British Society of Rheology: One Day Meeting on the Rheology of Biosystems

The Novartis Foundation, London, UK
September 21, 1999

The BSR held a one day meeting on the Rheology of Biosystems at the Novartis Foundation in London on a rather damp 20th September 1999. Thirty-seven delegates attended and there were six invited lectures together with a poster session.

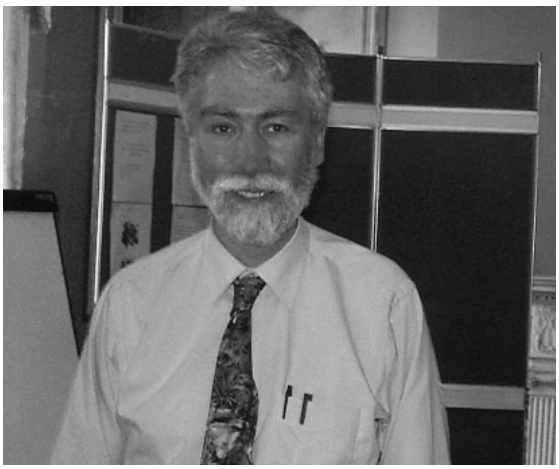
Dr. Jeff Odell from Bristol University opened the meeting talking about his work on *hyaluronic acid*. This polymer forms a vital part of sinovial fluid that lubricates knee joints and Dr. Odell described how recent advances in crosslinking hyaluronic acid and injecting a gel suspension into knee joints has produced therapeutic relief. He described work that has been carried out at Bristol both using micro-indentation techniques and extensional flow in order to elucidate physical properties of the polymer and polymer gel particles. In particular he reported the measurement of gel elastic moduli as low as 200 N/m^2.

Dr. Mike Rampling from Imperial College London Medical School gave an authoritative review on the rheology of *human blood*. He discussed the many factors that effect blood rheology including temperature, haematocrit (amount of red blood cells), shear rate and presence of plasma proteins. Blood clearly shows significant shear thinning characteristics with variations from low to high shear rate between 1 - 10^{-2} Pas. He gave a number of examples where blood disorders can be related to pathological symptoms, however he was also clear that much still needs to be done in linking blood rheological response to biological function.

Dr. Malcom Faers from Argevo talked about his work on using biopolymers such as *zantham gum* to help keep sub micron particles in suspension. Remarkably small amounts of polymer were required to stabilise suspensions from sedimenting and the concept of depletion flocculation was important in explaining many of his results.

Professor Simon Ross Murphy from King's College London opened the afternoon session with review of his group's work on the gelation kinetics of physical gels such as *gelatin* and "het set" gels such as *globular proteins*. In the former case the formation of inter helix bridges between chains appears to control the network formation and in the latter case the globular proteins appear to "unfold" and then attach to each other to form a network chain.

Professor John Trinick from the School of Biomedical Sciences at Leeds University educated the meeting on the *giant muscle molecule, Titin*. This long chain molecule appears to control the elasticity of muscle and some of its mysteries are now being probed using a combination of electron microscopy and the new technique of atomic force microscopy to measure the stretching behaviour of single chains!



Dr. Jeff Odell

Finally, Dr. Imad Farhat spoke about the rheological work being carried out within the Division of Food Sciences at the University of Nottingham. He described nice systematic studies where they are using DMTA to probe the way the glass transition temperature of *amylopectin / gelatin / water* systems are influenced by its relative composition and water sensitivity. He was even able to relate his data to the mechanical properties of bread being fried for breakfast!

The meeting covered a lot of ground both in relation to types of bio-molecules considered and also in relation to their physical state. There was lively debate after each presentation which indicated consistent interest in such a wide range of different biosystems. The additional complexity of bio-systems to synthetic polymer Systems was very apparent and the further dimension of relating microstructure and rheology to biological function remains a challenging problem for the future.

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This is an extract of the complete reprint-pdf, available at the Applied Rheology website
http://www.appliedrheology.org

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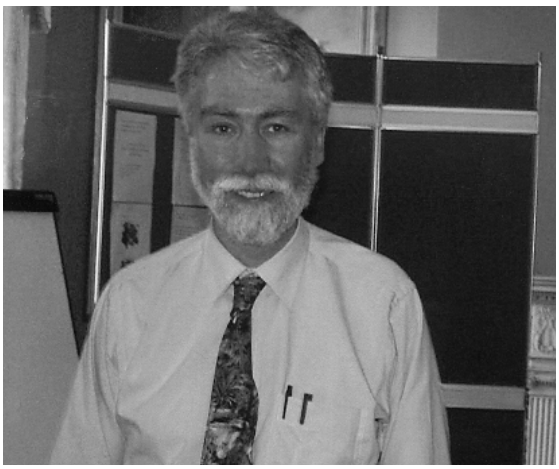

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