ISSN 0377-4910

ICMR BULLETIN

Vol. 25, No. 2 February, 1995

ZINC STATUS OF INDIAN CHILDREN

Zinc is a trace element, essential for human health. It is a cofactor for more than 200 metalloenzymes thus regulating various cellular metabolic activities and physiological functions of the body. As an essential metal required for protein and DNA synthesis and for expression of the biological activity of thymulin (the thymic derived hormone), zinc plays an important role in growth and development and regulation of cell mediated immune response.

Severe deficiency of this micronutrient is known to cause a clinical syndrome in children characterised by extreme degree of stunting, hypogonadism, anaemia, anorexia and hepatosplenomegaly[1]. Though such a severe form of nutritional zinc deficiency is reported from Egypt and countries of the Middle East, this is not a common clinical problem in India. Nevertheless, in populations that subsist on meagre diets which are also of poor quality, it is possible for the deficiency to exist in subclinical forms. Though the existence of zinc deficiency and its functional significance are not established, zinc supplements are often prescribed to children on the presumption that such supplements improve growth and immune function. In fact, it has been demonstrated clearly that zinc supplements confer no additional benefits to an individual whose zinc status is already normal. On the contrary, inadvertent zinc supplements can disturb the delicate homeostasis of the trace element nutriture particularly affecting the iron and copper status[2]. Therefore studies were carried out at the National Institute of Nutrition (NIN), Hyderabad, to see if the problem of zinc deficiency exists in our population and whether there is a need for routine zinc supplementation.

Assessment of Zinc Status in Children

The extent of the problem of subclinical zinc deficiency has not been defined, probably due to the lack of a suitable marker. In studies reported till recently, plasma zinc levels are used to assess the zinc stores of the body. However, plasma zinc is known to fluctuate with factors like infections and diet and hence is not regarded as a useful marker[3]. Leukocyte zinc levels are less fluctuant and are widely used to assess zinc status. Changes in zinc status are known to alter the biochemical functions of several enzymes and hormones to which zinc is a cofactor. Estimation of alkaline phosphatase and other enzymes were attempted to define zinc status. However, due to lack of specificity and inability of these enzymes to reflect early changes in zinc status, they were not useful. Recent studies indicate that serum thymulin activity is a sensitive indicator of early zinc deficiency[4] This parameter, coupled with the conventional parameters like leukocyte and plasma zinc were used in recent studies at the NIN to assess the zinc status of children aged 1-5 years[5]. The zinc status of the children was related to their nutritional status. Nine normals, 56 undernourished and 38 children with severe clinical protein energy malnutrition (PEM) were investigated. In a subsample of 25 children,

Division of Publication & Information, ICMR, New Delhi - 110 029

serum thymulin activity was determined. Activation of thymulin was also carried out by *in vitro* addition of zinc chloride, using standard methodology, to delineate the effects of PEM per se from those of zinc deficiency on the activity of thymulin.

Normal and undernourished children were found to have satisfactory leukocyte and plasma zinc levels while children with severe PEM had significantly lower levels showing that severe deficiency of zinc is part of the syndrome of severe PEM. Serum thymulin was undetectable in these children which could not be raised even by *in vitro* addition of zinc chloride (Figs.1 and 2) indicating that the thymic dysfunction observed could be primarily due to PEM per se. Children with undernutrition, however, showed significant rise of thymulin activity over basal levels following *in vitro* addition of zinc. This type

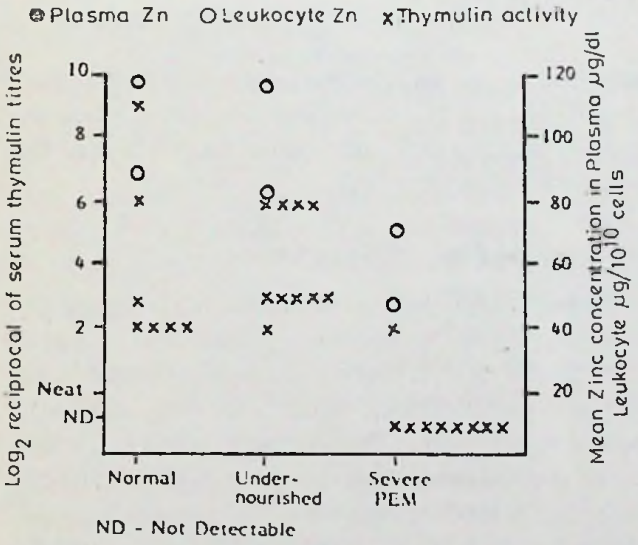

Fig.1. Mean leukocyte, plasma zinc and thymulin activity in relation to nutritioinal status

of response could probably be interpreted as unmasking of a relative zinc deficient status by activating the thymulin which probably remained in an inactive form due to a relative deficiency of zinc, in these children and hence could be used as a sensitive parameter to detect very mild forms of zinc deficiency. The biological significance of such a mild zinc deficiency is, however, not known and furthermore, the assay of serum thymulin is a cumbersome procedure and cannot be carried out to screen the population for zinc deficiency. Under these circumstances, leukocyte zinc levels, particularly if carried out in homogenous populations of leukocytes and platelets, yield useful information in assessing the zinc status of an apparently normal population.

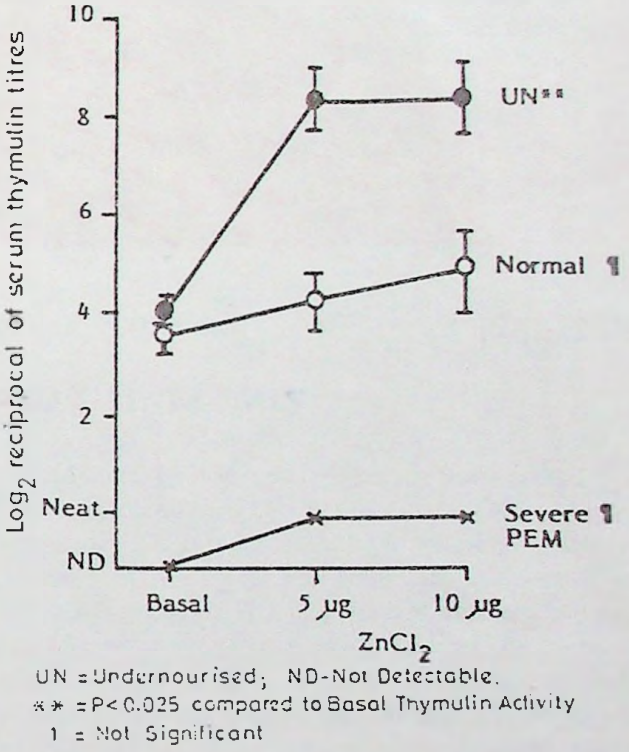

Fig.2. *In vitro* addition of zinc chloride and thymulin activity

Apart from identifying the marker to define the zinc status of children, the NIN study suggests that there is no significant problem of zinc inadequacy in the apparently normal children in the community.

Role of Zinc Supplements in Rehabilitation of Children with Severe PEM

Though zinc status of children suffering from severe PEM is significantly low, the need if any, for routine zinc supplementation in the rehabilitation of children with severe PEM, is not clear. This aspect was investigated with the help of a double blind controlled study on 33 children suffering from clinical forms of severe PEM[6]. The children were randomly allocated into two groups, one which received 40 mg of zinc as zinc sulphate while the other had

placebo during the rehabilitation period of 3-4 weeks in addition to the diet containing about 150-200 calories and 3-4 g protein/kg body weight/day. Both the groups received similar supportive therapy. The leukocyte and plasma zinc levels were determined initially at the time of admission and at the end of rehabilitation. The children were closely monitored for daily weight gain, food intake, disappearance of oedema, duration of morbidity due to infection and serum albumin regeneration. No differences were observed in the clinical and biochemical parameters studied in the 16 children who received zinc supplements and the 17 children who received placebo.

All the children had significantly lower levels of leukocyte and plasma zinc levels at the time of admission compared to 34 normal children who were simultaneously investigated. At the end of rehabilitation, both the zinc supplemented and placebo groups of children demonstrated significant increase in the leukocyte zinc levels comparable with the levels observed in normal children. However, children on placebo experienced a fall in plasma zinc levels which remained at significantly lower levels than normals even at the end of the rehabilitation period. In contrast, the supplemented children had increased plasma zinc levels that were comparable with levels in normal children.

This study showed that supplementation of zinc in addition to adequate diet did not have additional benefits on the clinical or biochemical responses. However, the differential behaviour of plasma zinc in the two groups of children is interesting. Plasma zinc is a measure of critical balance between zinc supply and zinc demand. Fall in plasma zinc levels in unsupplemented children, at a time when they were experiencing rapid weight gain and tissue deposition during rehabilitation, suggests the relative inadequacy of zinc supply through diet alone to replenish their deficient zinc status. The dietary zinc level of the children was 7.3 mg per day which closely compared with the level reported in literature based on dietary analysis and also to the recommended dietary allowances (RDA) per day for mineral elements for children below 5 years of age. The study indicates that the dietary zinc is perhaps adequate to bring about clinical res-ponse, though it is inadequate to replenish the zinc stores of the deficient children.

It is known that zinc is essential for laying down muscle mass and zinc deficient children have more adipose tissue than muscle[7]. Hence it is possible that the type of tissue deposited in zinc supplemented children could be different from the placebo group of children. Therefore, it may be useful to supplement zinc to children with severe PEM which would not only improve their zinc status but could also affect their body composition favourably.

Zinc Status of Pregnant Women and Newborns

It is believed that relative zinc deficiency occurs during periods of increased physiological demands like pregnancy and lactation and during situations of rapid growth like the immediate post natal period when zinc supplements could be useful, though there are no controlled studies to prove the need for increased intakes. Data available on zinc status of pregnant women and newborns are based on estimations of plasma zinc which is not a suitable parameter for assessing zinc status[8,9]

In a recently conducted survey, by workers at the NIN, it was found that 70 per cent of practising obstetricians and pediatricians prescribed zinc supplements routinely to pregnant women and to the newborns, particularly to infants with low birth weight. Justification for such prescription needs to be established with the help of controlled studies using better markers for assessing zinc status in view of the adverse effects of unnecessary administration of zinc supplements. In a recent study at the NIN, leukocyte and plasma zinc levels were determined in 33 women who delivered at term and 30 at preterm[10]. Maternal and cord blood samples were collected at the time of delivery. Gestational ages and birth weights of the babies were determined soon after delivery and body mass index (BMI) of mothers was also determined.

The results showed that both the leukocyte and plasma zinc levels of mothers were lower than the corresponding cord blood values, irrespective of birth weight or gestational age of the newborn. They also had no relation to BMI. Mothers with BMI of 12.0 to 18.5 and 18.5 to 25.0 had leukocyte zinc levels ($\mu g/10^{10}$ cells) of 63.3 and 79.3 respectively while the respective plasma concentrations (μg/dl) were 93.4 and 88.6.

Leukocyte zinc levels of preterm infants (213.6) were significantly higher than those observed in full term infants with a propriate or low birth weight (131 and 119 respectively). Plasma zinc levels of preterm infants were also higher than in the other two groups but the differences were not of statistical significance.

The study showed that, maternal zinc status has no effect on birth weight. Zinc status of the infant is also

not related to the birth weight suggesting that zinc alone is unlikely to regulate foetal growth which is a complex process governed by several factors. Zinc status of the newborns is, however, closely related to the gestational age. The premature newborns seem to have an advantage of better leukocyte zinc concentrations which perhaps could be utilised during the rapid postnatal growth period.

These studies indicate that routine zinc supplements to undernourished pregnant women or to newborns are unnecessary.

Zinc Status of Infants in relation to Their Diets

Zinc deficiency is very rare among breast-fed infants. However, some recent reports indicate the need for routine zinc supplements to young infants with the presumption of preventing growth faltering[11]. These studies are not based on any biochemical evidence of zinc deficiency in breast-fed infants nor its inadequacy in breast milk and yet they recommend the single nutrient supplementation. In view of the potential adverse effects of routine administration of zinc to healthy infants, a cross sectional study was carried out to examine the zinc status of infants born at term and preterm[12].

Besides determining the zinc status of the infants at birth and at 3 monthly intervals till one year of age, breast milk zinc concentration was also estimated at different periods of lactation. Twenty six of the full term infants who were solely fed formula milk from birth were also examined along with determination of zinc concentrations of the formulae used (unpublished data). All the infants were adequately and appropriately weaned between 4–6 months.

The leukocyte and plasma zinc levels of the full term and preterm breast-fed and the full term formula fed infants at different ages are presented in Fig.3 and zinc levels of breast milk in Fig.4. Both the full term and preterm infants showed a decline in zinc status between 4-6 months of age which gradually improved by 9 months. The zinc levels at 9 months were comparable to those at 1 year of age. Such decline in the status of various nutrients is commonly observed at the age of 4-6 months marking the need for commencement of weaning. After appropriate weaning, the zinc status reached normal levels thus suggesting that the decline at 4-6 months is only a physiological and transient phenomenon for which the solution is proper weaning rather than single nutrient supplementation. Preterm infants also followed the same trend.

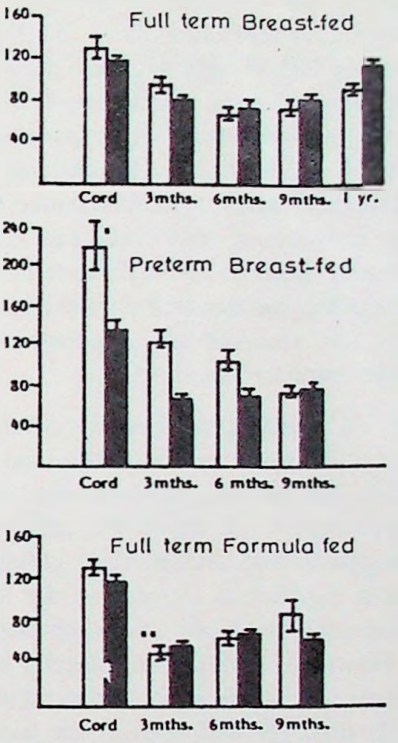

Fig.3. Zinc levels in full term, preterm and top fed infants at different age periods

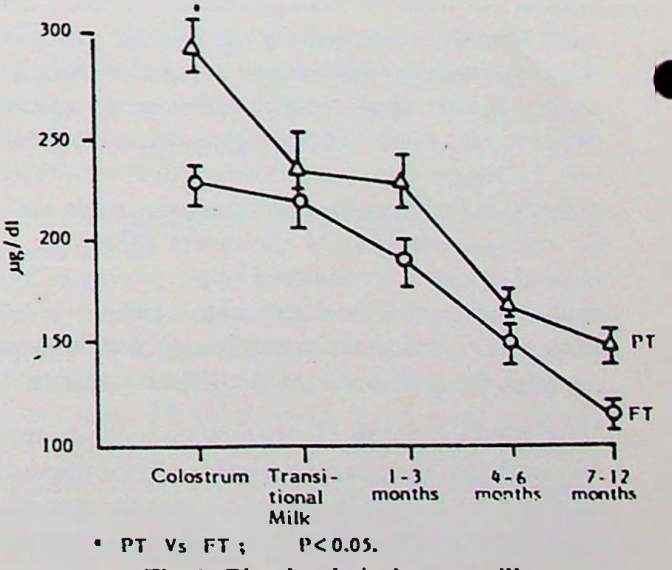

Fig.4. Zinc levels in breast milk

Zinc levels in colostrum were high and declined as lactation progressed in both term and preterm mothers. However, the latter had higher levels throughout lactation thus perhaps meeting the higher requirements of the preterm infants.

Formula fed infants, however, showed significantly low levels of zinc at 3 months of age which became normal following weaning. The formula milk contained zinc in higher levels than mature milk of term mothers. However, the low zinc levels of formula fed infants suggest that either the zinc from the formula is not bioavailable or the formula is not fed adequately or both. Though the period of poor zinc status in these infants is transient, it is severe. These babies might require zinc supplements.

Thus, studies at NIN on the zinc status of pregnant women and children indicate that zinc deficiency is not a significant problem and routine zinc supplements to pregnant women, newborns or to breast-fed infants are not necessary.

References:

1. McClain, C.J., Kasarskis Jr., E.J. and Allen, J.J. Functional consequences of zinc deficiency. *Prog Food Nutr Sci 9:* 185, 1985.
2. Solomons, N.W. On the assessment of zinc and copper nutriture in man. *Am J Clin Nutr 32:* 856, 1979.
3. Aggett, P.J., Crofton, R.W., Khin, C., Grozdanovic, S. and Grozdanovic, D. The mutual inhibitory effects on their bioavailability of inorganic zinc and iron. *Prog Clin Biol Res 129:* 117, 1983.
4. Prasad, A.S., Meftah, S., Abdallah, J., Kaplan, J., Brwer, G.J, Bach, J.F. and Dardenne, M. Serum thymulin in human zinc deficiency. *J Clin Invest 82:* 1202, 1988.
5. Hemalatha, P., Bhaskaram, P. Qadri, S.S.Y.H. and Ajeyakumar, P. Assessment of mild zinc deficiency in children. *Nutr Res 13:* 115, 1993.
6. Hemalatha, P., Bhaskaram, P. and Khan, M.M. Role of zinc supplementation in rehabilitation of severely malnourished children. *Eur J Clin Nutr 47:* 397, 1993.
7. Golden, M.H.N. and Golden, B.E. Effect of zinc supplementation on the dietary intake, rate of weight gain and energy cost of tissue deposition in children recovering from severe malnutrition. *Am J Clin Nutr 34:* 900, 1981.
8. Prasad, L.S.N., Ganguly, S.K. and Vasuki, K. Role of zinc in foetal nutrition. *Indian Pediatr 11:* 799, 1974.
9. Bogden, J.D., Thind, I.S., Kemp, F.W. and Caterini, H. Plasma concentrations of calcium, copper, iron, magnesium and zinc in maternal and cord blood and their relationship to low birth weight. *J Lab Clin Med 92:* 455, 1978.
10. Islam, A., Hemalatha, P., Bhaskaram, P. and Ajeyakumar, P. Leukocyte and plasma zinc in maternal and cord blood. Their relationship to period of gestation and birth weight. *Nutr Res 14:* 353, 1944.
11. Walravens, P.A., Chakar, A., Mokni, R., Denise, J. and Lemonnier, D. Zinc supplements in breast-fed infants. *Lancet 340:* 683, 1992.
12. Bhaskaram, P., Hemalatha, P. and Islam, A. Zinc status in breast-fed infants. *Lancet 340:* 1416, 1992.

This write-up has been adapted from the article entitled "Is zinc deficiency in children a nutritional problem lin India?", by P. Bhaskaram and P. Hemalatha, published in the *Nutrition News 15(2),* 1994.

ABSTRACTS

Some Research Projects Completed Recently

Study of a possible link between smoking and pulmonary tuberculosis.

The study was carried out in Municipal Wards 10 and 11 of the old city of Delhi (approximate population 40,000) to determine whether the prevalence of pulmonary tuberculosis among adult smokers in a general population was significantly higher than in a corresponding group of non-smoking adults.

A complete census of the entire population of the area was carried out on specially designed census registers. Besides the identifying particulars, information on age, sex and smoking habits and nature of smoking were also collected. Persons in the age group of 15 years and above were subjected to 70 mm chest X ray. Those with radiographic abnormalities were subjected to bacteriological examination including sputum/laryngeal swab examination by direct microscopy and

culture. Where indicated, repeat bacteriological and radiological examinations were carried out to establish a diagnosis.

Of the 24064 persons in the age group of 15 years and above only 19399 (80.6%); 10057 males and 9342 females, could be studied. Overall 26.0 per cent of males were smokers, 2.4 per cent ex-smokers and 71.6 per cent non-smokers. As the prevalence of smokers among females was only 0.6 per cent, further analysis was confined only to males. The proportion and intensity of smoking increased with increase of age.

Among the 10057 males, 162 (1.61%) patients with active pulmonary tuberculosis, of whom 54 (0.54%) were bacteriologically proven, were found. The overall prevalence of active pulmonary tuberculosis in smokers, ex-smokers and non-smokers was 3.26, 3.29 and 0.96 per cent respectively. The corresponding rates for bacteriologically proven pulmonary tuberculosis were 1.9, 1.23 and 0.28 per cent. After standardisation for age it was found that 2.43 per cent of the smokers were suffering from pulmonary tuberculosis (1.03% of theses being bacillary cases). The corresponding figures for non-smokers being 1.07 per cent (0.32% bacillary cases). The differences are statistically significant. A 'trend test' also revealed that the prevalence of pulmonary tuberculosis increased with the intensity of the smoking.

Govind Prasad
New Delhi Tuberculosis Centre
New Delhi.

Immunopathogenetic role of food antigens in rheumatoid arthritis.

Fifty patients with rheumatoid arthritis (RA) were studied to determine whether food related antigens caused exacerbation and their removal caused remission in the inflammatory activity in RA. This was done in order to see if this dietary elimination technique could become one of the adjuctive techniques and whether it could be predicted as to which patient would respond to this therapy and to which of the food item(s). Patients receiving any disease modifying drugs or having taken corticosteroids were excluded from the study.

The patients were subjected to dietary modification therapy. This comprised a protein free diet of salads, fruits, vegetables, sugar and oils for 2 weeks. Patients who responded to this dietary elimination were then allowed step-wise dietary addition. Seventeen of the 50 patients (34%) responded to diet elimination and showed decreased synovitis. Only 10 of these 17 patients could be followed up in the dietary addition phase. Six of them were intolerant to one of three dietary items (one to milk, two to rice and three to wheat), two were intolerant to more than one dietary items (both milk and wheat caused flare in these two) and two patients were intolerant to some food items which could not be identified. Wheat, milk, and rice were found to be the common offending dietary items causing flare up of the synovitis.

Analysis of relative risk for the various HLA antigens revealed that RA patients carrying HLA DR1 phenotype had over 26 times more chance of responding to diet elimination compared to those without DR1. Similarly RA patients carrying DR5 had 2.75 times higher chances of responding to diet elimination than those without this antigen. Nonspecific inflammatory immunoglobulin levels, immune complex levels, lymphoproliferative response and anti-food item antibodies did not show any correlation with response to dietary elimination.

Patients with active rheumatoid arthritis showed decreased lymphoproliferative response both to specific antigens as well as nonspecific mitogens. They also showed perturbed ratio between 'naive' and 'memory' CD4+ subset of helper lymphocytes. Those who responded to dietary elimination showed a trend of this ratio to revert towards normal levels. High levels of anti-food item antibodies seen in RA patients could be related to the increased gut permeability in patients with rheumatoid arthritis. Those who showed response to dietary elimination also showed a fall in the IgA class of anti-food antibodies indicating that, somehow their gut permeability could have improved.

A.N. Malaviya
Department of Medicine
All India Institute of Medical Sciences
New Delhi.

ICMR NEWS

The following meetings of various technical groups/ committees of the Council were held:

Meetings of the Scientific Advisory Committees (SACs) of the ICMR Institutes/Centres:

Centre for Advanced Research for Bone Marrow Transplantation for Thalassaemia, Vellore	January 23, 1995 (at Vellore)
Regional Medical Research Centre, Bhubaneswar	February 13, 1995 (at Bhubaneswar)
Malaria Research Centre, Delhi	February 15, 1995 (at Delhi)

Meetings of Scientific Advisory Groups (SAGs)/Project Advisory Committees (PACs)/Project Review Committees (PRCs)/Task Forces (TFs) held at New Delhi:

PRC on ICRC Leprosy Vaccine Trial	January 16, 1995
PRC for Projects on Non-Communicable Diseases	January 17, 1995
SAG of the Division of Publication and Information	January 18, 1995
PAC on District Level Project for Control of Cervical Cancer	January 23, 1995
PAC on Tobacco Economics	January 24, 1995
TF on Drug Delivery System for Contraceptives	January 25, 1995
PAC on Collaborative Study on Coronary Heart Disease	February 1, 1995
PAC on Integrated Delivery of Reproductive Health care at District Level	February 6-7, 1995

Participation of ICMR Scientists in Scientific Events:

Dr. G.V. Satyavati, Director-General, ICMR, delivered the Prof. C. Dwarkanath Memorial Lecture as part of the National Symposium on Charak Samhita at Varanasi (February 1, 1995).

Dr. V.P. Sharma, Director, Malaria Research Centre, Delhi, participated in the Commonwealth Secretariat Expert Group meeting on Health Impact Assessment within Environmental Impact Assessment at Aberdeen (February 1-3, 1995).

Dr. S.P. Pani, Dy. Director, Vector Control Research Centre, Pondicherry, participated in the II meeting of the WHO Steering Committee on Applied Field Research at Geneva (February 6-10, 1995).

INDIAN COUNCIL OF MEDICAL RESEARCH

AWARDS AND PRIZES 1994

The Indian Council of Medical Research invites nominations/applications from Indian scientists for its various prizes and awards in the field of Biomedical Sciences. Application forms and other relevant information can be obtained from the Director-General, Indian Council of Medical Research (Indo-foreign Cell), Ansari Nagar, New Delhi-110029.

Nominations and completed applications should reach this office on or before **30th June 1995.**

1. Basanti Devi Amir Chand Prize (Value = Rs.5,000):

This prize will be awarded annually to a senior research worker of more than ten years standing for work of outstanding merit in any subject in the field of biomedical science, including clinical research. The term "Clinical Research" implies research into the mechanism and causation of disease, including its prevention and cure. The criteria for award of the prize are the significance and value of addition to existing knowledge contributed

by a worker in a particular field in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

The selection for this prize is made one year in advance.

2. Dr.P.N.Raju Oration Award (Value = Rs.5,000):

This prize will be awarded in alternate years, to an eminent scientist, preferably a medical person, for his/her work in any subject of national importance in the field of **Medicine or Public Health**. The subject will be notified at the time of advertisement. The subject for 1994 is "Tuberculosis".

3. Sandoz Oration Award for Research in Cancer (Value = Rs.2,500):

This prize (and a medal) will be awarded in alternate years, to an eminent scientist for outstanding work carried out on a particular aspect of **Cancer**. The eminence is to be judged on the basis of his/her contributions to cancer research which should have been recognised nationally and internationally and helped towards control, prevention and cure of cancer.

4. Dr.Y.S.Narayana Rao Oration Award in Microbiology* (Value = Rs.4,000):

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **Microbiology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in **Microbiology** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

5. Chaturvedi Kalawati Jagmohan Das Memorial Award (Value = Rs.2,000):

This prize (and a gold medal) will be awarded once in three years, to an eminent scientist, preferably a medical person, for his/her work in the field of **Cardiovascular Diseases**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in **Cardiovascular Diseases** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

6. Dr.Kamala Menon Medical Research Award (Value = Rs.5,000):

This prize will be awarded to an eminent scientist, preferably a medical person, for outstanding contribution made in the field of **Internal Medicine** and **Paediatrics** respectively in alternate years. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on a subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research. The subject for 1994 is "Internal Medicine".

7. Kshanika Oration Award to a Woman Scientist for Research in the field of Biomedical Sciences (Value = Rs.5,000):

This prize will be given annually to an eminent woman scientist for outstanding work carried out in any branch of biomedical science, contributing to the alleviation of human suffering. The criterion for award of this prize is the significance and value of addition to existing knowledge contributed by her in any field of biomedical sciences in which she has been actively engaged over a number of years and has shown sustained activity in research.

---

*This Award/Prize is not being awarded for the year 1994

8. Dr.M.K.Seshadri Prize in the field of Practice of Community Medicine (Value = Rs.10,000):

This prize (and a gold medal) will be awarded in alternate years, to an eminent scientist or institution whose original work has led to useful inventions in or otherwise significantly contributed to the **Practice of Community Medicine.**

9. M.N.Sen Oration Award for Practice of Medicine* (Value = Rs.5,000):

This prize will be given once in three years, to an eminent scientist for outstanding work carried out in the field of **Practice of Medicine (clinical, laboratory or therapeutic).** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker to the practice of medicine in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

10. JALMA Trust Fund Oration Award in the field of Leprosy (Value = Rs.5,000):

This prize (and a medal) will be given annually to an eminent scientist for outstanding research in the field of **Leprosy.** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on any aspect of leprosy in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

11. Dr.J.B.Srivastav Award in the field of Virology* (Value = Rs.10,000):

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **Virology.** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in **Virology** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

12. ICMR Prize for Biomedical Research for Scientists belonging to Under-privileged Communities (Value = Rs.5,000):

This prize will be given annually to an eminent scientist for his/her outstanding contributions in any field of **Biomedical Sciences.** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in the particular field in which he/she has been actively engaged over a number of years and has shown sustained activity in research. This prize will be awarded to **scientists belonging to under-privileged communities.**

13. ICMR Prize for Biomedical Research conducted in Under-developed Areas (Value = Rs.5,000):

This prize will be awarded annually to an eminent scientist for his/her outstanding contributions in any field of **Biomedical Sciences.** The criterion for award of the prize is the significance and value of biomedical research carried out by a **worker based in under-developed parts of the country, or for work carried out in under-developed parts of the country over a period of five years preceding the year** for which the award is to be given.

14. BGRC Silver Jubilee Oration Award (Value =Rs.5,000):

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **Haematology/Immunohaematology.** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in this speciality in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

---

*This Award/Prize is not being awarded for the year 1994

15. Smt.Swaran Kanta Dingley Oration Award* (Value = Rs.10,000):

This prize will be given in alternate years, to an eminent scientist for outstanding contribution in the field of **Reproductive Biology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in the field of **Reproductive Biology** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

16. Dr.M.O.T.Iyengar Memorial Award (Value = Rs.4,000):

This prize will be given annually to an eminent scientist for outstanding contribution in the fields of **Malaria, Filariasis, Plague or Medical Entomology**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in any of the fields of **Malaria, Filariasis, Plague or Medical Entomology** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

17. Prof.B.K.Aikat Oration Award* (Value = Rs.3,000):

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of **Tropical Diseases**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in **Tropical Diseases** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

18. Dr.Vidya Sagar Award* (Value = Rs.5,000):

This prize will be awarded in alternate years, to an eminent scientist for outstanding contributions made in the field of **Mental Health**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in **Mental Health** in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

19. Amrut Mody-Unichem Prize (Value = Rs.10,000):

This prize will be given to an eminent scientist for outstanding work carried out in the field of **Cardiology & Neurology, and Gastroenterology** (in alternate years). The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on a subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research. The subject for 1994 is "Cardiology & Neurology".

20. Amrut Mody-Unichem Prize (Value = Rs.10,000):

This prize will be given to an eminent scientist for outstanding work carried out in the field of **Maternal & Child Health, and Chest Diseases** in alternate years. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research. The subject for 1994 is "Chest Diseases".

21. Chaturvedi Ghanshyam Das Jaigopal Memorial Award (Value = Rs.3,000):

This prize will be given in alternate years, to an eminent scientist for outstanding work carried out in the field of Immunology. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

***This Award/Prize is not being awarded for the year 1994**

22. Lala Ram Chand Kandhari Award (Value = Rs.5,000):

This award will be given in alternate years, to an eminent scientist for outstanding research in the fields of **Dermatology and Sexually Transmitted Diseases**. The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

23. Dr.Prem Nath Wahi Award for Cytology and Preventive Oncology* (Value = Rs.30,000):

This award will be given in alternate years, to an eminent scientist for outstanding contribution in the field of **Basic and/or Clinical Cytology, and/or Preventive Oncology**. The criterion for award is the significance and value of addition to existing knowledge contributed by a worker on the subject in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

24. Dr.D.N.Prasad Memorial Oration Award* (Value = Rs.20,000):

This award (and a medal) will be given in alternate years, to an Indian scientist for significant contribution to research in the field of **Pharmacology**, carried out in India, as evidenced by research papers and innovations. The criteria for award will be the significance and value of addition to existing knowledge in research in **Pharmacology**.

25. Prof.Surindar Mohan Marwah Award (Value = Rs.25,000):

This award will be given once in 3 years to an Indian scientist for significant contribution in the field of **Geriatrics**, through sustained research in India on the problems of the aged as evidenced by research papers in science publications. The subject matter could be biomedical or psychosocial research on problems of the aged, both basic and applied.

Award/Prize for Scientists above 45 years of age on January 1st of the year for which this award is being given

26. Smt.Pushpa Sriramachari Award* (Value = Rs.5,000):

This prize (and a silver medal) will be given in alternate years, to individuals for outstanding contribution to research on **"Pathology and Pathophysiology - Clinical or Experimental"**. The individual should be an established scientist above the age of 45 years and should have made a comprehensive and significant original contribution in unravelling the understanding and the nature, evolution or prevention of any human disease entity.

Awards/Prizes for Young Scientists below 40 years of age on January 1st of the year for which these awards are being given

27. Shakuntala Amir Chand Prizes (Four in Number of value = Rs.1,500 each) :

These four prizes will be awarded annually to the **best published research** work in any subject in the field of **Biomedical Science** including clinical research. The term 'Clinical Research' covers research into the mechanism and causation of disease and its prevention and cure, and includes work on patients in hospitals, field studies in epidemiology and social medicine, and observations in general practice.

---

*This Award/Prize is not being awarded for the year 1994

Both medical as well as non-medical graduates are eligible for award of the prize. The prizes are awarded to Indian nationals for work done in any institution in India. **Work started in India but completed abroad will not be acceptable.**

Papers published in Indian or Foreign Journals in the previous two years will be considered for award of these prizes in the current year.

28. Raja Ravi Sher Singh of Kalsia Memorial Cancer Research Award (Value = Rs.2,000):

This prize will be awarded in alternate years, to a scientist for outstanding work done in the **experimental or clinical aspects of cancer or in the organisation and conduct of any service or service-cum-research programme in cancer prevention and treatment.** For the prize to be awarded in the current year the work carried out in the previous year will be considered.

29. Dr.V.N.Patwardhan Prize in Nutritional Sciences (Value = Rs.7,000):

This prize will be given in alternate years, to an eminent scientist, for outstanding work carried out in India on **fundamental, clinical or field studies in Nutritional Sciences.** The criterion for award of prize is the contribution of a worker to nutritional sciences in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

30. Tilak Venkoba Rao Award (Value = Rs.1,000):

This prize will be given to an eminent scientist for research in the field of **Psychological Medicine** and **Reproductive Physiology** respectively in alternate years. The criterion for the award is the significance of contribution to existing knowledge by a worker who has been actively engaged in research on the subject over a number of years. The subject for 1994 is "Psychological Medicine".

31. Dr.T.Ramachandra Rao Award* (Value = Rs.3,000):

This prize will be given in alternate years, to a scientist below the age of 40 years for his/her outstanding contribution made in the field of **Medical Entomology.** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in this speciality in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

32. Dr.C.G.S.Iyer Oration Award* (Value = Rs.1,500):

This prize will be given in alternate years, to a scientist below the age of 40 years for his/her outstanding contribution made in the field of **Leprosy.** The criterion for award of the prize is the significance and value of addition to existing knowledge contributed by a worker in this speciality in which he/she has been actively engaged over a number of years and has shown sustained activity in research.

33. Dr.Dharamvir Datta Memorial Oration Award (Value = Rs.3,000):

This award will be given in alternate years, to a scientist (Medical or non-medical) below 40 years of age for work carried out in the last 5 years in India in the field of **Liver Diseases.** The criteria include significance and value of addition to existing knowledge contributed by a worker in this speciality, with special reference to **application of findings to clinical hepatology.**

---

*This Award/Prize is not being awarded for the year 1994

34. Prof.B.C.Srivastava Foundation Award (Value = Rs.5,000):

This award will be given in alternate years, to a scientist below the age of 40 years for work in the field of **Community Medicine** in medical colleges/recognised institutions. The criterion for the award is the significance of research contributions to the practice of community medicine by a worker.

35. Smt. Kamal Satbir Award (Value = Rs.5,000):

This award will be given annually to individuals for outstanding contribution to research on **non-tuberculous Chest Diseases, especially Respiratory Allergy and Chronic Obstructive Lung Diseases**, pertaining to mechanism and causation of the diseases, their prevention and/or management.

The work to be assessed would be the research carried out in India and published in scientific journals during the three years preceding the year for which the award is to be given.

36. Major General Saheb Singh Sokhey Award (Value = Rs.10,000):

This award will be given annually to a scientist below the age of 40 years for his/her outstanding contribution in the field of **Communicable Diseases** depending upon its significance and value in terms of addition to existing knowledge contributed by the worker in that field. The facets of work to be considered could be basic or applied research which add to the knowledge on the mechanism and causation of communicable diseases, their prevention and/or their management. The work to be assessed would be the research carried out in India and published in scientific journals, during the 3 years preceding the year for which the award is to be given.

37. Dr.H.B.Dingley Memorial Award (Value = Rs.5,000):

This award will be given annually to individuals for outstanding contribution to research in the field of **'Paediatrics'** by Indian scientists below the age of 40 years. The work to be assessed would be research work carried out in India and published in scientific journals during the 3 years preceding the year for which the award is to be given.

Dr. B.R.Ambedkar Centenary Award for Excellence in Biomedical Research (Value Rs. 1.00 lakh)

Dr. B.R.Ambedkar Centenary Award for excellence in biomedical research was instituted in the year 1991-92 as part of the Dr. Ambedkar Birth Centenary Celebrations. The award, of value rupees one lakh, is to be awarded in alternate years, for excellence in any field of biomedical research, as evidenced by scientific publications in internationally recognised journals, and contribution to advancement of knowledge and/or improvements in medical practices, health programmes etc. This Award is open to all age groups.

Direct applications are not accepted for this Award. Only nominations by certain categories of people will be considered. Details are available in a separate brochure, which is available on request.

HOW TO APPLY

Applications/nominations should provide the names and other particulars of the candidates for award of the prizes to the Council in the prescribed proforma.

Five copies (**Ten copies** in the case of the **Basanti Devi Amir Chand Prize**) of each of the following documents will have to be sent with the application:

1. The proforma for application/nomination with the details duly completed.
2. A note giving full details of the outstanding research contribution of the nominee or applicant which makes him/her worthy of the award.
3. A short biographical sketch of the candidate.
4. A list of papers published by the candidate giving details of those published in Indian and Foreign Journals separately, and also indicating whether the journals are indexed or not.
5. Five reprints each of five recent significant papers published on the subject of the award by the applicant/nominee (for the **Basanti Devi Amir Chand Prize, ten reprints** of each paper are required).

The applications for **Shakuntala Amir Chand Prize** should be sent along with **ten copies** each of the following documents.

1. The proforma for application/nomination with the details duly completed.
2. Reprints of the papers submitted for the prize.
3. A note giving details of research work done by the candidate.
4. A list of papers published giving details of those published in Indian and Foreign Journals separately, and also indicating whether the journals are indexed or not.
5. A short biographical sketch of the candidate.

Nomination for Dr. B.R. Ambedkar Centenary Award for Excellence in Bio-Medical Research should be in the separate format prescribed. Direct applications will not be entertained for this Award.

TERMS & CONDITIONS OF ICMR AWARDS/PRIZES

1. Only work published in Scientific (Scholarly) Journals will be considered for ICMR Awards.

2. Normally work done during the preceding five years on the subject will be considered (except where otherwise indicated, under "Detailed information on the ICMR prizes/awards)".

3. If a scientist has received an ICMR award earlier for a particular subject, the same material will not be considered for another ICMR award, unless there is evidence that additional work has been done. As such, those applicants/nominees who have received an ICMR award previously, should clearly indicate the additional work done by them and provide reprints of subsequent publications, in support of such a claim.

4. Only applications/nominations which are complete in all respects will be considered. Five sets of documents (10 in case of Basanti Devi and Shakuntala Amir Chand Prizes) should be submitted, each set containing one copy of the documents indicated in the Section "How to Apply". If sets received are not complete, the application/nomination will not be considered.

5. While the applicants/nominees do not need to provide " No Objection Certificates" from co-authors (since 1990 onwards), in the event of any dispute, the onus will be on the applicant/nominee/recipient of an ICMR Award or Prize, and the ICMR will not be responsible for any such dispute arising out of counter-claims.

6. The nominations/applications complete in all respects and with all the required documents should reach the Council not later than 30th June, 1995 for ICMR Awards/Prizes for the year 1994.

JOINT APPLICATIONS

In the case of joint applications/publications, the prizes shall be divided between the applicants/authors in such proportion as the Selection Board may decide. The role of the individual who applies for the prize should be clearly indicated so as to make it easy to determine whether major part of the work has been done by that person. A certificate from the Senior Author that the candidate applying for the award has himself/herself made significant contribution to the research work for which his/her paper is being recommended for the award should also be submitted along with the application.

FORMAT FOR FURNISHING RELEVANT INFORMATION ABOUT THE NOMINEE/APPLICANT

Name of Award Applied for_____

1. Name of the Nominee/applicant:
2. a) Date of birth and age as on 1st January of the year for which the award is being applied for:

   b) Sex:
3. Academic qualifications beginning with the Bachelor's degree:
4. Present employment and posts held previously:
5. Details of outstanding research achievements during the last five years:
6. Whether the achievements have been recognised/awarded by any learned society/institution (if so brief outline to be given)
7. Number of scientific papers published and reprints of those papers to be considered for the present application:
8. Subject of research work presented for the award:
9. Whether you have received any award earlier for the same work or paper, if so, give the following:

   (i) Name (ii) Year (iii) Value of award and

   (iv) Exact caption of work for which the prize was awarded:
10. Give names and designations of all the joint authors, if any, on the work/paper(s) submitted for the award:
11. State whether for the same work/paper(s) any of the joint authors have received any award. If so,give the name of the prize awarded, year of award and its value:
12. If you are a joint author, state precisely what has been your individual contribution to the work:
13. State whether you have now applied for any other award for the same or any other work. If so, state the name of the award and the subject of work submitted for the award:
14. (i) List of papers, if any, submitted earlier for any other award and (ii) List of papers published subsequently and now submitted for consideration of the award:
15 Address for correspondence:

NOTE: Applicants for the ICMR Prize for Biomedical Research for Scientists belonging to Underprivileged Communities should provide attested Caste/Community certificates.

ICMR AIDED SYMPOSIA/SEMINARS/WORKSHOPS/COURSES/CONFERENCES

Symposium/Seminar/Workshop/ Course/Conference	Date & Place	Contact Address
Workshop on Techniques in Human Cytogenetics.	January 20-February 29, 1995; (at Bangalore)	Dr. I. Manorama Thomas, Professor and Head, Department of Anatomy and Division of Human Genetics, St. John's Medical College, Bangalore.
VL National Conference on Occupational Health and Safety.	February 3-5, 1995; (at Bangalore)	Dr. H.R. Rajmohan, Organising Secretary of the Conference, Regional Occupational Health Centre (South), Library and Information Block, Medical College Campus, Banglore.
National Symposium on Cancer Research: Bridging the Gap between Laboratory and Clinic and XIV Annual Conference of the Indian Association for Cancer Research	February 6-8, 1995; (at Shillong)	Dr. R.H. Duncan Lyngdoh, Convener of the Conference, Department of Chemistry, North-Eastern Hill University, Shillong.
VII National Conference of All India Rhinology Society and Functional Endoscopic Sinus Surgery Workshop.	February 7-8, 1995; (at Sevagram)	Dr. V.N. Chaturvedi, Organising Secretary of the Conference, Department of ENT, Mahatma Gandhi Institute of Medical Sciences, Sevagram, Wardha.
VIII Biennial Conference of the Indian Society of Medical and Paediatric Oncology and International Symposium on Primary Chemotherapy.	February 9-11, 1995; (at Indore)	Dr. Dinesh Pendharkar, Organising Secretary of the Conference, B.D. Singhal Cancer Detection and Prevention Centre, Roberts Nursing Home Campus, Indore.
XIX National Conference of Indian Association for Study of Transmitted Diseases and AIDS.	February 11-12, 1995; (at Chandigarh)	Dr. Bhushan Kumar, Organising Secretary of the Conference, Department of Dermatology, Venereology and Leprosy, Postgraduate Institute of Medical Education and Research, Chandigarh.
Indo U.S. Conference on Recent Advances in Pulmonology and Tuberculosis.	February 11-12, 1995 (at New Delhi)	Dr. K. Chopra, Organising Secretary of the Conference, Department of Pediatrics, Maulana Azad Medical College, New Delhi.
International Seminar on Environment, Sustainable Development and Human Health.	February 11-15, 1995; (at Varanasi)	Prof. Onkar Singh, Convener of the Seminar, Department of Geography, Banaras Hindu University, Varanasi.
XVIII Annual Conference of the Indian Society of Cell Biology and Cell Biology Symposia.	February 13-15, 1995; (at Lucknow)	Dr. Rakesh Tuli, Convener of Conference, National Botanical Research Institute, Lucknow.
International Symposium on Neurointensive Care and Neuroanaesthesia.	February 19, 1995; (at New Delhi)	Dr. H.H. Dash, Organising Secretary of the Symposium, Department of Neuroanaesthesia, Neurosciences Centre, All India Institute of Medical Sciences, New Delhi.
Workshop on Molecular Finger Printing of Bacteria causing Nosocomial Infections: Its Application to Trace Source of Infection.	February 21-27, 1995; (at New Delhi)	Dr. Ashok Rattan, Organising Secretary of the Workshop, Department of Microbiology, All India Institute of Medical Sciences, New Delhi.
I Congress of Federation of Indian Physiological Societies (FIPS).	March 1-3, 1995; (at New Delhi)	Dr. W. Selvamurthy, Chairman, Organising Committee of the Congress, Defence Institute of Physiology and Allied Sciences, Delhi.
National Conference on Adolescent Health-cum-Workshop on AIDS/HIV Infection Prevention amongst Adolescent and Youth.	March 4-5, 1995 (at New Delhi)	Dr. Prema Bali, President, Indain Association for Adolescent Health, A-5, Greater Kailash-II, New Delhi.

Symposium/Seminar/Workshop/ Course/Conference	Date & Place	Contact Address
IV Convention of Indian Society of Agricultural Biochemists and Symposium on Recent Developments in Biochemistry	March 20-21, 1995; (at Varanasi)	Dr. R.S. Dubey, Organising Secretary of the Convention, Department of Biochemistry, Faculty of Science, Banaras Hindu University, Varanasi.
XI National Symposium on Developmental Biology.	March 25-27, 1995; (at Rohtak)	Dr. S.K. Gakhar, Organising Secretary of the Symposium, Department of Biosciences, Maharishi Dayanand University, Rohtak.

COUNCIL'S TRAINING PROGRAMMES FOR 1995-96

Leprosy

At the Central Jalma Institute for Leprosy, Agra:

- Multidrug Therapy Orientation Course in Leprosy for Medical Officers (February 6-18, 1995).

Virology

At the National Institute of Virology, Pune:

- Diploma in Medical Virology (June 1995 - May 1996).

Reproductive Biology

At the Institute for Research in Reproduction, Bombay:

- Training Course on Techniques in Human Semenology (May 15 - June 2, 1995).
- Training Course on Techniques in Immunology, Cell Biology and Molecular Biology (November 2-25, 1995).
- Training Course on Techniques in Neuroendocrine Research (February 6-10, 1996).

Endocrinology

At the National Institute of Nutrition, Hyderabad:

- Annual Training Course on Endocrinological Techniques and their Application (August/September, 1995).

Nutrition

At the National Institute of Nutrition, Hyderabad:

- M.Sc. in Applied Nutrition (June 1, 1995 - February 28, 1996).
- Annual Training Course in Nutrition (December 1, 1995 - February 28, 1996).

Oncology

At the Institute of Cytology and Preventive Oncology, New Delhi:

- Workshop on Research Methods relating to Oncological Studies with Computer Application (Febraruy 12-16, 1995).
- Workshop on Molecular Biology of Viruses and Cancer alongwith Oligo DNA Synthesis and Polymerase Chain Reaction (September 18-22, 1995).

Occupational Health

At the National Institute of Occupational Health, Ahmedabad:

- Training Course on Pesticide Residue Analysis (February 6-17, 1995)
- Orientation Course on Occupational Health for Industrial Medical Officers (November 13-24, 1995)
- Training Course on Air Pollution Monitoring and Risk Assessment (December 13-19, 1995).

Medical Entomology

At the Vector Control Research Centre, Pondicherry:

- M.Sc. in Medical Entomology (From August 1995: for 2 years).

Laboratory Animal Technology

At the Laboratory Animal Information Services Centre, National Institute of Nutrition, Hyderabad:

- Training Course for Laboratory Animal Technicians (June - July, 1995).

ICMR PUBLICATIONS

	Price Rs.
Nutritive Value of Indian Foods (1985), by C. Gopalan, B.V. Ramasastri and S.C. Balasubramaniam, Revised and Updated (1989), by B.S. Narasinga Rao, K.C. Pant and Y.G. Deosthale	21.00
Growth & Physical Development of Indian Infants and Children (1972, Reprinted 1989)	10.00
Studies on Weaning & Supplementary Foods (1974, Reprinted 1986)	6.00
Studies on Pre-School Children (1974, Reprinted 1986)	6.00
A Manual of Nutrition (Second Edition 1974, Reprinted 1992)	4.50
Low Cost Nutritious Supplements (Second Edition 1975, Reprinted 1994)	4.00
Menus for Low Cost Balanced Diets and School Lunch Programmes Suitable for South India (Third Edition 1977, Reprinted 1991)	4.50
Menus for Low Cost Balanced Diets and School Lunch Programmes Suitable for North India (Second Edition 1977, Reprinted 1994)	4.50
Some Common Indian Recipes and their Nutritive Value (Fourth Edition 1977, Reprinted 1991) by Swaran Pasricha & L.M. Rebello	10.00
Nutrition for Mother & Child (Third Edition 1978, Reprinted 1991) by P.S. Venkatachalam & L.M. Rebello	9.00
Japanese Encephalitis in India (Revised Edition 1980)	5.00
Some Therapeutic Diets (Fourth Edition 1988, Reprinted 1992) by Swaran Pasricha	4.50
Nutrient Requirements & Recommended Dietary Allowances for Indians (1990, Reprinted 1992)	13.00
Fruits (1983, Reprinted 1992) by Indira Gopalan & M. Mohan Ram	7.00
Count What You Eat (1989, Reprinted 1991) by Swaran Pasricha	9.00
Diet & Diabetes (Second Edition 1993) by T.C. Raghuram, Swaran Pasricha. & R.D. Sharma	18.00
Dietary Tips for the Elderly (1990, by Swaran Pasricha & B.V.S. Thimmayamma	3.50
Diet and Heart Disease (1994) by Ghafoorunissa and Kamala Krishnaswamy	26.00
*Depressive Disease (1986) by A. Venkoba Rao	58.00
**Medicinal Plants of India Vol.2 (1987)	136.00
**The Anophelines of India (Revised Edition 1984) by T. Ramachandra Rao	150.00

*10 per cent discount allowed to individuals. **25 per cent discount allowed to individuals.

These publications are available on prepayment of cost by cheque, bank draft or postal order (bank and postal charages will be extra) in favour of the Director-General, Indian Council of Medical Research, New Delhi. Money orders are not acceptable. All correspondence in this regard should be addressed to the Chief, Division of Publication and Information, Indian Council of Medical Research, Post Box No.4911, Ansari Nagar, New Delhi-110029 (India).

INDIAN COUNCIL OF MEDICAL RESEARCH

Grant-in-aid for organising Seminars/Symposia/Workshops

The Council provides partial financial assistance for organising Seminars/Symposia/Workshops. Applications for grant of financial assistance (complete in all respects in the prescribed proforma), will be considered only if furnished at **least four months before the date of commencement** of the Seminar/Symposium/Workshop, *etc.*.

Statement about ownership and other particulars of the ICMR Research Information Bulletin as required under Rule 8 of the Registration of Newspapers (Centarl) Rules 1956.

Place of Publication	:	Indian Council of Medical Research Ansari Nagar, New Delhi-110029.
Periodicity of Publication	:	Monthly
Printer's Name	:	Shri J.N. Mathur
Nationality	:	Indian
Address	:	Press Manager Indian Council of Medical Research Ansari Nagar, New Delhi-110029.
Publisher's Name Nationality Address	:	Same as above
Editor's Name	:	Dr. N. Medappa
Nationality	:	Indian
Address	:	Indian Council of Medical Research Ansari Nagar, New Delhi-110029.

I, J.N. Mathur, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/- J.N. Mathur
Publisher

Editorial Board

Printed and Published by Shri J.N. Mathur for the Indian Council of Medical Research, New Delhi at the ICMR Offset Press, New Delhi-110029

R.N. 21813/71