



# आरोग्य खनिक AAROGYA KHANIK

A NEWSLETTER OF NATIONAL INSTITUTE OF MINERS' HEALTH

VOLUME II, ISSUE 4, APRIL 2012

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## Events

- Training Workshop
- Visits
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## Forth Coming Event

“Workshop on ILO Classification of Chest Radiograph of Pneumoconiosis 30th Oct -n 2nd Nov 2012, India Habitat Center, New Delhi.”

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## Research Advisory Council of NIMH



The Meeting of Research Advisory Council of NIMH under Chairmanship of Prof. S. P. Banerjee was held on 24<sup>th</sup> January, 2012 in the Committee Room of JNARDDC. In the meeting, RAC reviewed research programmes, clientele sponsored programmes of the Institute and suggested improvement wherever necessary. The members also took keen interest in the proposed project of "Capacity Building at NIMH" and while appreciating necessity for expansion of the Institute, unanimously endorsed the future plans of the Institute. The members also opined that the proposal should be forwarded for inclusion in the 12<sup>th</sup> Five Year Plan to the Government .

## Ancient Copper Mines of Chalcolithic Period

The Chalcolithic period or Copper age or Eneolithic/Aeneolithic period is the phase in human civilization where mankind started extracting metals from earth crust and used them as tools along with stone tools in sixth millennium BC. The oldest Chalcolithic Copper mine in the World is Timna Valley which existed in Circa (ca) 3500 BC. The lower part of the mountain slopes have rich deposit of Copper nodules (55% Copper) mainly malachite and Chalcocite which were mined in ancient times.



**Chalcolithic Timna Copper Mine**

Archeologist Nelson Glueck in 1930 named the Timna Copper mining site as "King Solomon's Mine" which existed in 10<sup>th</sup> Century BC. Archeological evidence reveal that Copper mine existed in Timna valley during the Chalcolithic period, Early Bronze age, Late Bronze age, late bronze-Iron and Roman period. In 1959 Professor Beno conducted an archeological expedition of Timna valley and discovered 10,000 Copper mining shafts, smelting camps with furnaces, rock drawings, Geological features, shrines, temples, Egyptian mining sanctuary, jewelry and other artifacts.



The main Geological features of Timna Valley are Mushroom and Solomon's Pillars and Arches. Mushrooms are the unique Geological monolithic, mushroom-shaped, red sandstone rock formation. This mushroom shape was caused by wind, humidity and water erosions over centuries. They are surrounded by Copper ore smelting sites which dates between 14th and 12th centuries BC.

**Debasis Chatterjee**

### OUR VISION

"Safe Mines  
and Healthy  
Miners"

## HISTORICAL REVIEW OF INSTRUMENTS

### Thermal Precipitator

The Thermal precipitator consists of a 'head' water aspirator and control box. The head is made out of two brass blocks bolted together with strips of Bakelite between them, in such a way as to leave a channel running vertically through the head. A nichrome resistance wire is stretched across the centre of the channel, and this is electrically heated at 1.2 amps, supplied by a two volt accumulator in control box. On each side of the wire, microscope cover glasses are inserted through cylindrical holes at the sides of the head and kept in position by brass plugs.

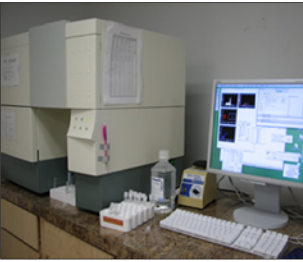


The Thermal precipitator head is connected to a water aspirator (1200 cc) which is supported on a stand. Dusty air is drawn through the instrument by allowing water to run out of the aspirator at 7c.c. per minute. The dust particles being unable to penetrate the dust free barrier extending across the channel are deposited by thermal action on the cover glasses. The instrument is 100% efficient up to 5 micrometer size and a fraction or so less between 5 micrometer and 10 micrometer particles. After the removal of combustibles, particles derived from the atomisation of the mine water use in rock drills (acid solubles) are eliminated by immersing the cover glasses. The cover glasses are heated for 15 minutes to drive away moisture and allowed to cool. Then they are mounted, deposit down wards on 3"x 1" glass slides by sealing the edges with paraffin wax. The counting is done using a micro projector, with high power light field technique at magnification of 1940. After calculations, the dust counts are expressed in particles per cubic centimetre of air. The eyepiece graticule used for the determination of the number and size frequency of particles is of Weston type, in which the dust particles are matched for size against a series of discs of rings ranging in size <math><0.5 \mu</math>, <math>0.5\mu</math>, to <math>5.0\mu</math> and <math>> 5.0 \mu</math>.

**G. S. Ravindra**

## Flow Cytometry

Flow cytometry is a technique for counting, examining and sorting microscopic particles suspended in a stream of fluid. It allows simultaneous multiparametric analysis of the physical and/or chemical characteristics of single cell flowing through an optical and/or electronic detection apparatus. Flow cytometry involves analysis of the fluorescence and light scatter properties of single particles (e.g. cells, nuclei, chromosomes) during their passage within a narrow, precisely defined liquid stream. Applications in hematology include DNA content analysis of cell in leukemia, immunologic monitoring of HIV-infected individual, and assessment of structural and functional properties of erythrocytes, leukocytes, and platelets. An increasing number of clinically useful antibodies are creating more opportunities for routine clinical laboratories to use flow cytometry in the diagnosis and management of disease.

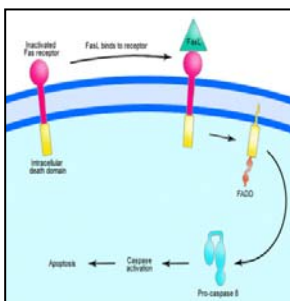


Every event that occurs during the process of lymphocyte activation can be measured by flow cytometry, calcium flux, oxidative metabolism, neoantigen expression (CD11b/CD18 and CD154), and cellular proliferation, Apoptosis (quantification, measurement of DNA degradation, mitochondrial membrane potential, permeability changes, caspase activity) can be determined by flow cytometry.

A variety of properties can be measured, for example the DNA content of the nucleus, the expression of a surface or intracellular antigen, the activity of an intracellular enzyme, the pH or Heat shock proteins.

**Divya Kumbhakar**

## Fas Ligand (FasL) Mediated Apoptosis in Silicosis



Fas is membrane bound protein belonging to the Tumor Necrosis Factor (TNF) gene family. It is expressed by lung epithelial cells. In silicosis patients, apoptosis is initiated when Fas is engaged by Fas trimers. The Fas associated Death Domain (FADD), adaptor protein, associates with multimerized Fas and recruits procaspase 8 to form the Death Inducing Signaling Complex (DISC). The procaspase 8 activates each other and induce the caspase-cascade and apoptosis pathway. Dysregulation of apoptosis, particularly in the FasL pathway, is considered to be involved in the pathogenesis of autoimmune diseases. There are functional similarities between Soluble Fas (sFas) and Decoy receptor 3 (DcR3). Both are soluble molecules, compete with membrane Fas (mFas) and FasL binding and prevent cells from undergoing Fas-mediated apoptosis therefore, it is possible that DcR3 is over-expressed and produced by peripheral blood mononuclear cells (PBMC) in order to make self-recognizing clones survive in an autoimmune disease or a preclinical autoimmune state such as silicosis.

Recently DcR3, that binds to FasL and inhibits FasL-induced apoptosis, has been identified. Serum sFas levels are elevated in silicotic patients who have no clinical symptoms of autoimmune disease. This indicates that disruption of the FasL apoptotic pathway may cause the presentation of clinical autoimmune symptoms and may be an important mechanism behind acquisition of autoimmune disease. It has been found that there is a decrease in Fas-L expression and silica induced apoptosis in old macrophages. The Fas and FasL expression in silicosis patients has been observed to be significantly higher than those in healthy controls. In these patients, FasL was highly expressed on CD4+, CD56+, and CD45+ (Cluster of Differentiation) bronchoalveolar lavage cells. Thus, FasL was significantly expressed on Cytotoxic effector and memory cells in silicosis.

**Lucky Thakkar**

## PME of GMDC Miners

National Institute of Miners' Health completed the third and fourth phase of Periodical Medical Examination of Miners' in GMDC Mines. A total of a 754 miners working in Tadkeshwar, Rajpardi, Bhavnagar Lignite Mines, Gadhsisa, Bhatia Bauxite Mines and Akrimota Thermal Power Station of GMDC in the Gujarat State were examined. The medical examination was conducted as per the standards prescribed under Rule 29B of Mines Rules, 1955 and Recommendation of 10<sup>th</sup> Conference on Safety in Mines. A General Physical Examination of every employee was carried out and recorded in Form "O". All chest X-rays were evaluated as per ILO Classifications of Radiographs of Pneumoconiosis, 2000 for detection of pneumoconiosis as recommended by Conferences on Safety in Mines. Spirometry, Audiometry were done as per standard practises. In addition to routine urine and blood sugar, Serum urea and creatinine were also included for assessment of renal function. Blood counts, differential count, percentage of hemoglobin and erythrocytes sedimentation rate were also analyzed to diagnose blood dyscrasias.

**-Dr. Sarang Dhatrak**

### Workshop on “Notified Diseases in Mines”



National Institute of Miners' Health (NIMH) in collaboration with Directorate General of Mines Safety (DGMS) organized a two-day workshop on “Notified Diseases in Mines” on 21<sup>st</sup> and 22<sup>nd</sup> February 2012 on the occasion of Miners' Health Day and Foundation Day of the Institute. The Chief Guest of the function was Shri G P Kundargi, Director (Production & Planning), MOIL Limited and the Guests of Honour were Shri R B Chakraborty, Deputy Director General of Mines Safety, Western Zone, Nagpur and Dr. S P Vivekchandra Rao, Vice President (Occupational Health), Hyderabad Industries Limited, Hyderabad. The basic purpose of workshop was to create awareness among the mine officials and medical doctors about the Notified disease under Mines Act, 1952 and to develop better understanding of the importance of detection, control and reporting of Notified Disease in Mines. The workshop also involved on-hand training of delegates in dust measurement and noise monitoring etc., and demonstration of ILO classification of Pneumoconiosis. The workshop was attended by 22 participants from different mining companies from all over the country.

### Director (Technical) visit NIMH



Dr. H.S.M. Prakash, Director (Technical), to Government of India, Ministry of Mine visited NIMH on 20<sup>th</sup> March 2012. During his visit, he interacted with officers, staff and students and visited occupational health, occupational Hygiene and Biochemistry departments. He took keen interest in understanding the function of NIMH and noted that the institute has a lots of scope for stepping up the level of research to cater to the need of nation and also the surrounding countries.

### CONSULTANCY SERVICES OFFERED BY NIMH

#### Occupational Hygiene Surveillance

- Airborne Respirable Dust studies and determination of free silica in accordance with MMR—124 of 1961.
- Area & Personal Noise Monitoring and Noise Mapping studies.
- Illumination studies in accordance with MMR 148(2) of 1961.
- Whole-body and Hand Arm vibration monitoring studies in mining machinery.

#### Occupational Health Surveillance

- Periodic Medical Examination of miners in accordance with DGMS guidelines
- Evaluation of X-Rays as per ILO classification for Pneumoconiosis
- Audiometry testing for evaluation of Noise Induced Hearing Loss (NIHL)
- Testing for various biochemical parameters
- Health Impact Assessment Studies

### Workshop on ILO Classification of Chest Radiograph

Workshop on “ILO Classification of Chest Radiographs for Pneumoconiosis-2000” by NIMH in collaboration with International Labour Organization, DGMS and AIR Pneumo Project of Fukui Medical University Of Fukui, Japan and Central Chest Institute of Thailand at India, Habitat Center, New Delhi India, 30<sup>th</sup> October -2<sup>nd</sup> November 2012 .Participation restricted to 50 delegates.

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