

## Recombinant elastin-like protein polymer for biomineralization and tissue engineering

### Recombinant amphiphilic statherin-containing triblock protein polymer

**Product Number:** TP30401

**Mol. Weight:** Monodisperse recombinant protein containing 797 amino acids and having a molecular weight of 71.5 kDa by MALDI-TOF mass spectrometry.

**p.I.:** 10.1

**Purity:** >95% by SDS-PAGE gel

**Additional characterization:** FT-IR, <sup>1</sup>H-NMR (DMSO)

#### **Sequence:**

MESLLP-(((VPGIG)<sub>2</sub>VPGKG(VPGIG)<sub>2</sub>)<sub>2</sub>-  
DDDEEKFLRRIGRFG-  
((VPGIG)<sub>2</sub>VPGKG(VPGIG)<sub>2</sub>)<sub>3</sub>-(VPAVG)<sub>20</sub>-  
(((VPGIG)<sub>2</sub>VPGKG(VPGIG)<sub>2</sub>)<sub>2</sub>-  
DDDEEKFLRRIGRFG-  
((VPGIG)<sub>2</sub>VPGKG(VPGIG)<sub>2</sub>)<sub>3</sub>-V

**Description:** The monomer unit contains two different functional blocks in order to achieve an adequate balance of amphiphilicity, biocompatibility, bioactivity and thermal response. In the first block; ((VPGIG)<sub>2</sub>VPGKG(VPGIG)<sub>2</sub>)<sub>2</sub>-DDDEEKFLRRIGRFG-((VPGIG)<sub>2</sub>VPGKG(VPGIG)<sub>2</sub>)<sub>2</sub> converge the VPGIG sequence, which confers the mechanical properties (similar to the natural elastin), the biocompatibility and the stimuli-responsive nature, the pentapeptide VPGKG which is a modification of the first, containing lysine, so that the lysine ε-amino groups can be used for crosslinking purposes and other chemical modifications. Finally, the bioactive sequence contains a modified SNA15 domain of statherin, a human salivary protein, whose interaction with calcium phosphate is well-established. There is a hydrophobic middle building block VPAVG, which is also thermo-responsive.

**Source:** Microbial production.

**Formulation:** Sterile lyophilized form (white foam) from a 0.2 µm-filtered solution using deionized ultrapure water.

**Preparation Instructions:** Lyophilized protein can be reconstituted in water or aqueous buffer solutions up a concentration of 300 mg/mL at cold temperature (4 °C). Other organic solvents: DMF, DMSO, TFE (100 mg/mL).

**Storage and Stability:** This lyophilized preparation is stable at room temperature, long storage it should be kept at -20 °C. Reconstituted material should be stored in working aliquots at 4 °C for 2 weeks.

#### **Additional information for water-based solutions:**

**Stimuli-responsiveness and T<sub>t</sub>:** These protein polymers undergo a phase transition in response to changes in the temperature. Below the so-called inverse transition temperature (ITT) the uncrosslinked polymer chains are soluble in water, however, above the transition temperature (T<sub>t</sub>) the polymer chains form nano- and microaggregates which segregate from the solution.

This reversible process is monitored by DSC showing a two T<sub>t</sub> in deionized ultra-pure water caused by the independent folding of the two different blocks. In the case of the triblock a broad endothermic peak and a shoulder are visible. Similar behavior has been found in other studies on related systems based in alanine-triblock systems.

(50mg/mL) at pH 7.2 of 31 °C

#### **References:**

*Biomacromolecules* 2011, **12**, 1480-1486.

*Biophysical J.*, 2009, **97**, 312-320.

**Product use limitation:** This product is exclusively for *research purposes and in vitro use only*. The product was not tested for administration to humans or animals.

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