Anti-arthritic and anti-proteus activities of colloidal metallic silver (CMS)
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Introduction. Colloidal silver has been used as an antibiotic for over 100 years (Cock et al 2012). Patients with rheumatoid arthritis may produce antibodies to both Proteus bacteria and to proteins containing citrullinyl residues. Proteus are enterobacteria also found in the upper urinary tract (notably in females), that can transform protein-arginyl residues to antigenic protein-citrullinyl residues.

Aims: To investigate antibiotic efficacy of CMS against an arthritigenic bacterium.

Methods. Anti-arthritic activity was evaluated after orally administering colloidal metallic silver (CMS) to female Wistar rats developing chronic polyarthritis after tailbase injection of either (i) a complete Freund’s adjuvant or (ii) collagen type-II with an incomplete Freund’s adjuvant or (iii) pristane. Anti-proteus activity was determined by a disc diffusion assay growing P.vulgaris and P.mirabilis on agar plates in the presence of various CMS preparations.

Results. A. CMS preparations made electrolytically and administered orally (alternate days for two weeks) were powerful anti-arthritic agents in rats (ED80 approx. 85 μg/kg total silver). Monovalent silver products (acetate, nitrate, oxide) were ineffective at twice this dose.

B. CMS preparations were also more potent than silver salts in suppressing growth of Proteus sp. in vitro. Against P.mirabilis, minimal inhibitory concentrations (MIC) of total silver were greater than 22μg/ml for chemically prepared CMS and less than 3μg/ml for electrolytically prepared CMS: the difference being due to the smaller size of nanoparticles and different Zeta potentials in electrolytic preparations, compared with chemical preparations, of CMS.

Discussion. Pro-arthritic gut micro-organisms may be susceptible to ‘old’ antibiotics taken orally such as colloidal silver, as well as to accepted slow-acting anti-rheumatic drugs (DMARDs) originally developed as antibiotics eg minocycline, salazopyrine. More rigorous Quality Controls must be developed for the preparation of CMS – as well as antimicrobial efficacies and general safety.