

## Recombinant elastin-like protein polymer for nanotechnological applications

### Recombinant amphiphilic diblock protein polymer

**Product Number:** TP40209

**Lot. No.** (See product label)

**Mol. Weight:** Monodisperse recombinant protein containing 707 amino acids and having a molecular weight of 59.3 kDa by MALDI-TOF mass spectrometry.

**p.I.:** 2.9

**Purity:** >97% by SDS-PAGE gel

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

**Sequence:**

MESLLP-(VPGVG VPGVG VPGEG VPGVG VPGVG)<sub>20</sub>-(VPAVG)<sub>40</sub>-V

**Description:** The monomer unit contains two different functional blocks in order to achieve an adequate balance of amphiphilicity, biocompatibility, pH-responsiveness and thermal response. The first block [(VPGVG)<sub>2</sub>VPGEG(VPGVG)<sub>2</sub>] confers the pH-responsiveness. The second building block VPAVG is only 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 microaggregates (acid pH) and nano-objects (neutral pH), which segregate from the solution. This process is monitored by DSC showing a  $T_t$ :

DEIONIZED ULTRAPURE WATER (50 mg/mL)		
pH	2.5	7
$T_t$ (°C)	30 y 32 (two peaks)	44

PBS, pH 7.2 (50 mg/mL): 35°C

The reverse dissolution of the aggregates takes place only after the temperature is undercooled to 15 °C. This degree of large undercooling has been found to be strongly dominated by kinetics, and the acute hysteresis behavior seems to govern the hydration process.

**References:**

*Biomacromolecules*, 2012, **13**, 293-298.

*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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