

Effects of prenatal hypoxia on hematological and respiratory acclimatization to high altitude in rats.

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We tested the hypothesis that prenatal hypoxia have long-term consequences on physiological acclimatization to high altitude in rats. Male and female high-altitude rats (3600m, La Paz, Bolivia) were exposed to normal room air or enriched oxygen (32-35% O₂ - corresponding to sea level PO₂) between 10 and 1 day before birth (prenatal normoxia - pnNorm). At twelve weeks of age, we first assessed hematocrit and hemoglobin values. Then we measured respiratory parameters under baseline condition, in response to brief exposures to 32% O₂ (relieving the ambient hypoxic stimulus), and to 10% O₂ (severe hypoxia). We then calculated the % changes of respiratory frequency in response to 32 or 10% O₂ exposure. Compared to control, pnNorm male rats have increased hemoglobin and hematocrit levels, while males and females have reduced respiratory frequency. Respiratory frequency decreased similarly in pnNorm compared to Cont rats in response to 32 % O₂, and increased similarly in response to 10% O₂. Respiratory frequency response to 10% O₂ was higher in females of both groups compared to males. We conclude that in rats living at high altitude, prenatal hypoxia exerts an important life-long influence on hematological acclimatization to high altitude, preventing against excessive erythrocytosis. These effects may partially depend on altered respiratory control. Founded by NSERC.

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