Non covalent interaction play a critical role in ion transport by the membrane channel forming antibiotic gramicidin A and in the mechanism of catalysis in short chain oxidoreductase (SCOR) enzymes. Gramicidin A, a pentadecapeptide composed of alternating d and l residues, form a nanotube long enough to extend across a lipid bilayer and large enough to allow an unsolvated monovalent cation to move through the membrane. The inner surface of the nanotube is lined by $\pi$ orbitals associated with peptide bonds and conjugated carbonyl groups. Ion coordination with these $\pi$ orbitals are the driving force in ion transport. A pattern of strong C-H..O=C hydrogen bonds between carbon atoms on the nicotinamide ring of the NAD cofactor and the backbone carbonyl is of a Pro-Gly sequence in SCOR enzymes indicates that these interactions facilitate hydride transfer in the enzymes. Funded in part by NIH grant No. DK26546.

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