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Lyophilized hemoglobin-albumin cluster with disaccharides: Long-term storable powder of artificial O₂-carrier

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Abstract:

Core-shell protein cluster comprising a hemoglobin (Hb) in the center and human serum albumins (HSA) at the exterior, Hb-HSA₃ cluster, is an artificial O₂-carrier designed for use as a red blood cell (RBC) substitute. Lyophilization of the Hb-HSA₃ cluster solution ([Hb unit] = 5 g/dL) with sucrose and trehalose yielded stable pink powder, which can be stored for two years at 4°C. Addition of pure water to the powder regenerated the homogeneous solution. The O₂-binding properties and oxyHb rate have been unaltered during the storage period. Infrared spectroscopic studies revealed that the hydrogen bond between protein and sugar stabilizes three-dimensional structure of the cluster.

■ 理工学研究所との関連

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