

Extension of a local backbone description using a structural alphabet: a new approach to the sequence–structure relationship

A. G. de Breverá *et al.*
Prot. Sci., 2002, **11**, 2871–2886.

Seventy-two most frequent sequences of five protein blocks (PBs) are grouped into structural words (SWs). Analysis of four protein databanks shows that SWs provide a good approximation for prediction of structure of sequences, 9 c- α -long.

An RNA thermosensor controls expression of virulence genes in *Listeria monocytogenes*

J. Johansson *et al.*
Cell, 2002, **110**, 551–561.

Transcriptional activator PrfA regulates expression of virulence genes in *Listeria monocytogenes* in a temperature-dependent manner. Chemical probing and compensatory mutagenesis studies suggest that the 5' UTR of the mRNA of PrfA forms a secondary structure that is important in thermoregulation that switches between an active structure at high temperatures and another inactive one at low temperatures. This hypothesis is further confirmed by GFP-fusion experiments in *E. coli* that becomes fluorescent at 37°C but not at 30°C.

ARROGANT: an application to manipulate large gene collections

A. V. Kulkarni *et al.*
Bioinformatics, 2002, **18**, 1410–1417.

ARROGANT (ARRay OrGANizing Tool) is a newly developed software package containing three modules of a web server, a database server and a computer server. The objective of the package is to provide an interface to compile genes and clones from different databases facilitating identification, annotation and comparison of large collections. ARROGANT has been used to handle human microarray data to study cancer.

Determination of the equation of state of dense matter

P. Danielewicz *et al.*
Science, 2002, **298**, 1592–1596.

The repulsive forces between two nucleons make nuclear matter difficult to

compress beyond a limit, giving rise to approximately the same saturation density for most stable nuclei. Matter within neutron stars and core-collapse supernovae exists at higher density, a situation that can be simulated in the laboratory by nuclear collisions. To relate the equation of state, containing the pressure, density and temperature terms with the experimental observables, a model is formulated within the relativistic Landau theory. The dense state of the matter is analysed under pressures in excess of 10^{34} pascals that can provide the experimental laboratory system to study properties of neutron-rich matter and dense astrophysical objects.

RNA helicase-like protein as an early regulator of transcription factors for plant chilling and freezing tolerance

Z. Gang *et al.*
Proc. Natl. Acad. Sci. USA, 2002, **99**, 11507–11512.

Freezing tolerance in plants reduces damage caused by chilling injury. Mutational analysis in *Arabidopsis thaliana* identifies a nuclear localized RNA-helicase as a regulator of resistance to chilling injury in plants.

A new method to determine the foeto-placental volume based on dilution of foetal haemoglobin and an estimation of plasma fluid loss after intrauterine intravascular transfusion

M. Hoogeveen *et al.*
Br. J. Obstet. Gynaecol., 2002, **109**, 1132–1136.

Anaemic foetuses call for restoration of delivery of oxygen to the foetal tissues usually through intrauterine intravascular transfusion. This paper reports a procedure to calculate the foeto-placental blood volume and the transfusion-induced loss of plasma fluid.

Stochastic and genetic factors influence tissue-specific decline in ageing *C. elegans*

L. A. Herndon *et al.*
Nature, 2002, **419**, 808–814.

Availability of over 50 mutants has made *Caenorhabditis elegans* an important model experimental system for studying

the genetics of ageing. Using fluorescent microscopy and transmission microscopy, the morphology of different cells is observed as the animal ages in the wild-type and in the age-1 mutant. Results indicate the involvement of both stochastic and genetic factors in the ageing of *C. elegans*.

Observational bounds on quantum gravity signals using existing databanks

D. Sudarsky *et al.*
Phys. Rev. Lett., 2002, **89**, 23301.

Interplay of cosmology, atomic and nuclear physics leads to the nature of quantum gravity, that has been difficult to experiment within a laboratory system. This letter reconsiders already existing experimental data to explore the effects arising from the quantum gravity corrections to the propagation of fields.

Thermodynamics of rotating self-gravitating systems

E. V. Votyakov *et al.*
Eur. Phys. J., 2002, **29**, 593–603.

The statistical equilibrium properties of a system of classical particles enclosed in a three-dimensional spherical volume are investigated assuming that the particles interact via Newtonian gravity. Such a system generates 'gravitational collapse' at low angular momentum, and 'double clusters' at high angular momentum. Breakdown of rotational symmetry, the stability, and the thermodynamics of the system are discussed.

Site-specific incorporation of an unnatural amino acid into proteins in mammalian cells

K. Sakamoto *et al.*
Nucleic Acids Res., 2002, **30**, 4692–4699.

3-iodo-L-tyrosine is incorporated into proteins in mammalian cells utilizing a suppressor t-RNA^{Tyr} and a mutant tyrosyl-tRNA synthetase pair. The *E. coli* mutant synthetase is expressed in mammalian cell line to incorporate the unnatural amino acid at amber positions, when the cells are grown in presence of 3-iodo-L-tyrosine.