

In this issue

Non-communicable Diseases

DBT's contributions to research

In the last few decades, the development of drugs against disease-causing viruses, bacteria, protozoa, fungi, helminths, arthropods and other pathogens led to a drastic fall in mortality and morbidity due to communicable diseases. Life expectancy began to rise. But, side by side, the incidence and prevalence of non-communicable diseases also began to rise.

The Department of Biotechnology rose to the occasion, formulating strategies, and funding and facilitating collaborative and interdisciplinary research to face challenges in the surveillance, prevention and control of non-communicable diseases and to reduce the national disease burden. In a General Article in this issue, Sandhya R. Shenoy from DBT explains recent steps taken by DBT to energise research on cardiovascular and kidney diseases, diabetes, cancer, autoimmune and neurological disorders, systemic lupus erythematosus, disorders of the eye, low back pain and degenerative disc disease with a focus on applied, translational and cohort studies as well as clinical trials.

The General Article on **page 148** spells out the strategic support extended by DBT for research and development in critical areas of citizen health – a must read for biotechnology researchers in India.

Epigenetics of Longevity

In eusocial insects

The members of a eusocial insect colony having the same genetic makeup may still vary widely in morphology as well as the roles they play and the functions they fulfil within the colony. This provides an excellent opportunity for researchers to explore epigenetic mechanisms. There are different mechanisms to be understood: modifications of histones to allow or disallow enzymes access to relevant gene sequences, various types of modifications of specific bases in DNA and a host of control mechanisms exerted by various types of non-coding RNAs to modulate genetic expression.

A Review Article on **page 154** in this issue examines recent research on the epigenetic mechanisms of caste differentiation, behaviour and longevity in eusocial insects.

Gamma Radiation Exposure

In southeast Haryana

Radioactive isotopes of atoms are ubiquitous in nature – in the lithosphere, the hydrosphere and the atmosphere. In some locations, where it is very high, the chances of various types of cancers increase. What is the health risk due to natural outdoor radiation in southeast Haryana?

Researchers from the M.D. University, Rohtak selected 50 villages from three districts, Jhajjar, Sonapat and Rohtak for their survey. Gamma ray measurements showed variations between the sites selected. Gamma radiation was higher in winter than in summer in all three locations. But exposure doses on people living there was not high enough to warrant worry. In fact, exposure to such low doses of gamma rays is protective: it stimulates DNA repair mechanisms. This can lead to reduced incidence of several diseases. The Research Article on **page 169** in this issue will bring good news and cheer for people in southeast Haryana.

Detecting Forged Fingerprints

Fingerprints have played a major role in forensic science and crime detection for many decades now. Today fingerprint detection is common in many digital devices for biometric verification. But criminals have now started forging fingerprints using polyvinyl acetate. How can we detect and distinguish a forged fingerprint from a real one? Researchers from Amity University and the Central University of Haryana provide a simple solution to the problem in a Research Article in this issue.

Latent fingerprints are traditionally made visible by black powder, ninhydrin, silver nitrate or by fuming iodine. Once they become visible, there is software that can enhance, calibrate and

compare fingerprints. But these methods cannot distinguish between forged and real fingerprints.

The researchers thought of the Hertzberg stain. The stain is made easily by mixing zinc chloride and iodine potassium iodide and is not unknown to forensic science. It has been used for detecting and distinguishing various fibres. The researchers found that it can be used to detect fingerprints forged using polyvinyl acetate. But real fingerprints cannot be developed using the stain.

The team then tried combinations of the Hertzberg stain and traditional methods to find out the best combination to develop both real and forged fingerprints, but with adequate differences to enable distinguishing real from forged ones. A combination of ninhydrin and the Hertzberg stain produced the best results for differentiating forged from real fingerprints.

For a typical example of scientific sleuthing, turn to **page 160** and read more.

Agriculture in Arunachal

Transforming tradition

Jhum cultivation, where forests are slashed and burned to make way for agriculture for short durations, is slowly giving way to more settled agroforestry practices in Arunachal Pradesh, report researchers from Rajiv Gandhi University.

The researchers, after surveying three districts in the state, find that the number of farmers opting for agroforestry has been increasing in the last decade. Irrigation schemes, training programmes, seed subsidies, technical inputs and links to agricultural marketplaces are some of the factors that may have provoked the transition. Agroforestry makes better economic sense to the farmers there and provides nutritional security to their families, say the researchers. Turn to **page 220** for more.

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