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Multi-session Examinations

Normalising marks

When a large number of candidates take an exam, computerised multiple choice questions help reduce time and effort for evaluation. Sometimes, when the number of computer terminals is not adequate for the purpose, the examination is conducted in batches. In such cases, each batch has to be given a different set of questions to avoid question leakages from earlier batches.

Though examiners can try to make all question papers equal in terms of perceived difficulty, it is not always possible and the results, therefore, become questionable. So the marks have to be normalised between batches to select the best candidates.

Researchers at the Indian Statistical Institute and the Chennai Mathematical Institute examine the four schemes available to do this. They simulated schemes to find the best method. Agencies and departments involved in the large scale administration of multiple choice questions may like to reassess their strategies after reading the General Article on **page 34** in this issue.

Violence Against Doctors

In the recent past, there have been many cases of violence against doctors by patients and their relatives. Why does this happen?

In a General Article in this issue, Gautam Ganguly analyses the problem and suggests ways to reduce the chances of such occurrences. A must-read for doctors, managers of hospitals, public health administrators and policy makers. Turn to **page 40**.

Euglena Population in a Lake

Gleaning the details

In the heart of Thiruvananthapuram city, there is a museum, an art gallery and zoo, all in one complex which also contains a lake of about 9000 square metres. It is a natural water body and retains water even in scorching summers. Come the rainy season, the water becomes slightly muddy and is mixed with the detritus from surrounding trees and the droppings of bats that live nearby. Anila P. Ajayan, Mahatma Gandhi College and Ajit Kumar, Kerala State Biodiversity Board, have been studying the ecology of this lake for some years now.

Can euglena populations in the lake provide indications about organic pollution? Which are the best euglena species that can be used as ecological indicators? They wondered. Euglena can use photosynthesis like plants and are motile and eat like other protozoans. So they have a special position among living creatures.

To tackle the question, they collaborated with Jan W. Rijstenbil, an expert from the Netherlands on the impact of environment on water quality. They examined the association of the variations in euglena species in the lake and the possible environmental factors over all the seasons. Out of the 23 species of euglena, they could identify 3 which may serve as bioindicators. But the attempt to correlate the environmental factors and the euglenoid abundances brought out interesting questions.

To read the beginnings of what looks like a detective story, turn to the Research Article on **page 94**.

Kiwi Fruit and Star Anise

Neutraceuticals against cancer

Both the Kiwi fruit and star anise originated in China millions of years ago. Now researchers from Egypt and Saudi Arabia report their beneficial effects in this issue of your favourite journal published from India. Science knows no boundaries except rigour of experimental investigations.

Inject some oesophageal carcinoma cells into mice. When the cancerous cells start multiplying inside the animal, take five grams of star anise, boil it on low heat for about 10 minutes. Cool and strain it. Peel a kiwi fruit. Blend it using a mixer. In the morning every day, feed the mice one millilitre of the fruit juice or the star anise extract or a mixture of the two. For comparison, inject 10 milligrams of cisplastin, an anticancer drug, into the peritoneum of another group of mice. As controls, give no medicine to another group and have some normal mice without cancerous growth. After fourteen days, check blood count, the number of cancer cells, check liver function, performance of the spleen, and analyse the cell cycle stage.

You don't have to do these experiments. It is easier to read the Research Article on **page 87** to find out the results that may have implications on the treatment of cancer without consequent side effects.

Protein Interaction Network

Identifying cancer genes

Most phenotypic traits are controlled by many genes. Take the case of uncontrolled proliferation of cells – cancer. The list of genes implicated has gone beyond 4500. And there are more than 30,000 that we know have some chance roles to play in cancer. To identify the remaining by traditional research methods might take more decades. Researchers from the Rajagiri School of Engineering and Technology, Ernakulam have now come up with a strategy for a short cut: network analysis.

The relationships between the proteins and their interactions allow the use of graph theory to construct networks to identify those that interact closely and those that are removed by other nodes. Thus community structures of the proteins can be delineated.

The technique can help us predict whether a protein that has not been considered in their analysis has the potential to cause cancer or is involved in some manner in cancerous growth, assert the researchers in a Research Article in this issue. Turn to **page 62** for more details.

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