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AC10VNC10ELF: A Thermo- Responsive, Self-Assembling Protein Gel

We have designed protein polymer (designated AC₁₀VNC₁₀ELF) that forms a self-assembling gel. Self assembly is the process by which a complex molecule assembles itself from its components. The protein we have created has the unique property of remaining liquid at low temperatures (about 4°C) and self-assembling into a gel at normal physiological temperatures (about 37°C). This thermo-responsive behavior is determined by the ELF domain, a modified version of the protein elastin (EL). Bonds also form between the leucine zipper domain (A) of adjacent proteins. A major application for this protein could be in tissue engineering, where live cells could be homogenously distributed in solution, and then immobilized at physiological temperature. A cell binding domain derived from vitronectin (VN) is engineered in the protein polymer to provide a scaffold that enhances cell adhesion and survival. So far, we have genetically engineered bacteria to produce our designed protein, and I have worked towards producing and purifying batches of the protein, as well as testing its material properties.



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