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Proteases and Serine Proteases Mechanisms

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Abstract

The ocean delivers food, financial action, and national worth for a great amount of people. Our information of aquatic ecosystems lags behindhand that of earthly ecosystems, warning operative fortification of maritime capitals. We label the product of 2 factories in 2011 and 2012 toward found a slope of significant queries, which, if replied, would considerably recover our attitude toward preserve and achieve the world's maritime incomes. Members comprised persons after academe, administration, and nongovernment governments through broad knowledge diagonally punishments, maritime networks, and nations that differ in stages of growth. Donors from the arenas of science, preservation, manufacturing, and administration succumbed queries toward our plants, which we purified into a list of importance investigation queries. Through this procedure, we recognized 71 important queries. We gathered these into 8 topic groupings, apiece relating toward a comprehensive constituent of maritime upkeep: fisheries, weather alteration, additional anthropogenic intimidations, bionetworks, maritime nationality, policy, societal and cultural contemplations, and technical initiative. Our queries speech several problems that are exact toward marine preservation, and will attend as a street plan towards funders and investigators toward grow packages that can importantly advantage nautical preservation.

Keywords: Molecular Biology, Marine, Conservation.

Introduction

Regulation of serine protease enzymes

The activity of serine protease must be proper in the organisms otherwise several different kinds of complications and diseases may result. The adequate regulation and initial activation of serine protease along secretion of inhibitors in specific amount must be ensured.

Serine Protease has important role in the immunological responses and inflammatory reactions. Neutrophil elastase and proteinase are considered as the main protease present along Polymorphonuclear cells (PMN). Polymorphonuclear cells are the first inflammatory cell lines that penetrate in the tissue can cause immunological complex reactions [1]. For this purpose the serine protease inhibitors used for the diagnosis and treating many complex human diseases. Several different kinds of serine proteases are present and have common mechanisms but cannot be used as active serine. For example, serine peptidase includes papain from papaya in which sulfur in cysteine residues act like oxygen on serine in serine proteases. There are aspartic peptidases, which includes HIV protease and that has potential use in drug development [2].

There are many kinds of metalloproteases from which the use of interaction are important in an aspect that help in the regulation of different kinds of reactions by keeping intact specific metal ions within the structure as shown in (Figure 1A).

Working of Serine Protease and inhibitors in Cancer Development in TTSP- Type II transmembrane serine proteases

Secreted form of 175 Serine Protease is being reported in the humans. This serine protease has important role in maintain the tissue homeostasis. Urokinase Plasminogen activator system has major role for the multiple metabolic functions, and also in physiological functions like cell signaling to tissues for the process of remodeling but the dysregulation of serine protease leads to development of cancerous condition [3].

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Plasmogen activity is controlled by plasminogen activation system. It includes the urokinase activator (uPA) and its pro enzyme pro-uPA, cell surface (uPAR), Plasminogen activator inhibitors (PAI's), plasmogen activators of body tissues [4].

This universal system for all most all kinds of cancer has role in matastasis thus making it ideal for gene therapy.

Serine Protease works with other proteases to break matrix and cause the cancer invasion or metastasis, which will result for triggering the active function of metallo-memberane protease (MMPs). It inhibits the cancer progression by down regulation of cancer progression [5]. In this model, there is the activation of coagulation cascade of cancerous cells which will result in initiation of Plasmin, PA 11 and PA 12 and Serine Protease inhibits which will trigger P13 kinase pathway in (Figure 1B).

TTPs are now the targets for the purpose of therapy and for this purpose several different kinds of cell line and animals models are needed. Several different kinds of TTPs inhibitors block the cell pro-oncogenes inhibitor that ultimate signals for the cancer induction [6].

Coagulation activated mediated by serine protease has direct role in diagnosis of hemorrhagic and thromboticconditions

The coagulation activity of serine proteases take place by cleaving downstream of several different kinds of proteins. There are 20 soluble plasma factors like fibrogen (FI), Prothrombin (FII) and calcium ions (FIV) and factors for deficiency like FVIII and FXII. FVIII and FV are glycoproteins while F13 is the transglutamainase. Precursors of serine protease like zymogen circulate in an inactive form [7]. Now coagulation factors and cofactors will work together and produce thrombin. Thrombin has an important role in blood clotting (Figure 1C).

Primary Hemostatsis involves the pathways of serine having zymogen in an inactive form of a serine protease and it glycoprotein cofactors are now activated through extrinsic and intrinsic pathways which will result in the cascade of production of fibrin and this mainly considered as secondary hemostasis.

Serine protease in mast cells

This protein has major role in immunoglobulin E (IgE)-mediated degranulation. There are several mechanism involved in the process. The well accepted mechanism is the combine role of cysteine proteases and IgE cleaves the surface CD23 from B cells and thus increase the production of IgE by initiating the inhibitory feedback mechanism. CD23 will also result in increased soluble CD23 that will increase interleulins (IL-4) to produce IgE. According to Pharmacological aspects, pulmonary serpin a-1-antitrpsine inhibits thecleavage of DC23 (Figure 1D).

This serine protein has more important and promising role than histamine [8].

Bowman–Birk inhibitor (BBI): This serine protease inhibitors are being derived from the soya bean

Serine proteases are important enzyme and dysregulation of this can cause inflammation and many complicated kinds of auto immune diseases. Inhibitors of the serine proteases has excellent role for the treatment purposes. Recent studies found that various legume species having soya bean derived BBI protein which consist of 71 amino acids in Figure 2.

BBI protease inhibitors are oral agents and used the treatment of anti-inflammation. BBI reduce effects on CNS inflammation by IL-10 production thus it is known as secretory.

Lung inflammatory therapy by serine protease

COPD (chronic obstructive disease), asthma and pneumonia increase the risk of hepatocellular inflammation. Serine Protease enzyme has important role to intervene the pulmonary immune responses. For lung inflammation treatment

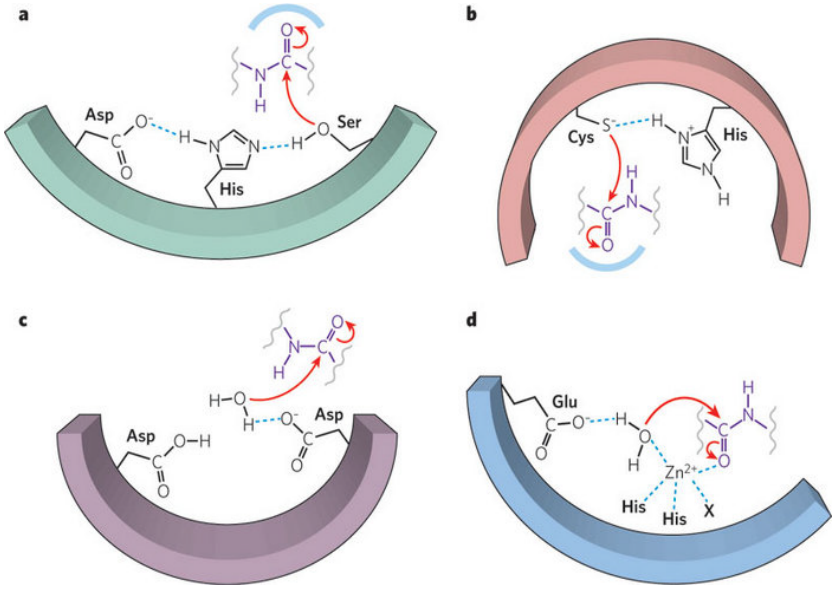

Figure 1. Different amino acid presents within the Serine proteases, affecting the biological specificity of enzyme.

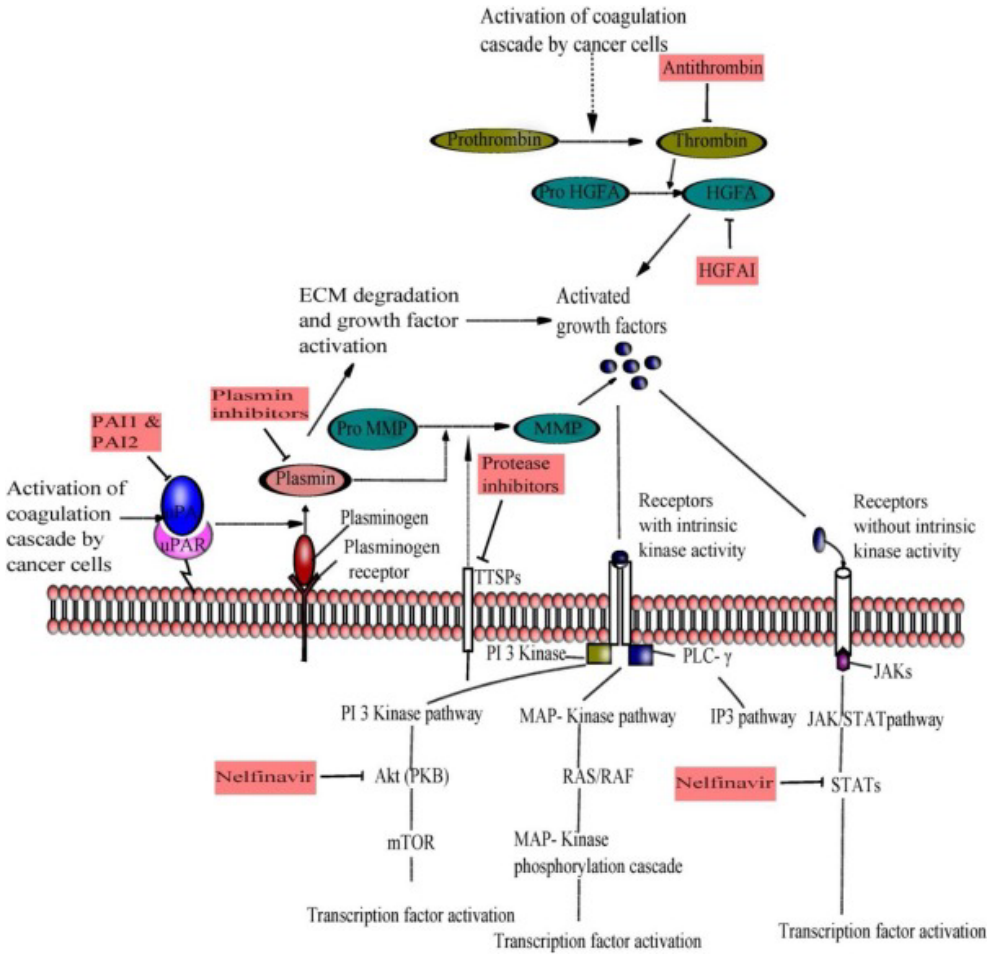

Figure 2. Cancer treatment pathways through serine protease inhibitors.

which assist in the disease development. Proteolytic serine proteases present in Neutrophils known as HNE are major target for therapeutic purpose [9].

Serine protease inhibitors as antiviral agents

Serine proteases has important role in binding with mannose binding lectins, soluble CD14 like proteins. These proteins are mainly involved in the viral infection removal. Another potential serine protease derived serpins are now available commercially that is effective against the HIV, HCV, HSV and influenza viruses [10].

The level of seprin present is an excellent indicator for the detection of disease progression in body. Abnormally, low levels of serpin and antitrypsin during HIV and HCV infection is the best for the treatment of Liver fibrosis.

Use of serine protease enzyme at industrial level

At food, agricultural, textile industries serine protease has important biological functions [11-13].

Without the implement of this serine protease, the quality of the end product will be affected thus will affect the cost effectiveness. At commercial level, these enzymes are being used in form of different products. Following are the names of Product available with use in specific industries to prepare the specific product of fine quality.

Examples of industrial products available

SEB soak, Proteinase K-16 and Alcalase are ready made products available being used in the various industries for soaking and protein removal purpose.

Conclusion

About 25%, known proteolytic enzymes are majorly the proteases of serine. Trypsin has dominant role in genetic expansion that help in the blood coagulation, fibrinolysis and for the responses associated with the immunological responses. Serine proteases effectiveness mainly associated with the conformational changes of the trypsin folds. The new molecular analysis has revealed two forms of protease E^* and E and effect of biological activity by the change of their allosteric equilibrium.

A typical genome consist of almost 4-5% total genes basically codes for the proteolytic enzymes. Serine Protease emerges during the evolution as the most abundant with diversity in functions. Molecular paradigm showed that regulations in these enzymes need attention because of wide application at industrial level and in medicine. Allosteric of serine protease has convincing explanation about the properties of multsubunits of these enzymes. It has been cleared by thousands of experiments that serine protease inhibitors are excellent tools for treating very complex diseases of human beings.

Serine Protease inhibitors has played important role in many important biological processes like homeostatic regulation and immunological disease treatment. In medicine serine protease inhibitors provide promising treatment for the cancer and heart diseases. This enzyme itself can be use for the crop production in agriculture.

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