

## **INTEINY - BUDOWA, FUNKCJE BIOLOGICZNE I FILOGENEZA**

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1. Wprowadzenie. 2. Nazewnictwo, rodzaje i rozpowszechnienie intein. 3. Ukierunkowane endonukleazy intein. 4. Obecność intein w białkach metabolizmu DNA. 5. Rozważania na temat funkcji i pochodzenia intein. 6. Zastosowanie intein w biotechnologii

### **Inteins - organization, biological functions and phylogenesis**

*Abstract* Inteins are the intervening sequences of proteins that are excised from precursor by an auto-catalytic mechanism. The regions flanking an intein are called exteins. Inteins in contrast to introns, are transcribed and translated together with their host protein. Most of these elements consist of two domains: one that catalyzes its own removal from the host protein and is involved in protein self-splicing, and the other display a site-specific endonuclease activity. Posttranslational highly specific self-cleavage of intein, and protein ligation reactions lead to the splicing of functional protein in the cell. Inteins avoid disrupting their host gene function by splicing themselves out at the protein level. Endonucleases of inteins are rare-cutting enzymes that confer genetic mobility to these elements by catalyzing a specific double-strand break in a cognate recipient allele of the host gene lacking intein. The end result of such homing process is the duplication of the intein. Inteins occur in all three kingdoms of life: archaea, eubacteria, and eukaryote. This broad phylogenetic distribution suggest their ancient evolutionary origin, and reflects their nature as a mobile genetic elements. Also, cases of horizontal inteins transfer have been discovered. Inteins exist in numerous host protein, many of these proteins are involved in DNA replication, transcription, and repair mechanisms, although there is no known limitation on the type of host protein. Inteins provide a source for innovate biotechnology tools, particularly for protein purification, for labeling or protein modification, and for cytotoxins expression.

1. Introduction. 2. Nomenclature, types and dissemination of inteins. 3. Homing endonucleases. 4. Localization of inteins in DNA metabolism proteins. 5. Inteins function and origin. 6. Application of intein systems

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