

## SERPINBASE – A DATABASE OF SERINE PROTEASE INHIBITORS

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**Abstract**

Serine proteinase inhibitors (Serpins) are irreversible suicide inhibitors of proteases that regulate diverse physiological processes such as coagulation, fibrinolysis, complement activation, angiogenesis, apoptosis, inflammation, neoplasia and viral pathogenesis. The molecular structure and physical properties of serpins permit these proteins to adopt a number of variant conformations under physiological conditions including the native inhibitory form and several inactive, non-inhibitory forms, such as complexes with protease or other ligands, cleaved, polymerised and oxidised. Alterations of a serpin which affect its structure and/or secretion and thus reduce its functional levels may result in pathology. Serpin dysfunction has been implicated in thrombosis, emphysema, liver cirrhosis, immune hypersensitivity and mental disorders. SERPIN BASE in its current form shall be a trusted resource for researchers working on the superfamily and for biologists with a yearn to learn

**Keywords:** Serpin, phylogeny, Umbrella sampling, Docker in repeats

**Introduction:**

Serpins (serine protease inhibitors or classified inhibitor family) are the largest and most broadly distributed superfamily of protease inhibitors (1 -5). Serpin-like genes have been identified in animals, poxviruses, plants, bacteria and archaea, and over 1,500 members of this family have been identified to date. Analysis of the available genomic data reveals that all multicellular eukaryotes have serpins: humans, *Drosophila*, *Arabidopsis thaliana* and *Caenorhabditis elegans* have 36, 13, 29, and about 9 serpin-like genes, respectively. In contrast, serpins in prokaryotes are sporadically distributed and most serpin-containing prokaryotes have only a single serpin gene (6 - 15). The majority of serpins inhibit serine proteases, but serpins that inhibit caspases and papain-like cysteine proteases have also been identified. Rarely, serpins perform a noninhibitory function; for example, several human serpins function as hormone transporters and certain serpins function as molecular chaperones or tumor suppressors (16 - 20, 40 - 42). A phylogenetic study of the superfamily has segregated the eukaryotic serpins into 16 'clades' (termed A-P). The proteins are named SERPIN Xy, where X is the clade and y is the number within that clade; many serpins also have alternative names from before this classification was proposed specificity or inhibitory function. Here, we summarize the evolution, structure and mechanism of serpin function and dysfunction

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**Fig 1: The Hierarchical Organization Of The Serpinbase And Its Components**

