Recombinant elastin-like protein polymer for biomineralization and tissue engineering

Recombinant amphiphilic statherin-containing diblock protein polymer

Product Number: TP30301

Mol. Weight: Monodisperse recombinant protein containing 452 amino acids and having a molecular weight of 40.4 kDa by MALDI-TOF mass spectrometry.

p.I.: 9.9

Purity: >95% by SDS-PAGE gel

Additional characterization: FT-IR, 1H-NMR (DMSO)

Sequence:

MESLLP-[((VPGIG)$_2$VPG**K**G(VPGIG)$_2$)$_2$-
DDDEEKFLRRIGRFG-
((VPGIG)$_2$VPG**K**G(VPGIG)$_2$)$_2$]$_3$-(VPAVG)$_{20}$-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)$_2$VPG**K**G(VPGIG)$_2$)$_2$-DDDEEKFLRRIGRFG-((VPGIG)$_2$VPG**K**G(VPGIG)$_2$)$_2$ 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 second building block VP**A**VG, 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_t: 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_t) the polymer chains form nano- and microaggregates which segregate from the solution.
This reversible process is monitored by DSC showing a two T_t in deionized ultra-pure water caused by the independent folding of the two different blocks. Similar behavior has been found in other studies on related systems based in alanine-diblock systems.

(50mg/mL) at pH 7.2 of 32 and 35 °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.

Technical Proteins Nanobiotechnology, S. L.
Edificio CTTA, Campus Miguel Delibes
Paseo de Belén 9A, 47011, Valladolid-SPAIN

Tel: +34 629 864 862
Fax: +34 983 184 698
e-mail: techserv@tpnbt.com
www.tpnbt.com