P010 Are oblique orientated α-helices used by antimicrobial peptides for membrane invasion?

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Oblique orientated α-helices are highly specialised protein structural elements that possess hydrophobicity gradients, which facilitate membrane penetration at an angle between 30° and 60°, thereby promoting membrane destabilisation. Here, the use of extended hydrophobic moment methodology shows a number of α-helical antimicrobial peptides (α-AMPs) possess levels of amphiphilicity (0.35 – 0.71), measured as the mean hydrophobic moment (<μH>), and hydrophobicity (0.21 – 0.47) that are generally associated with oblique orientated α-helix formation. These α-AMPs possess asymmetric distributions of hydrophobicity, consistent with the possession of hydrophobicity gradients, and structural features that are shared by many known oblique orientated α-helix formers, including glycine rich polar faces and hydrophobic arc sizes ranging between 40° and 300°. Recently, several of these α-AMPs, including aurein 1.2, citropin 1.1 and synthetic peptides, have been experimentally shown to destabilise model membranes via angled bilayer penetration. It is suggested that these α-AMPs may use oblique orientated α-helices to facilitate the destabilisation of microbial membranes, an event that appears to be common to the antimicrobial action of most peptides in this class. Analysis of a recently presented α-AMPs dataset using similar methodologies showed that over 50% of the peptides examined were candidates for oblique orientated α-helix formation.