

Zinc finger protein

A [zinc](#) finger is a small protein structural motif that is characterized by the coordination of one or more zinc ions in order to stabilize the fold. Originally coined to describe the finger-like appearance of a hypothesized structure from *Xenopus laevis* transcription factor IIIA, the zinc finger name has now come to encompass a wide variety of differing protein structures.

Xenopus laevis TFIIIA was originally demonstrated to contain zinc and require the metal for function in 1983, the first such reported zinc requirement for a gene regulatory protein.

Proteins that contain zinc fingers (zinc finger proteins) are classified into several different structural families. Unlike many other clearly defined supersecondary structures such as Greek keys or β hairpins, there are a number of types of zinc fingers, each with a unique three-dimensional architecture. A particular zinc finger protein's class is determined by this three-dimensional structure, but it can also be recognized based on the primary structure of the protein or the identity of the ligands coordinating the zinc ion. In spite of the large variety of these proteins, however, the vast majority typically function as interaction modules that bind DNA, RNA, proteins, or other small, useful molecules, and variations in structure serve primarily to alter the binding specificity of a particular protein.

Since their original discovery and the elucidation of their structure, these interaction modules have proven ubiquitous in the biological world. In addition, zinc fingers have become extremely useful in various therapeutic and research capacities. Engineering zinc fingers to have an affinity for a specific sequence is an area of active research, and zinc finger nucleases and zinc finger transcription factors are two of the most important applications of this to be realized to date.

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