**Effect of treatment with oligosaccharide nanomedicine on the rheology of cystic fibrosis sputum**

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**Objectives:** Modulation of sputum rheology represents an important therapeutic target in chronic inflammatory lung disease such as cystic fibrosis (CF). The novel alginate oligomer (OligoG) modulates pseudomonal biofilms and increases susceptibility of multi-drug resistant bacteria to antibiotics and has previously been shown to modify rheology of mucin/alginate gels, mucin/DNA gels and sputum from a CF patient. This study tested the ability of OligoG to modify the rheological properties of CF sputum.

**Methods:** The effect of OligoG on the viscoelastic properties of sputum samples from cystic fibrosis patients (n=23) and in a longitudinal study (10 weeks) was studied using shear and extensional rheology. Samples were subjected to 7 treatment modalities:

i. distilled water control;
ii. 7% saline;
iii. 100 nM dornase alpha (Pulmozyme®; Pz);
iv. 0.2% OligoG;
v. 2% OligoG;
vi. 100 nM Pz and 0.2% OligoG;
vii. 100 nM Pz and 2% OligoG.

An oscillatory frequency sweep was conducted and the values of storage and loss modulus (G', G'') analysed to detect changes in viscoelasticity. Extensional rheology was employed to detect changes in 2% OligoG treated sputum, in comparison to the control.

**Conclusion:** OligoG significantly decreased the storage and loss modulus of sputum (P<0.0001), as well as the extensional viscosity. OligoG also significantly potentiated the effect of Pz (P<0.01). These studies show that use of inhaled oligosaccharide nanomedicines such as OligoG may provide a novel, well-tolerated therapeutic approach in the treatment of impaired lung clearance and chronic bacterial colonization in chronic inflammatory lung diseases.