

This Week's Citation Classic™

Nicolson G L. The interactions of lectins with animal cell surfaces. *Int. Rev. Cytol.* **39**:89-190, 1974.

[Cancer Council and Electron Microscopy Labs., Armand Hammer Ctr. for Cancer Biology, Salk Inst. for Biological Studies, San Diego, CA]

This paper reviews the specificities and the many and varied uses in the biomedical sciences of lectins, proteins, or glycoproteins that bind to carbohydrate structures via bivalent or polyvalent interactions. [The SC¹® indicates that this paper has been cited in over 700 publications since 1974.]

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"I first became interested in lectins¹ as a graduate student at the University of California, San Diego, in the mid-1960s. These intriguing molecules had been used mainly to agglutinate red blood and other cells.²³ Their ability to distinguish untransformed from transformed cells⁴ sparked an unusual interest in their interactions with a wide variety of different cell types. Various investigators were using lectins as cell mitogens, inducers, and probes for glycoconjugate structure, membrane dynamics, and asymmetry, as well as glycoprotein, cell, and virus purifications.

"My own graduate studies with S.J. Singer utilized lectins as ultrastructural probes for dynamic studies on cell membrane glycoconjugates.^{5,6} After graduate school, I

moved to the Salk Institute for Biological Studies where my interest in lectins grew to include their abilities to cause transmembrane perturbations,⁷ their toxic actions on cells,⁸ their modes of cell entry,⁹ and, of course, their activities in binding and agglutinating transformed cells.¹⁰ We also used lectins to probe the surfaces of specialized cells, such as the spermatozoan,¹¹ and to inhibit fertilization by blocking sites on mammalian eggs.¹²

"It is with amusement that I recall writing this paper, which was to become the first of several lengthy reviews I have written. At the time, I was quite inexperienced in organizing such a long paper, and the eleventh hour found my laboratory personnel working overtime on the references, pagination, tables, and figures. I owe special thanks to A. Brodginski, M. Lacorbiere, and G. Beattie for their efforts and for maintaining their humor when the boxes of reference cards were displaced to the floor.

"This review is probably cited so many times because of its extensive coverage of the field (it contained more than 100 pages and more than 700 references) and its comprehensive discussion of various aspects of the chemistry and biology of lectin interactions with animal cells. More recent reviews^{13,15} have again dealt with these aspects of lectins and their interactions and uses, but I will always appreciate the fact that so many scientists have turned to my paper as one of the important reviews in this area."

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5. **Singer S J & Nicolson G L.** The fluid mosaic model of the structure of cell membranes. *Science* **175**:720-31. 1972. (Cited 3,175 times.)
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8. **Nicolson G L, Lacorbiere M & Hunter T R.** Mechanism of cell entry and toxicity of an affinity purified lectin from *Ricinus communis* and its differential effects on normal and virus-transformed fibroblasts. *Cancer Res.* **35**:144-55. 1975. (Cited 85 times.)
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15. **Barondes S H.** Soluble lectins: a new class of extracellular proteins. *Science* **223**:1259-64. 1984.