To adapt the physical properties of living materials to their biological function, nature developed various types of polymers with outstanding physical behavior. One example is the vitreous body, which is important intraocular elements not only because of its optical and mechanical performances, but also due to its important role in the pathogenesis and treatment of conditions affecting adjacent tissues and eventually the whole eye. Here, we report a novel biocompatible material for injectable vitreous substitute, composed of thermosensitive amphiphilic polymer, which is capable of forming a transparent gel in the vitreous cavity. It is nontoxic, provides adequate support for the retina, and allows light to reach the sensory elements at the back of the eye. The amphiphilic polymer exhibits mechanical stability by assembling to form highly interconnected hydrophobic domains, which leads to the constitution of a network structure.