Long-term exposure to intermittent hypoxia results in increased hemoglobin mass, reduced plasma volume, and elevated erythropoietin plasma levels in man

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While it is well established that highlanders have optimized their oxygen transport system, little is known about the acclimatization of those who move between different altitudes. The purpose of this study was to establish whether the acclimatization to long-term intermittent hypoxic exposure in members of the Chilean Army who frequently move from sea level to 3,550 m altitude is correlated with acute acclimatization or chronic adaptation to hypoxia. A group of officers was exposed intermittently to hypoxia for about 22 years (OI, officers at intermittent hypoxia) and a group of soldiers for 6 months (SI, soldiers at intermittent hypoxia). Both groups were compared to residents at altitude (RA) and to soldiers at sea level (SL). When compared to SL, we observed an 11% increase in total hemoglobin mass (tHb) as well as a corresponding increase in red cell volume (RCV), hemoglobin concentration and hematocrit in all three groups at altitude. Plasma volume (PV) and blood volume (BV) decr