



Anadolu Reoloji Derneği Anatolian Society of Rheology

Webinar Series # 3 : Prof. Dr. Gerald G. Fuller

Başlık/Title: **Investigating the Development of Pathological Air Mucus using Active Microrheometry**



Biography: Gerald Fuller is the Fletcher-Jones Professor of Chemical Engineering at Stanford University. He joined Stanford in 1980 having received his Ph.D. from Caltech and his B.Sc. from University of Calgary. His research interests lie in the subjects of interfacial fluid mechanics and rheology with a particular focus on problems in biophysical phenomena, foams, and emulsions. His work has been recognized by receipt of the Bingham Medal of the Society of Rheology, election to the National Academy of Engineering, and Fellowship in the American Academy of Arts and Science. He has been granted honorary doctorates from the Universities of Crete and Leuven. He presently serves as the General Secretary of the International Committee on Rheology.

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Konu/Subject: Airway mucus serves as a protective layer lining the bronchial epithelial cells or our lung airways. It is a viscoelastic, semi-dilute mixture primarily consisting of mucins (MUC5AC and MUC5B). Resting upon ciliated cells, it is continuously brought upward to our mouths where it is swallowed, thereby removing contaminants in the form of viruses, bacteria, and debris. However, diseases states, such as acute asthma and cystic fibrosis cause an elevation of the elasticity and viscosity of the mucus layer, making it difficult to transport upward. Consequently, stagnant mucus layers become hosts for infection diseases that can lead to pneumonia. This presentation describes the use of active microrheology to directly measure the viscoelasticity of mucus residing directly upon living air-liquid-interface (ALI) bronchial epithelial cells. The cytokine, IL-13, is used to stimulate asthmatic conditions and it is found that the mucus transitions from a viscoelastic liquid towards a viscoelastic gel. The cause of this transition is found to be an elevation in the production of MUC5AC and thiol peroxides. The peroxides cause cross linking reactions to occur that stiffen the mucus. It is demonstrated that the rheological instrument developed in our laboratory is a valuable tool for exploring a number of problems in the area of human health.

Katılım ve bağlantı linki e-posta ile gönderilecektir / *The connection link will be sent via email*

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