Human Limits for Hypoxia: The Physiological Challenge of Climbing Mt. Everest

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Climbing Mt. Everest without supplementary oxygen presents a fascinating physiological challenge because, at the summit, humans are very near the limit of tolerance to hypoxia. It was not until 1978 that the feat was accomplished, and this was after many unsuccessful attempts over a period of more than 50 years, and several physiological studies that suggested that it would be impossible. An analysis shows that the critical factors for reaching the summit are the enormous hyperventilation which is necessary to maintain the alveolar PO_2 at viable levels, the fact that the barometric pressure is substantially higher than predicted by the Standard Atmosphere, and the severe respiratory alkalosis that assists loading of oxygen by the blood in the lung. Even so the maximal oxygen consumption on the summit is extremely low with the result that climbers are critically vulnerable to unexpected setbacks such as changes in the weather.