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# Binding and immune modulation properties of mannosylated lipo-peptide vaccines

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O-glycosides, found on the cell wall of fungi, viruses and bacteria, are commonly attached through the hydroxyl group of serine and threonine. Mannose receptor, a front-line receptor in the human immune system, is known to bind bacterial, fungal and viral glycosides. 1, 2 Subsequently, synthesis of mannosylated subunit vaccines could allow for new targets in the activation of the immune system in a safer and more effective approach. 2 This study focuses on the complex synthesis and analysis of a library of O-mannosylated lipo-peptides designed to investigate mannose receptor binding properties for potential use in vaccine design and targeting.

Here, a library of fluorescently-labelled dendrimers containing one or more mannosylated moieties (separated by a variable-length spacer) and the ovalbumin CD4 antigen [OVA(323-339)] was synthesised using solid phase peptide synthesis on Rink Amide resin (Figure 1-A).

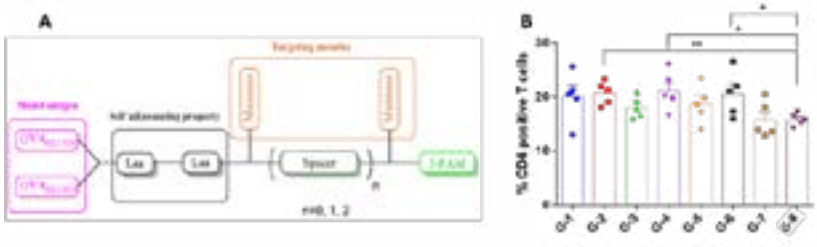


**Figure 1 (A)** Compound library containing OVA(323-339) antigen, lipoaminoacids (Laa), mannose and a fluorescent tag (FAM). **(B)** CD4+ T cell proliferation post 3rd immunisation for mannosylated vaccine constructs **(G1-3)** and controls **(G4-8)** indicating T cell activation related to structural properties.

**Results:** Fluorescent glycol conjugate and dendritic cell targeting lipo-peptides have been successfully synthesised using Fmoc solid phase peptide synthesis and click chemistry techniques and purified using RP-HPLC. Compounds were analysed for purity and size using TEM. Uptake studies, performed on F4/80+ and CD11c+ cells, showed significant uptake for all glycosylated lipo-peptides when compared to the un-glycosylated controls. Furthermore, a mannan inhibition study confirmed receptor-mediated uptake. Synthetic strategies, characterisation, and preliminary in vitro uptake studies will be presented.

**Conclusion:** We were able to successfully synthesise, purify and characterise fluorescently-labelled glyconjugate and dendritic cell targeting lipo-peptides in milligram quantities. In vitro analysis reinforces the use of glycoconjugates as targeting moieties towards APCs for applications in enhanced vaccine and drug delivery.

Mannosylated vaccine constructs were shown to successfully increase endogenous CD4+ T cells (Figure 1-B) the constructs were able to activate T helpers depending on their structural properties. Results from in vivo studies including cytokine analysis, antibody response, and T cell proliferation will be discussed and presented.

## Biography

Bita is currently a third year PhD student (started from 2012) at the University of Queensland in the field of chemistry and molecular biosciences. She got her Pharm D. from the Tehran University of medical sciences and has got international working experience with 3 years of work in Japan as a visiting scholar in Kobe Gakuin University and working collaboration with Nisshin Kasei a pharmaceutical company.

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