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The biological activity of streptomycin and related molecules are associated with the presence of 2 functional guanidine groups

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The presence of at least 2 functional guanidine groups within a non-polymeric hydrophilic molecular system was suspected to be the chemical structure of streptomycin implicated in the interaction with proteins. To prove this hypothesis, several chemicals possessing two guanidine groups as streptomycin (dihydrostreptomycin, bis-3-aminoproylamine, guanidine hydrochloride, triethylene tetra mine and spermine tetra-hydrochloride) were tested for evaluating their interaction with the pathogenic prion protein (PrPsc). All molecules sharing common chemical function with streptomycin reproduced aggregation and precipitation of the prion protein. The interaction of streptomycin with proteins is optimum at alkaline PH and takes place through hydrogen bond transfer between the 2 guanidine groups on streptomycin and the amino-acids of one or several prion peptides ruling the possibility of a Schiff-base reaction. Streptomycin had proved valuable for earlier and higher immunological detection of prions in clinical samples due to protein aggregation as well as to a better attachment of antibodies to their epitopes through electric charge transfer on the protein surface. These changes of the surface electrostatic charges induced by streptomycin affect also the prion stability leading to a reduced infectivity.

Biography

Aly Moussa obtained his BVSc from Cairo University, Egypt; Vet. Med. From Justus Liebig university, Germany and PhD from Claude Bernard University, France. He worked 4 years at IFFA-Mérieux Laboratory; Lyon- France, for 20 years and was the chief of virology service at the French Bovine Pathology laboratory. Then for 8 years he was concerned at the national agency for sanitary security of aliments with research on the pathogenic prion proteins. He has published many papers in the fields of Virology and Transmissible Spongiform Encephalopathy's.

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