

An Important Tool For Identifying Proteins That Interact

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Virtually every biological process — including DNA replication, cell growth, key metabolic reactions and disease states — depends upon protein-protein interactions at the cellular level.

In the late 1980s two Stony Brook University School of Medicine researchers, Stanley Fields and Ok-Kyu Song, developed a way to use the yeast transcriptional activator protein for the GAL4 gene to easily detect the interaction of proteins within a cell. This method — the “yeast two-hybrid system for determining protein-protein interactions” — was first published in Nature. Initial funding for the research was provided by the National Science Foundation.

“*Transcription is the process through which genetic information is copied from DNA to RNA, ultimately producing a functional peptide or protein. The DNA-binding domain and activation domains from GAL4 are separately fused to the proteins being studied.*”

If the proteins of interest interact, the two domains are brought together and transcription results. This transcription can be easily identified through the use of a marker gene. The system can also be used to discover compounds that

inhibit specific protein interactions.

Understanding and detecting proteins that interact is a fundamental area of inquiry in biology. The yeast two-hybrid system provides an elegant and useful method for carrying out this research. The technology has been licensed nonexclusively to more than one hundred companies, including large pharmaceutical companies and a wide range of biotechnology companies. As a result, hundreds of scientists around the world have used this method, in both corporate and university laboratories.

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