In the early 1970s, lectins attracted a great deal of attention, following the demonstration that these sugar-binding proteins were useful probes for cell surface glycoproteins that could detect changes that occurred after malignant transformation.1,2 I joined the laboratory of Nathan Sharon and Halina Lis as a PhD student in 1971 to study these interesting proteins.

In 1973, towards the end of my doctoral research on soybean agglutinin (SBA) and wheat germ agglutinin (WGA), we investigated together with Yehuda Markovskly and David Danon, both from the Section of Biological Ultrastructure at the Weizmann Institute, the binding and distribution of ferritin-SBA on the surface of young and "old" red blood cells (RBC). Our aim was to determine whether the decrease in cell surface sialyllactose, which occurs during senescence of RBC in vivo, is accompanied by an exposure of galactose (Gal) and N-acetylgalactosamine (GalNAc) residues, which usually occupy a penultimate position to sialic acid on oligosaccharide chains of cell surface glycoproteins. Unexpectedly, we found that "old" RBC possessed fewer SBA receptors on their surface than young RBC, suggesting that the decrease in sialic acid content during aging of these cells is not accompanied by unmasking of Gal and GalNAc residues. Since SBA has a higher affinity for GalNAc than for Gal, it was not clear from the above study which of these sugars is present in lower amounts on the "old" cells as compared to the young ones.

Ehud Skutelsky, from the Section of Biological Ultrastructure, suggested that a lectin from peanut, peanut agglutinin (PNA), which I then characterized, independently, the same lectin was isolated by the group of Toshiaki Osaka.2 I found out about their results when Osaka and I were hanging our posters on two sides of the same board at the Third International Symposium on Glycoconjugates, in Brighton, England, in 1975. Subsequently, in a collaboration with Skutelsky and Danon, we found that RBC senescence does not involve unmasking of galactose residues despite the loss of cell surface sialyl residues.3 These results indicated that the use of sialylased-treated RBC, which do bind PNA, for studies of RBC clearance from the circulation in vivo is not justified. PNA proved to be a lectin with many applications. Yair Reusner (then a fellow PhD student) and Sharon demonstrated that PNA selectively agglutinates immature thymocytes and developed a method for the isolation of this subpopulation, and, subsequently, of subpopulations of bone marrow cells. These methods have paved the way for the use of lectins for the isolation of bone marrow cells capable of being transplanted into immunocompromised recipients without causing the lethal graft versus host disease.4 In addition, PNA is extensively employed for the immunohistologic analysis of Galα1-3GalNAc-containing glycoconjugates in a variety of normal and pathological specimens including carcinomas.5

This paper describes the first purification and characterization of an anti-T lectin from peanut. The use of affinity chromatography on an immobilized galactopyranosylamine derivative to obtain a homogeneous protein by a single-step procedure is described along with some physicochemical properties, hemagglutinating activity, and carbohydrate and glycoprotein-binding specificity of the pure lectin. [The SCI® indicates that this paper has been cited in over 520 publications.]