

In this issue

Dietary restriction

Systematic studies on dietary restriction (DR) have been undertaken with success in various experimental animals and have contributed to an increase in longevity and the postponement of age-related diseases. DR, a reduction in calorie intake without malnutrition, plays an important role in neuroendocrine and immune systems and also in general carbohydrate, protein and fat metabolism. Among various intervention strategies, DR has been shown to be the most powerful modulator of the ageing process in diverse groups of organisms. It is an efficacious means of increasing longevity and reducing age-related pathology. Its multifaceted effects are achieved by various modes primarily by potentiating the immune responses, lowering oxidative stress, acting as a neuroprotector, and attenuating major inflammatory processes. DR, thus, has robust effects on delaying mortality, increasing the life span and attenuating chronic diseases of old age that may be superior to pharmaceutical intervention. Once its detailed regulatory mechanisms are established, it could be an important tool to prevent diseases of old age and to promote healthy (quality) ageing in humans in near future. See page 1203.

Polygalacturonase-inhibiting proteins

Gomathi and Gnanamanickam review (page 1211) the importance of the 'polygalacturonase-inhibiting proteins (pgip)' in plant defence against invading pathogens. This group of proteins belong to the superfamily of leucine-rich repeat (LRR) proteins present in the primary cell walls of plants that inhibit the polygalacturonases (PGs) secreted by pathogenic microorga-

nisms. Their inhibitory action stops the aggressiveness of pathogens. They are a class of the PR (pathogenesis-related) proteins with a definite role in plant defence. The authors survey a number of PGIPS (arranged in a table), discuss the early discovery, hardships in their purification, specific properties and their fascinating molecular characteristics. Recent advances in incorporating *pgip* genes for pathogen-resistant transgenic crop plants are also discussed.

Laminar and turbulent flows

Umur and Ozalp (page 1237) experimentally investigate the combined effects of pressure gradients and surface curvature on the boundary layer development and the convective heat transfer. Velocity and wall temperature measurements were carried out with inlet velocities of 3 and 15 m/s, encompassing laminar and turbulent flows on concave, flat and convex surfaces so that the velocity profiles were presented in non-dimensional form and convective heat transfer as Stanton numbers. Three empirical equations have also been produced to determine the streamwise variation of Stanton number as functions of momentum thickness, pressure gradient parameters and surface curvature.

Bioremediation

Bioremediation has been recognized as a cheaper and more effective alternative to physico-chemical means of remediation. Aromatic compounds and their derivatives often exist in the environment at a higher concentration than desired due to anthropogenic activities and may be a source of environmental pollution. Aromatic compounds are also present as components of complex polymers such as lignin that comprises about 25% of the land-based biomass on earth. Recycling of such aromatic compounds is vital for maintaining the earth's carbon cycle. In recent years, attempts have been made toward exploring microbial potentials for remediation of environmental pollution. Understanding the biodegradation of structurally simpler aromatic compounds facilitates studies on more recalcitrant members of the group.

p-Hydroxybenzoate (PHB), formed during the degradation of lignin, is subsequently degraded to protocatechuate that enters the β -ketoadipate or the *ortho*-cleavage pathway. D. Paul *et al.* (page 1263) have studied the degradation of PHB by *Arthrobacter protophormiae* and *Burkholderia cepacia*. These organisms were isolated and characterized in their laboratory. They demonstrate that although PHB degradation followed the same route, the placement of gene(s) on the genome differed in the two organisms. In *A. protophormiae* the genes were found to be chromosomally encoded whereas in *B. cepacia* they were plasmid-borne.

Dating of fibrous gypsum along fault plane

Mathew *et al.* (page 1269) report the application of Electron Spin Resonance (ESR) technique in detecting the radiation sensitive defects in gypsum that can be used for dating the fibrous gypsum, grown perpendicular to a fault plane. The authors discuss that the fault movements can be dated by several methods provided suitable material exists for different techniques of age estimation. The most successful method of determining the age of a fault is ESR dating of finely crushed materials *fault gouge*. According to them if such materials are not preserved, minerals that have grown after the movement along the fault plane would give the upper limit of last movement.

Based on petrographic studies they show that the fracture/fault opening and growth of fibrous gypsum are contemporaneous. ESR spectroscopic investigation reveals that during its crystallization, the crystals have incorporated charge deficit/defect sites that are capable of trapping electrons, and form paramagnetic centres. The study shows that although several defect centres are seen in gypsum crystals, the signal associated with $g = 2.008$ attributed to $\text{CO}_3^{\cdot -}$ radical are suitable for radiation sensitive chronometry. The age ~ 70 ka of a normal fault plane in the Katrol Hill range, Kachchh indicates that they have formed on account of the compressive stresses perpendicular to the principal stress that got filled later by sulphate-rich solutions.

