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# Controlling the conformation of a modified gramicidin S cyclic peptidomimetic with an azobenzene photo-switch

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Secondary structures in proteins contain motifs which are important in determining protein folding and arrangement. The unique folding pattern creates a well-defined structure of protein which governs the function, as emphasized by the quote structure dictates function. Thus, the ability to control the secondary structure of a protein will enable the regulation of protein activity and function. The main objective of this research is to reversibly control the secondary structure of a cyclic peptide photochemically, using UV and visible light. This is demonstrated by incorporating a cis-trans photoisomerizable azobenzene photo-switch into the naturally occurring antibiotic, gramicidin S, to produce a cyclic peptidomimetic, azobenzene-gramicidin S (Azo-GS). Gramicidin S exists as a cyclic peptide with two antiparallel β-strands, linked by two β-turns. The cis isomer of Azo-GS was found to adopt a β-sheet with a β-turn structure, while the trans isomer exists as a random structure. While gramicidin S is active against both Gram-positive and Gram negative bacteria, our experimental results showed that Azo-GS is only active against Gram positive bacteria. Both isomers of Azo-GS were tested against the Gram positive bacteria, *Staphylococcus aureus* and the Gram negative bacteria, *Escherichia coli,* respectively. The cis isomer, containing the more well-defined secondary structure, was found to be active in suppressing the growth of *S. aureus*, while the trans isomer was found to be inactive. The findings of this research form the basis for photo-switches to function as potential molecular switches to control the secondary structures and ultimately, the activity of peptides.

## Biography

John Horsley has completed his PhD from the University of Adelaide and currently undertaking Post-doctoral studies from the University of Adelaide, Australia. He is working with the Abell Group focusing on peptide synthesis and has published number of papers in the reputed scientific journals.

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