A generic conjugation chemistry supporting the development of multivalent vaccines

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Glycoconjugation is a well-established technology for vaccines development as linkage of the polysaccharide (PS) antigen to an appropriate carrier protein makes them effective in infants and provides immunological memory. Glycoconjugates have been successful in reducing the burden of different diseases, however many diseases still remain to be controlled and alarming concern is emerging toward antibiotic resistant bacteria. Considering the variety of PS antigens displayed on the surface of the pathogens for which vaccines are not available yet, high-valency glycoconjugates need to be developed.

CDAP chemistry was identified with the aim to develop a generic conjugation chemistry that can be applied to PS having different structures. This chemistry works with hydroxyl groups on the PS and amino groups on the protein[1,2]. Starting from published procedure[3,4], reaction conditions were extensively investigated. The resulting protocol has been successfully applied to a broad range of bacterial PS from different pathogens like *Klebsiella pneumoniae*, *Salmonella* Paratyphi A, *Salmonella* Enteritidis and Typhimurium, *Haemophilus influenzae* type B, *Shigella sonnei* and *flexneri*. Furthermore, new statistical tools were applied in order to understand the impact of the reaction conditions on critical quality attributes of the resulting glycoconjugates, using *Salmonella* Paratyphi A O-antigen as model.

This work will support generation of a large number of conjugates in very short time and the development of multivalent vaccines, meeting unmet medical needs.

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