

DU-DST PURSE Grant helps Delhi University Researcher Take a Significant Step towards Production of Stable Hemoglobin Based Blood Substitute for use in Blood Transfusion

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Prof. Suman Kundu

The research group, led by **Prof. Suman Kundu** of the Department of Biochemistry, University of Delhi envisaged that the problem of blood shortage can best be solved by holding the heme within heme pocket by covalent linkage. Dr. Kundu's group successfully engineered such a covalent linkage observed naturally in a cyanobacterial hemoglobin (with unprecedented stability) into the prototype myoglobin. Engineered Mb demonstrated unique heme retention ability without any substantial changes in its biochemical, biophysical and oxygen binding properties. This proof-of-concept investigation, largely executed by Dr. Kundu's graduate student Sheetal Uppal, holds immense promise for production of stable HBOCs devoid of heme dissociation that can solve the shortage of blood worldwide. Dr. Kundu's group is now actively engaged in fulfilling this dream.

Research Brief

Blood shortage due to a general aversion to blood donation worldwide has plagued the human kind for decades. As an alternative, attempts have been made to use "blood substitutes" to mimic the functions of human blood especially to facilitate "blood transfusion" during medical emergencies. In most such cases, the major objectives are "volume restoration" and "oxygen transport" for resuscitation. Thus, there are commercially available non-blood "volume expanders" to restore lost body fluid, which can also carry oxygen and are often called "artificial hemoglobin" or "artificial blood substitute". Perfluorocarbon-based oxygen carriers, which are widely used, are examples of this class of blood substitutes. However, such chemical oxygen carriers fail to mimic