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NEWS

THE UNIVERSITY OF TEXAS
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DALLAS--A "blue baby" expert will study blood of the Apollo 14 astronauts in an effort to learn more about an oxygen-releasing factor in red cells.

Dr. William Miller, associate professor of pediatrics at The University of Texas Southwestern Medical School and director of Pediatric Cardiology at Children's Medical Center, wants to know whether the artificial spacecraft atmospheres change the level of a substance called 2,3-diphosphoglycerate in the red cells of the astronauts' blood.

This particular factor, which causes hemoglobin to unbind the oxygen it is carrying, is present in higher levels in blue babies--apparently an attempt by the body to compensate for oxygen shortage.

Blood from Astronauts Alan Shepard, Stu Roosa and Edgar Mitchell already has been sampled to provide comparative readings. So has blood of the back-up crew and other persons, which will provide readings on normal levels.

Dr. Miller acknowledges the work will have significiant implications for future manned spaceflight and orbital laboratory existence.

"From the space angle, it's very important to define control mechanisms (for oxygen release) which are either stimulated or inhibited. In long space flight, it's obvious they're going to have an artificial environment involving oxygen."

(The explosion of an oxygen tank caused the Apollo 13 mission to be aborted. A number of engineering changes have been made for Apollo 14).

Although DPG has been known since the 1920's, its exact function remained a mystery until only three years ago.

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DPG is the largest substance made from glucose inside the red blood cell, said Dr. Miller. There are four sites on the hemoglobin molecule which can bind oxygen molecules to them. The red cells carrying the hemoglobin-bound oxygen then travel to their destination in the body where, in a way not completely understood, DPG "competes" for the four sites on the hemoglobin molecule. This process unbinds the oxygen so that it can nurture the tissues of the body.

On the discovery of DPG's function by scientists at Columbia University and the University of Virginia in 1967, Dr. Miller and other workers then in Philadelphia asked whether the body would provide increased levels of DPG in response to oxygen-poor blood.

"Blue blood--oxygen-poor blood--is the factor giving rise to the term 'blue baby'. We showed that there was an increased level of DPG in every blue baby by age two months."

The question now is whether DPG levels in the astronauts living in oxygen enriched atmosphere will be lowered.

Blood will be sampled when the astronauts return to the aircraft carrier (scheduled to be in the Pacific). The samples will be frozen and will eventually be delivered to Dr. Miller's lab at the medical school.

"Of course, after all this, it's possible the DPG levels in the astronauts will be normal," he muses. "But if it's abnormal, you have a whole set of new questions."

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