

Starlinger P & Saedler H. IS-elements in microorganisms.

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Mobile genetic elements have altered our view on the stability of the genome. They were discovered in maize by Barbara McClintock¹ in the 1940s. Biochemical studies began with the discovery of IS elements in *E. coli*. This paper describes the first decade of this research. [The SCI® indicates that this paper has been cited in over 190 publications since 1976.]

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"When we published our review, this research was ten years old. It started with the study of particular mutations in *E. coli* by Jim Shapiro, then in London, and by E. Jordan, H. Saedler, and P. Starlinger in Cologne. By the end of 1968, we knew that the mutations were caused by the insertions of DNA pieces into genes.^{2,3} In 1972, we learned, together with the Szybalski laboratory in Madison, Wisconsin, that the insertions are not random pieces of DNA, but preferred mobile elements. They carry transcription stop signals and thus abolish the expression of genes located

downstream in an operon ('polar' mutations). We thought that they deserved a name. Szybalski suggested PS ('It may read as polar sequence'). Caution prompted us to suggest IS (for insertion sequence).^{4,5} Rightly so: not all insertions are polar, as was soon found out.⁶

"In 1972, we wrote our first review,⁷ and pointed to the similarity of IS elements and McClintock's 'controlling elements.'¹ Not many people were interested then. Public recognition of the field came with the discovery of the larger transposons, first by British, and soon followed by US, workers. Transposons are very similar to IS elements, but they are larger and carry genes encoding the resistance to antibiotics. The famous Asilomar Conference on recombinant DNA research was the first major meeting where IS elements and transposons were talked about. It was during that meeting that Werner Arber asked us to write a review for *Current Topics in Microbiology and Immunology*.

"The review turned out to be a timely one, at least as judged by the disappearance rate of the reprints. The time for mobile genetic elements had finally come, and the first meeting on the topic, organized by the late Ahmad Bukhari, Shapiro, and Sankar Adhya in Cold Spring Harbor, was already a very crowded one. Today mobile genetic elements have spread to virtually all classes of organisms and the research on them fills whole books."

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