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Roles of polyvalency of glycotopes in the mechanism of protein-glycan interactions-one of the most potential directions for the transforming glycosciences

Lectins are Glycan-Binding Proteins (GBP). On cell surfaces, they mediate cell-cell interactions by combining with complementary carbohydrates on opposing cells. They play a key role in the control of various normal and pathological processes in living organisms, such as fertilization, embryogenesis, cell migration, organ formation, immune defense, and microbial infection. Improper function of cell recognition may cause disease. (Sharon and Lis, Science, 1989 246,227) The hallmark of lectins is the ability to bind carbohydrates specially and reversible. To provide a more valid and satisfactory depiction of the carbohydrate specificity (RFs, Recognition Factors) of lectins in order to elucidate their functional roles and to optimize their biomedical applications, the following RFs have to be defined— (i) Sub-monosaccharide RFs (epimers and anomers of monosaccharides); (ii) Monosaccharide specificity (Gal, GalNAc, GlcNAc, Man, LFuc, and Sialic acid from mammalian glycans); (iii) Expression of a lectin reactivities toward structural units by decreasing order; (iv) the most active ligand; (v) simple multivalent or cluster forms of carbohydrate structural units; (vi) complex polyvalent structural units and/or glycotopes as well as their resulting conformational features present in macromolecules. These RFs can be divided into two forms for different functions- the Mono- forms are the weak RFs and provide mainly essential and basic structures for lectin identification and classification, while their polyvalent forms and resulting conformation features play a critical role in recognition intensities. The Roles of Polyvalency of Glycotopes in the Mechanism of Protein-Glycan interactions- should be one of the most advanced achievements in the field of Glycoimmunology since 1980.

Biography

Wu obtained his PhD degree with W Pigman, who is one of the pioneers in glycoproteins, at New York Medical College; and had his postdoctoral training at EA Kabat's Lab for quantitative immunochemistry, Columbia University Medical Center, New York. He joined as a faculty position at Texas A&M University in 1982; promoted as a full professor at Chang-Gung University since 1989; and as Emeritus Professor after 2011. Dr Wu published over 120 glycoprotein and polyvalent glycotopes related papers. He is the chief editor for three volumes of Molecular Immunology of Complex Carbohydrates 1 to 3 in Adv. Exp. Med. Biol. 228, 451, 705 (Springer Publisher). His major interests are (i) Glycan purification and characterization; (ii) recognition factors of glycans; (iii) combining sites of lectins and antibodies. He received many Outstanding Research Awards from government agents in Taiwan and USA.

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