Anticoagulant Effect of Two Metalloproteinases Purified from *Cerastes cerastes* Snake Venom: An Alternative Therapeutic Tool to prevent Thrombosis Disorders

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***Abstract*—** Thromboembolic disorders, including deep vein thrombosis, pulmonary embolism, and ischemic stroke, remain major causes of morbidity and mortality worldwide. Current anticoagulant and thrombolytic therapies, although effective, often present significant side effects such as bleeding complications, narrow therapeutic windows, and drug resistance. This has encouraged the search for safer, naturally derived molecules with improved efficacy and selectivity. In this context, snake venom metalloproteinases (SVMPs) represent promising bioactive candidates due to their potent regulatory effects on hemostasis. In this study, two SVMPs were purified from *Cerastes cerastes* venom by a combination of gel filtration, ion exchange, affinity and RP-HPLC chromatography, as well as characterized as zinc-dependent metalloproteinase, belongs to the P-I class of SVMPs (CcSVMP-I) and to the class P-III (CcSVMP-III). Indeed, CcSVMP-I contains only a metalloproteinase domain, whereas CcSVMP-III possesses three domains in its structure, metalloproteinase, disintegrin-like, and cysteine-rich domains. These two purified metalloproteinases exhibited anticoagulant activity, significantly prolonging plasma clotting times. However, CcSVMP-III showed a more potent anticoagulant and antithrombotic effect, likely due to its additional disintegrin-like domain that interferes with platelet aggregation and fibrin formation. Overall, these findings provide new insights into the structure–function relationship of SVMPs and highlight these biomolecules as a promising lead for the development of safer, natural therapeutics for the treatment of thromboembolic complications in cardiovascular diseases.

***Index Terms*—** Anticoagulant Effect, Antithrombotic Activity, Metalloproteinases, Snake Venom.

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