Membrane biology of leishmania infection: therapeutic role of liposomal cholesterol

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The disease leishmanisis is widening its base in different parts of the world and resistance to commonly used drugs is compounding the problem. Until now there is no effective vaccine against leishmaniasis. There is a need for an alternate mode of treatment. *Leishmania donovani* (LD), the causative agent of visceral leishmaniasis, during their intracellular life cycle takes up membrane cholesterol leading to increased membrane fluidity. Cholesterol forms adduct with number of membrane proteins including MHC-II protein. We also showed that LD infection alters conformation of cell surface MHC-II which favored faster dissociation of bound peptide. Treatment of LD infected hamsters with liposomal cholesterol led to clearance of organ parasites coupled with expansion of antileishmanial immune repertoire. The rate of decrease in peptide-MHC complex in case normal, infected and liposome treated infected macrophages was 1.45 μs^{-1}, 17.1 μs^{-1} and 1.38 μs^{-1} respectively indicating an important role of membrane cholesterol in peptide-MHC stability. Cholesterol rich diet is in use in pulmonary tuberculosis patients. Diet rich in cholesterol accelerates sterilization rate of sputum culture suggesting a complementary role of cholesterol in antitubercular treatment. Thus liposomal cholesterol may be used in combination with anti-leishmanial drugs as an adjunct to the treatment. Thus use of liposomal cholesterol may be of general use against intracellular pathogens where cellular cholesterol homeostasis is altered.