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# This Week's Citation Classic®

**Siegel B Z & Galston A W.** The isoperoxidases of Pisum sativum.
*Plant Physiol.* 42:221-6, 1967.
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The heterogeneity of the peroxidases in peas was examined by starch-gel electrophoresis. Comparisons were made between tall and dwarf cultivars and among organ systems developed in light and darkness. Each organ had a characteristic isozyme pattern, and the band patterns in corresponding organs from different varieties were far more alike than were the patterns in the different organs within the variety. Ontogenetic changes were marked in all organ systems, principally in the cathodic bands. The effect of light on isozymal patterns was quantitative rather than qualitative, possibly influencing the isoperoxidases secondarily via its effect upon organ physiology and development. [The *SCI*® indicates that this paper has been cited in over 120 publications since 1967.]

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**It's nice to be recognized for a pioneering piece of research. When I began work on the isozymes as part of my doctoral thesis at Yale University with A.W. Galston, we knew that others, especially C. Markert,[1] had already presented the evidence needed to convince the scientific community that enzymes came in multimolecular forms. But were all the variations based on the same principle? What controlled the variations—the genes, the environment, the physiological balance of hormones or nutrients? It was probably the only period of my life that I had the time, the hardware, and the moral and intellectual support to look at a complex problem and begin to solve it in a completely satisfying fashion.**

**Now, more than 15 years later as a senior research professor with about 100 other "major" publications, I realize how special this particular paper was for me. It was written during the hiatus that exists between turning in an acceptable thesis and seriously starting a postdoctoral. There was time to think, to chew on the data collected, and to have exotic ideas in private and to share them with fine colleagues.**

**This paper attempted to define the developmental, environmental, and genetic variations in peroxidases in *Pisum*, and the research was rather interdisciplinary in its approach. A wide array of experimenters can probably find a fact or statement within this publication that supports or appeals to them. I can understand why it has been well cited by plant physiologists, but I wonder if any human geneticists mention it or even know that it exists.**

**The initial ideas developed as a problem in human leukocyte peroxidase characterization and its relationship to leukemias. I was even given an NIH basic medical sciences predoctoral fellowship to work on this problem, but acquiring, growing, and analyzing human tissue was slow work. What I needed was an organism that I could acquire in large amounts for destructive analyses, an organism whose genetics was better understood, and a strong body of literature and a sizable support group of physiologists and biochemists also working with the same biologic system. When I transferred to Yale, Galston convinced me that peas were perfect "animals" for the kind of research I wanted to do, and he was absolutely right. When I wrote to the NIH and told them that I would now be working with Mendel's green peas instead of human beings, their wise response was that it was all right since "the problem hadn't changed, only the organism."**

**My research has remained problem oriented. Space does not allow me to spin the connecting threads but only to give a diversity of references.[2-6] It is hoped that the reader will see that the problems are similar and only organisms and locales have changed. And in science, I believe, the solving of problems is what is really important.**

1. **Markert C L & Moller F.** Multiple forms of enzymes: tissue, ontogenetic and species specific patterns. *Proc. Nat. Acad. Sci. US* 45:753-63, 1959. (Cited 985 times.)
2. **Siegel B Z & Siegel S M.** Biology of the Precambrian genus *Kakabekia*: new observations on living *Kakabekia barghoorniana*. *Proc. Nat. Acad. Sci. US* 67:1005-10, 1970.
3. **Siegel B Z, McMurtry G, Siegel S M, Chen J & LaRock P.** Life in the calcium chloride environment of Don Juan Pond, Antarctica. *Nature* 280:828-9, 1979.
4. **Siegel B Z & Siegel S M.** Mercury content of *Equisetum* plants around Mount St. Helens one year after the major eruptions. *Science* 216:292-3, 1982.
5. **Siegel B Z,** ed. *Hawaii energy resource overviews.* Springfield, VA: National Technical Information Service, 1979-1983. 7 vols.
6. **Siegel B Z.** (Women) as explorers and in science. (Lieban R, ed.) *Changing lives of Hawaii's women—progress since statehood.* Honolulu: Historians Committee, Foundation for Hawaii Women's History, 1984. p. 8-9; 22-4.




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