

Microwave-based Glycosylation Methodology Leads to Novel Immunotherapies

Neutral glycosylation, using microwave irradiation, is novel in the realm of carbohydrate chemistry. Providing mild reaction conditions, decreased reaction times and enabling good yields with high purity are the major advantages of microwave promoted reactions. However, only very few reports have been described. A Microwave Labile protecting group (MWLPG) will be discussed that gives good yields and high alpha selectivity with simple to complex glycosyl acceptors. In contrast to conventional glycosylation, this methodology aims to function without the use of chemical promoters such as Lewis or Bronsted acids. Furthermore, our strategy for immunotherapeutics involves the use of a novel capsular polysaccharide as a “carrier”. Zwitterionic polysaccharides (ZPSs), are unique in that they are known to activate CD4⁺ T-cells through the MHC II complex in the absence of peptide(s), lipids or proteins. Furthermore, they induce IgM to IgG class switching, invoke immune memory and essentially have challenged the paradigm of carbohydrate immune processing as *T-cell independent* antigens. Polysaccharide A1 (PS A1) is one of the most well-studied ZPSs and it is expressed on the surface of Gram-negative obligate anaerobic bacterium, *Bacteroides fragilis* ATCC 25285/NCTC 9343. In order to further our understanding, key immunological mechanisms, well-characterized synthetic constructs of designed oligomeric lengths are of high importance and substantial value for a variety of reasons. This talk will therefore focus on chemical methodology for oligosaccharide synthesis and evaluation of synthetic PS A1 conjugates thereof.