**Effect of zinc**-d**oped phosphate-based glasses on *Streptococcus mutans* NCTC10449**

S. P. Valappil\*, S. Rajadorai, A. Robinson, G. Harris, S.M. Higham.

\*Department of Health Services Research and School of Dentistry, University of Liverpool, United Kingdom

Novel zinc doped phosphate-based glasses (Zn-PBGs) are controlled delivery materials of zinc ions which may significantly impact *S. mutans*, a caries-associated bacterium.

Zinc (3mol%) doped (Zn-PBG) and control Zinc free PBG (c-PBG) rods (5x2mm) were produced using conventional melt quenching, at 1100°C for 1hour. For antibacterial assay, discs were placed on isosensitest agar previously inoculated with *S.mutans* NCTC10449, incubated for 24h anaerobically at 37°C. Diameters of inhibition zones were measured in triplicate. Liquid broth assay was conducted in phosphate buffered saline using *S.mutans* suspension (OD600=0.03) exposed to different Zn-PBGs (with increasing calcium concentrations; C11, C12 and C13) and controls. At 2, 4, 6 and 24h, samples were removed, diluted appropriately in PBS, spread on BHI agar to assess viable colony-forming units (CFU) present. *S.mutans* biofilms were grown in a constant depth film fermentor on hydroxyapatite, using artificial saliva. At 6, 24, 48 and 120h; discs containing biofilms were removed, subjected to 10 min exposure of Zn-PBG (C11) compared with 0.2% chlorhexidine or water. Statistical analyses were conducted using R software (Vienna, Austria). Tukey-Kramer multiple comparison tests were used to compare values and P values <0.05 considered statistically significant.

Inhibition zones decreased significantly (p< 0.03) as calcium concentration in the glasses increased (from 18±1.7, 16±1.6 to 15.0±1.1 mm for C11, C12 and C13 respectively) and in liquid broth assay (p< 0.03). The biofilm study Zn-PBG (C11) achieved growth inhibition of *S. mutans* NCTC10449 at 48 and 120h compared with both controls, with a maximum of 0.95 log CFU reduction at 120 h (p< 0.04).

Zn-PBGs inhibited *S. mutans* growth. Increasing calcium concentration in Zn-PBGs decreased antibacterial effects, C11 composition, may have potential use as an anti-caries agent.