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Mechanistic understanding of selective responses of small designed peptides to different cell membranes

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Interactions between peptides and model membranes have been extensively studied due to the emerging interests in developing effective antimicrobial peptides (AMPs) from various natural AMP molecules including peptides and proteins such as melittin, cecropin, maginin, indolicidin, protegrin, human defensin. Selective responses of peptides also have direct relevance to the development of peptide based bionanomaterials and their applications in a diverse range of sectors. Rationally designed peptides make it easy to link peptide structures to their affinities towards different cell membranes. This process not only helps us understand how peptides interact with different cell membranes but also leads to the shortening of peptide sequences and more importantly, the improvement of their selectivity. In this talk, I will show how the molecular structures of a group of small designed peptides can be manipulated to respond to different cell membranes and how the structural selectivity as unravelled from model membrane interfaces can be linked to their antimicrobial performance whilst remaining benign to mammalian cell hosts.