

## Unusual Ion Coordination in Membrane Channels and CH

### Hydrogen Bonds in Enzyme Catalysis

William L. Duax<sup>a</sup>, Vladimir Pletnev<sup>b</sup>, Marek Glowka<sup>c</sup>, Robert Huether<sup>a</sup>, <sup>a</sup>*Hauptman-Woodward Medical Research Institute, Buffalo, NY.* <sup>b</sup>*Institute of Bioorganic Chemistry RAS, Moscow, Russia.* <sup>c</sup>*Institute of General and Ecological Chemistry University of Technology, Lodz, Poland.* E-mail: duax@hwi.buffalo.edu

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 pentadecopeptide 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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