Serine Protease Inhibitor for Improved Viral and Bacterial Disease Treatment

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Technology description

Serpin-Derived Peptide Compound Improves Survival Rate in Models of Viral Hemorrhagic Fevers and Sepsis

This serine protease inhibitor (serpin) treats hemorrhagic infections in sepsis, improving animal survival rate by inhibiting targeted cell functions. Serpins are highly active regulatory molecules that can control coagulation and inflammation, in addition to inhibiting cell functions. Viral hemorrhagic fevers, such as Ebola and Marburg, and bacterial sepsis affect more than one million Americans per year and have mortality rates over50 percent. No complete cure is available for those affected by these infections and preventative treatments may include potentially ineffective and costly surgery, dialysis, and drug therapy. Further, available therapeutic approaches result in just a 6-19 percent reduction in mortality. University of Florida researchers have discovered a series of serpin-derived peptides that treat viral hemorrhagic fevers and that have anti-inflammatory and anti-atherogenic properties in mouse transplant models. The parent serpin has been safely tested in patients with unstable coronary disease and stent implant with reduced markers of heart damage in an early Phase IIA clinical trial. The serpin-derived peptides have the potential to curb the progression of lethal viral infections and sepsis, significantly improving the survival rates of those infected. The peptides may be administered intravenously, subcutaneously, or intramuscularly.

Technology

Serpine protease inhibitors, also known as serpins, are regulatory molecules that effectively control blood clotting and inflammation in biological systems. Peptides derived from a serpin Reactive Center Loop during protein metabolism extend serpin activity to increase rates of anti-inflammatory and anti-atherogenic activity. The amino acid sequence in the Reactive Center Loop of serpins target serine proteases, initiate structural changes in the resulting complex, and culminate in suicide inhibition. The parent serpins, more specifically recognized as Serp-1 or neuroserpin, inhibit one or more serine proteases that are thrombolytic or thrombotic in function, while additionally reducing inflammation and coagulation. The serpin-derived peptides have been modeled and found to block serpin activity,

specifically PAI-1, a known marker for inflammatory diseases. This leads to treating and preventing lethal hemorrhage in patients with Viral Hemorrhage Infections or bacterial infections.

Application area

Serpin-derived peptide that treats viral hemorrhagic fevers and bacterial sepsis while controlling coagulation and inflammation

Advantages

Controls coagulation and inflammation, increasing viral hemorrhagic fevers and bacterial sepsis patient survival rate
Provides easy production and manufacturing of serpin-derived peptides, improving access and reducing costs for patient treatment
Possesses negligible adverse effects, allowing for more comfortable patient care during and after treatment
Provides low-dosage treatment, enhancing simplicity and cost-effectiveness for healthcare providers and patients

Institution

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