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Nota di contenuto	Chemical Synthesis of Proposed RM2 and Derivatives -- RM2 Antigen: Structural Characterization and Determination of KD,surf for Multivalent Carbohydrate-Protein Interaction -- RM2 Antigen: Synthesis of Glycoconjugates -- Synthesis of the Heptasaccharide RM2 Prostate Tumor Antigen: Chemical Synthesis of Heptasaccharide and Tetrasaccharide (Inner Core of the RM2 Antigen).
Sommario/riassunto	This thesis focuses on the synthesis and vaccine evaluation of the prostate tumor- associated carbohydrate antigen RM2. The author first presents the use of the [1+2+3] one-pot sequential strategy to successfully synthesise the RM2 antigen and its analogues as single stereoisomers in every glycosylation step, producing good yields and stereoselectivity. He then introduces the conjugation of the synthetic RM2 antigen to the carrier protein CRM197 in an average number of 1–10 to create the prostate cancer vaccine candidate, which is combined with -galactosylceramide C1, its analogue C34, or Alu. The results of

the vaccination studies in mice are also described and indicate that the strongest anti-RM2 antigen titer is exhibited when one molecule of diphtheria toxin (DT) is conjugated with an average of 4.7 molecules of RM2 antigen (DT-RM4.7) and adjuvanted with the glycolipid C34. More importantly, the induced mouse antibodies mediate the effective complement-dependent cytotoxicity (CDC) against the prostate cancer cell line LNCap. The study presented in this thesis is the first ever to successfully synthesize this complex glycan molecule. Owing to the steric hindrance of the adjacent sialyl moiety, the introduction of two sialic acid units to the compact and rigid 3,4 dibranched galactoside unit is very challenging and the -selective and efficient glycosylation of the galactosamine moiety at the 4-position of dibranched galactose is also problematic.