

Determination of the stability of cysteine-rich peptides isolated from the deep-sea marine sponge *Stryphnus fortis* in human serum

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Cysteine-rich peptides are potential candidates for a broad spectrum of applications due to their highly stable disulfide frameworks. A handful of cysteine-rich peptides have been isolated from marine sponges so far. Investigation of the stability in body fluids would be important to utilize these peptides specially in *in-vivo* applications such as development of drug leads and drug delivery agents. Initially, the aqueous (60% Methanol in water) extract of the deep-sea marine sponge *Stryphnus fortis* (Demospongiae, Tetractinellida, Ancorinidae) was fractionated using Fast Protein Liquid Chromatography. The fractions consisting of peptide like masses were further purified using Reversed Phase – High Performance Liquid Chromatography to isolate three peptides, peptide A, B and C, having three intramolecular disulfide linkages between six cysteine residues. The stability of these peptides in human serum was evaluated up to 24 h including the time intervals 0, 3, 6 and 8 hrs. The percentage of peptides remaining in serum at each time interval was quantified using Liquid Chromatography coupled to Ultraviolet detector at 215 nm. Approximately 85% of the peptides remained without degradation for up to 24 h, which signifies an extreme stability of peptide A and C in human serum. In contrast, a drastic decrease of peptide B was observed from 90% to 20% within 6 h to 24 h. Asteropsin A to G from the sponge genus *Asteropus* are the only known linear knot peptides from sponges that showed extreme stability in both human plasma and gastrointestinal fluids due to its highly stable disulfide framework. Further studies are required to understand the deviation of peptide B as well as to determine the cytotoxicity and oral bioavailability of peptides A and C to broaden their potential applications in a therapeutic setting. Discovery of cysteine-rich peptides is important to unravel their ecological role and to establish their potential applications in pharmaceutical and biotechnological fields.

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