

## In this issue

### Assessing River Health

#### *Gaps in GAP*

The river Ganga covers more than 2,500 km, passing through many cities, towns and villages. The river supports more than 40% of India's population! It provides water for drinking, irrigation, navigation and recreation. The water is drawn for agriculture, industry and cities, but what is returned to the river is only waste.

Although the Government of India launched the Ganga Action Plan I (GAP-I) in 1986 and, in 1993, expanded it to GAP-II, and continued to expand it to the National Ganga River Basin Project, in 2011, the health of the river remains a serious concern.

Except for assessing the health of the Yamuna, under the '*Yamuna Jiye Abhiyan*', most of the work in India focused only on water quality index, says a Research Article on **page 263** in this issue. And this has, indeed, been the problem: there are severe limitations to measuring river health with physicochemical properties alone.

Firstly, water quality does not provide any information about actual damage to biota. After all, the river supports much fauna and flora, including the endangered river dolphin. Moreover, the conditions of the catchment, floodplains, hydrological and geomorphological aspects also impact water quality and these should be taken into consideration when measuring river health.

River health assessment programmes, associated with a culturally sensitive context like the Ganga, need collaboration and public participation.

To help bridge the gap between science and the sacred, researchers from the Banaras Hindu University examine attempts at measuring and restoring river health in the US, Europe, Australia, China, South Africa and India to derive a more comprehensive set of indices and suggest participatory river protection and rehabilitation.

### Drug Design for Diabetes

#### *Derivatives of PPA agonists for PPAR*

Diabetes, diagnosed by excess sugar in blood, can be simple to control if it is

due to lack of insulin. Thus, type-2 diabetes has a well established treatment regime: keep track of sugar in blood and administer insulin when needed. But type-2 diabetes is more intractable: there is insulin in the blood, but the receptors on the cells do not respond by sending off signals to use up the sugar.

Enough evidence has accumulated in the recent past to show that the Peroxisome Proliferator-Activated Receptor (PPAR) family of proteins, residing on the nuclear membrane, has a role to play in the development of insulin resistance. It is crucial in keeping a balance between sugar and lipid metabolism. Among the members of the PPAR family, scientists suspect PPAR- $\gamma$  as the main culprit.

And there is also evidence that phenylpropanoic acid (PPA) derivatives act as agonists of these receptors. So they could be used in controlling type-2 diabetes. However, PPA has many derivatives. Which one is the best?

To solve the problem, scientists in the Maulana Azad National Institute of Technology, Bhopal, turned to computer simulations. Chemometric modelling using structure activity relationships, docking studies and the pharmacophore analysis of 46 derivatives of PPA, home in on the essential features that are necessary to design a drug with optimum PPAR activation capacity.

For further information, read the Research Article on **page 356** in this issue.

### Forest Fires in Uttarakhand

#### *Man starts, monsoon stops*

Forest fires are quite common in the Himalayas. But they don't make it to newspapers as much as forest fires in Canada, the US or Australia do. Perhaps because they are comparatively smaller. Moreover, they are limited to the forest floor and, thus, do not often show up in satellite imagery. But the fact is that there are too many of them. And on the mountain slopes of the Himalayas, forest fires have consequences that are quite different from fires in plains.

Firstly, there is pollution and the associated health conditions of locals and then the depletion of biomass from hills

and fertility erosion after the onset of the monsoon. The seeds of some trees sprout after forest fires while those of other species perish. And this, in time, changes the type of forest cover. Thus, ecologists and environmentalists have been concerned about the phenomenon.

In a Research Communication on **page 388** in this issue, scientists in the Kumaon University and the Central Himalayan Environment Association, compare and contrast the timing, frequency and size of the man made forest fires of the Bageshwar and Chamoli Forest Divisions in the Uttarakhand. And they came up with data that is useful in anticipating fires and reducing chances of outbreaks.

### Modern Medicine at Crossroads

#### *Integrating Tradition*

Medical practice today has an ambivalent attitude towards traditional practices. On the one hand, there is recognition that many modern medicines have origins in traditional practices. On the other hand, there is reluctance to integrate traditional systems into patient care systems. While education in Ayurveda and Homeopathy exposes students to modern biomedical concepts and practices, education in Allopathic systems ignores 'alternative medicine'. Lack of evidence from double blind randomized control trials and lack of strict adherence to standardized protocols for the production of medicines are the reasons given. In spite of many attempts by the Government to provide credibility to indigenous systems such as Yoga, Siddha, Ayurveda and Unani, most patients turn to these 'alternatives' only when the allopathic systems fail to give relief.

The traditional medicine practitioners, thus, have no way to counter, except to become researchers and to provide evidence. And in the recent past, many success stories have emerged to help the integration of these practices. The Special Section starting on **page 278** in this issue brings together recent advances in this area.

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