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(54) Title: A HEAT STABLE OXYGEN CARRIER-CONTAINING PHARMACEUTICAL COMPOSITION FOR DIFFERENT TREATMENT APPLICATIONS

(57) Abstract: A highly purified and heat stable cross-linked nonpolymeric tetrameric hemoglobin suitable for use in mammals without causing renal injury and vasoconstriction is provided. A high temperature and short time (HTST) heat processing step is performed to remove undesired dimeric form of hemoglobin, uncross-linked tetrameric hemoglobin, and plasma protein impurities effectively. Addition of N-acetyl cysteine after heat treatment and optionally before heat treatment maintains a low level of met-hemoglobin. The heat stable cross-linked tetrameric hemoglobin can improve and prolong oxygenation in normal and hypoxic tissue. In another aspect, the product is used in the treatment of various types of cancer such as leukemia, colorectal cancer, lung cancer, breast cancer, liver cancer, nasopharyngeal carcinoma and esophageal cancer. The inventive tetrameric hemoglobin can also be used to prevent tumor metastasis and recurrence following surgical tumor excision. Further the inventive tetrameric hemoglobin can be administered to patients prior to chemotherapy and radiation treatment.

