1-1985 for two years.

c) Title : *"Cytodiagnosis of neoplastic disorders of the lower urinary tract,"*

By Dr. (Mrs.) Maher Bano Mustafa Kamal, Sr. Research Fellow under guidance of Dr. (Mrs.) Asha Kher, at Dept. of Pathology, Govt. Medical College, Nagpur, from 16-8-1984 for 2 years.

d) Title : *"Genetic cytogenetic immunologic studies in neoplastic diseases of gastrointestinal tract."*

By Dr. (Miss) M. Jayanthi, Jr. Research Fellow under the guidance of Dr M.C. Habibulla, at Dept. of Gastroenterology, Osmania Medical College, Hyderabad, from 1-2-1985 for 3 years.

GREAT WORDS

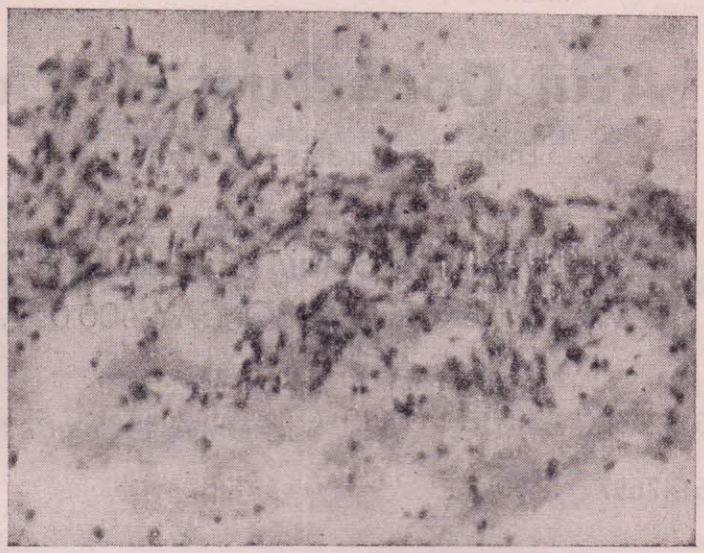
★ Let your life lightly danee on the edges of rime like dew on the tip of a leaf.

— RABINDRANATH TAGORE

★ The worst sin toward our fellow creatures is not hate them but to be indifferent to them; that's the essence of inhumanity.

— GEORGE BERNARD SHAW

Spot the Diagnosis



Short history of case :

Smear from uterine cervix of a female aged 35 years who gave history of postcoital bleeding.

Can you spot the diagnosis ?

Send your answer to Dr. P. V. Patil, Editor, I.A.C. Newsletter, "Shanti", 8th Cross, Dr. Radhakrishnan Road, Hindwadi, BELGAUM – 590 011, and write on the envelope " Spot the Diagnosis".
Answers should reach not later than 15th December 1986.

The first five correct entries opened on 16th December 1986 will be announced in the next issue (April 1987).

Feature is compiled by :-

Dr. Madhav K. Kolhatkar,
Consulting Pathologist,
759/88, Bhandarkar Institute Road,
PUNE - 411 004.