

Hemoglobin role studied

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Hemoglobin, the red pigment of our blood that carries oxygen from our lungs to the tissues, may have a further function in the human body, research at the University of California's Scripps Institution of Oceanography has disclosed.

Per F. Scholander, Professor of Physiology, has performed experiments that indicate the pigment may hasten the passage of oxygen, but not other gases, through the tissue walls. How it does this is not known.

Scholander has described his experiments and their implications in a recent issue of Science.

The experiments depend on a comparison of the rates of the diffusion of atmospheric oxygen and nitrogen through filters moistened by different substances.

Oxygen and nitrogen diffuse through a water-moistened filter into a vacuum chamber at a rate that depends entirely on pressure. If the air pressure is lowered, less oxygen and nitrogen get through, but always at a constant rate.

But if a solution of hemoglobin is used to moisten the filter, a curious thing happens: as the pressure is lowered, less nitrogen gets through, as before, but the amount of oxygen transported by the hemoglobin through the filter still remains the same as at atmospheric pressure. The proportion of the oxygen to the nitrogen thus rises. It goes from two to one at one atmosphere to eight to one at one-twelfth of an atmosphere.

The hemoglobin has in some way made it easier for the oxygen molecules to pass through the filter to the chamber. Scholander suggests that the hemoglobin acts as a conveyor belt, passing along oxygen molecules at a constant rate.

The discovery probably means that hemoglobin performs a like function in the human body. It may also offer a clue to the part that a very similar substance, myoglobin, plays in the physiology of muscles. Many animals that live in oxygen-poor environment are rich in myoglobin, i.e., have redder than usual muscles. Some live on the tops of mountains; some live in the sea. Diving animals such as sea lions have large quantities of myoglobin in their muscles. It was indeed the deep red color of seal and whale muscles that first set Scholander wondering about the problem.

That the pigment acts as a reservoir for oxygen was already known. The new discovery indicates that it may also serve as a "grease", making sure that if there is oxygen at all in the environment the animal shall receive it at a sufficient rate.

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