Supplemental Digital Content



**Figure.** Schematic view of the literature review process. Papers were initially retrieved from Web of Science and PubMed.

**Included references**

1. Alexander JK, Hartley LH, Modelski M, Grover RF. Reduction of stroke volume during exercise in man following ascent to 3,100 m altitude. J Appl Physiol. 1967;23(6):849-858. Prepublished on 1967/12/01 as DOI.

2. Ashenden MJ, Gore CJ, Dobson GP, Hahn AG. "Live high, train low" does not change the total haemoglobin mass of male endurance athletes sleeping at a simulated altitude of 3000 m for 23 nights. Eur J Appl Physiol Occup Physiol. 1999;80(5):479-484. 10.1007/s004210050621.

3. Ashenden MJ, Gore CJ, Martin DT, Dobson GP, Hahn AG. Effects of a 12-day "live high, train low" camp on reticulocyte production and haemoglobin mass in elite female road cyclists. Eur J Appl Physiol. 1999;80:472-478.

4. Balke B, Nagle FJ, Daniels J. Altitude and Maximum Performance in Work and Sports Activity. JAMA. 1965;194(6):646-&.

5. Boning D, Maassen N, Jochum F, et al. After-effects of a high altitude expedition on blood. Int J Sports Med. 1997;18(3):179-185. Prepublished on 1997/04/01 as DOI 10.1055/s-2007-972616 [doi].

6. Brugniaux JV, Schmitt L, Robach P, et al. Eighteen days of "living high, training low" stimulate erythropoiesis and enhance aerobic performance in elite middle-distance runners. J Appl Physiol. 2006;100(1):203-211.

7. Clark SA, Quod MJ, Clark MA, Martin DT, Saunders PU, Gore CJ. Time course of haemoglobin mass during 21 days live high:train low simulated altitude. Eur J Appl Physiol. 2009;106(3):399-406. 10.1007/s00421-009-1027-4.

8. Clinton M, Thorn GW, Davenport VD. Studies on Altitude Tolerance .2. Studies on Normal Human Subjects - Effect of Repeated Short Exposures to Reduced Atmospheric Pressure. Bulletin of the Johns Hopkins Hospital. 1946;79(1):70-89.

9. Dehnert C, Hutler M, Liu Y, et al. Erythropoiesis and performance after two weeks of living high and training low in well trained triathletes. Int J Sports Med. 2002;23(8):561-566. Prepublished on 2002/11/20 as DOI 10.1055/s-2002-35533 [doi].

10. Dempsey JA, Reddan WG, Birnbaum ML, et al. Effects of acute through life-long hypoxic exposure on exercise pulmonary gas exchange. Respir Physiol. 1971;13(1):62-89. 10.1016/0034-5687(71)90065-x.

11. Dill DB, Braithwa.K, Adams WC, Bernauer EM. Blood-Volume of Middle-Distance Runners - Effect of 2,300-M Altitude and Comparison with Non-Athletes. Med Sci Sports Exerc. 1974;6(1):1-7.

12. Dill DB, Horvath SM, Dahms TE, Parker RE, Lynch JR. Hemoconcentration at altitude. J Appl Physiol. 1969;27(4):514-518.

13. Douglas CG, Halpane JS, Henderson Y, Schneider EC. Physiological observations made on Pike's Peak, Colorada, with special reference to adaptation to low barometric pressures. Proc R Soc Lond B Biol Sci. 1913;203:185-318. 10.1098/rstb.1913.0006.

14. Faura J, Reynafar.C. Use metha-androstenolone for acceleration of erythropoiesis in exposure to height. Arch Inst Biol Andina. 1970;3(3-4):94-98.

15. Frayser R, Rennie ID, Gray GW, Houston CS. Hormonal and electrolyte response to exposure to 17,500 ft. J Appl Physiol. 1975;38(4):636-642.

16. Frese F, Friedmann-Bette B. Effects of Repetitive Training at Low Altitude on Erythropoiesis in 400 and 800 m Runners. Int J Sports Med. 2010;31(6):382-388.

17. Friedmann B, Frese F, Menold E, Bartsch P. Individual variation in the reduction of heart rate and performance at lactate thresholds in acute normobaric hypoxia. Int J Sports Med. 2005;26(7):531-536. 10.1055/s-2004-821326.

18. Friedmann B, Jost J, Rating T, et al. Effects of Iron Supplementation on Total Body Hemoglobin During Endurance Training at Moderate Altitude. Int J Sports Med. 1999;20(02):78,85. 10.1055/s-2007-971097.

19. Garvican LA, Pottgiesser T, Martin DT, Schumacher YO, Barras M, Gore CJ. The contribution of haemoglobin mass to increases in cycling performance induced by simulated LHTL. Eur J Appl Physiol. 2011;111(6):1089-1101. Prepublished on 2010/11/30 as DOI 10.1007/s00421-010-1732-z.

20. Gore CJ, Hahn A, Rice A, et al. Altitude training at 2690m does not increase total haemoglobin mass or sea level VO2max in world champion track cyclists. J Sci Med Sport. 1998;1(3):156-170. Prepublished on 1998/10/23 as DOI.

21. Gore CJ, Hahn AG, Burge CM, Telford RD. VO2max and haemoglobin mass of trained athletes during high intensity training. Int J Sports Med. 1997;18(6):477-482. Prepublished on 1997/08/01 as DOI 10.1055/s-2007-972667 [doi].

22. Gore CJ, Rodriguez FA, Truijens MJ, Townsend NE, Stray-Gundersen J, Levine BD. Increased serum erythropoietin but not red cell production after 4 wk of intermittent hypobaric hypoxia (4,000-5,500 m). J Appl Physiol. 2006;101(5):1386-1393. 10.1152/japplphysiol.00342.2006.

23. Greenleaf JE, Bernauer EM, Adams WC, Juhos L. Fluid-Electrolyte Shifts and Vo 2 Max in Man at Simulated Altitude (2,287 M). J Appl Physiol. 1978;44(5):652-658.

24. Grover RF, Selland MA, McCullough RG, et al. beta-adrenergic blockade does not prevent polycythemia or decrease in plasma volume in men at 4300 m altitude. Eur J Appl Physiol. 1998;77(3):264-270.

25. Hannon JP, Shields JL, Harris CW. Effects of Altitude Acclimatization on Blood Composition of Women. J Appl Physiol. 1969;26(5):540-547.

26. Hannon JP, Vogel JA. Oxygen transport during early altitude acclimatization: a perspective study. Eur J Appl Physiol Occup Physiol. 1977;36(4):285-297. Prepublished on 1977/05/10 as DOI.

27. Hansen JM, Olsen NV, Feldt-Rasmussen B, et al. Albuminuria and overall capillary permeability of albumin in acute altitude hypoxia. J Appl Physiol. 1994;76(5):1922-1927. Prepublished on 1994/05/01 as DOI.

28. Heinicke K, Heinicke I, Schmidt W, Wolfarth B. A three-week traditional altitude training increases hemoglobin mass and red cell volume in elite biathlon athletes. Int J Sports Med. 2005;26(5):350-355. 10.1055/s-2004-821052.

29. Imoberdorf R, Garlick PJ, McNurlan MA, et al. Enhanced synthesis of albumin and fibrinogen at high altitude. J Appl Physiol. 2001;90(2):528-537.

30. Jain SC, Bardhan J, Swamy YV, Krishna B, Nayar HS. Body-Fluid Compartments in Humans during Acute High-Altitude Exposure. Aviat Space Environ Med. 1980;51(3):234-236.

31. Jung RC, Dill DB, Horton R, Horvath SM. Effects of age on plasma aldosterone levels and hemoconcentration at altitude. J Appl Physiol. 1971;31(4):593-&.

32. Kapoor SC, Chatterjee AK. Hematological response among new arrival at high-altitude. Indian J Med Res. 1978;67(MAR):428-434.

33. Krzywicki HJ, Consolazio CF, Matoush LO, Johnson HL, Barnhart RA. Body composition changes during exposure to altitude. Fed Proc. 1969;28(3):1190-&.

34. Levine BD, Stray-Gundersen J. "Living high-training low": effect of moderate-altitude acclimatization with low-altitude training on performance. J Appl Physiol. 1997;83(1):102-112. Prepublished on 1997/07/01 as DOI.

35. Merino CF. Studies on Blood Formation and Destruction in the Polycythemia of High Altitude. Blood. 1950;5(1):1-31.

36. Neya M, Enoki T, Kumai Y, Sugoh T, Kawahara T. The effects of nightly normobaric hypoxia and high intensity training under intermittent normobaric hypoxia on running economy and hemoglobin mass. J Appl Physiol. 2007;103(3):828-834. 10.1152/japplphysiol.00265.2007.

37. Parving HH. The effect of hypoxia and carbon monoxide exposure on plasma volume and capillary permeability to albumin. Scand J Clin Lab Invest. 1972;30(1):49-56. 10.3109/00365517209081089.

38. Picon-Reategui E, Buskirk ER, Baker PT. Blood glucose in high-altitude natives and during acclimatization to altitude. J Appl Physiol. 1970;29(5):560-563. Prepublished on 1970/11/01 as DOI.

39. Pottgiesser T, Ahlgrim C, Ruthardt S, Dickhuth H-H, Schumacher YO. Hemoglobin mass after 21 days of conventional altitude training at 1816 m. J Sci Med Sport. 2009;12(6):673-675. 10.1016/j.jsams.2008.06.005.

40. Poulsen TD, Klausen T, Richalet JP, Kanstrup IL, Fogh-Andersen N, Olsen NV. Plasma volume in acute hypoxia: comparison of a carbon monoxide rebreathing method and dye dilution with Evans' blue. Eur J Appl Physiol Occup Physiol. 1998;77(5):457-461. Prepublished on 1998/04/30 as DOI.

41. Pugh LGC. Blood Volume and Haemoglobin Concentration at Altitudes above 18000 Ft (5500 M). J Physiol. 1964;170(2):344-354.

42. Reynafarje C, Lozano R, Valdivieso J. The polycythemia of high altitudes - iron metabolism and related aspects. Blood. 1959;14(4):433-455.

43. Robach P, Dechaux M, Jarrot S, et al. Operation Everest III: role of plasma volume expansion on VO(2)(max) during prolonged high-altitude exposure. J Appl Physiol. 2000;89(1):29-37. Prepublished on 2000/07/25 as DOI.

44. Robach P, Lafforgue E, Olsen NV, et al. Recovery of plasma volume after 1 week of exposure at 4,350 m. Pflugers Arch. 2002;444(6):821-828.

45. Robach P, Schmitt L, Brugniaux JV, et al. Living high-training low: effect on erythropoiesis and maximal aerobic performance in elite Nordic skiers. Eur J Appl Physiol. 2006;97(6):695-705.

46. Robach P, Schmitt L, Brugniaux JV, et al. Living high-training low: effect on erythropoiesis and aerobic performance in highly-trained swimmers. Eur J Appl Physiol. 2006;96(4):423-433.

47. Robertson EY, Aughey RJ, Anson JM, Hopkins WG, Pyne DB. Effects of Simulated and Real Altitude Exposure in Elite Swimmers. J Strength Cond Res. 2010;24(2):487-493.

48. Robertson EY, Saunders PU, Pyne DB, Aughey RJ, Anson JM, Gore CJ. Reproducibility of performance changes to simulated live high/train low altitude. Med Sci Sports Exerc. 2010;42(2):394-401. Prepublished on 2009/11/21 as DOI 10.1249/MSS.0b013e3181b34b57 [doi].

49. Robertson EY, Saunders PU, Pyne DB, Gore CJ, Anson JM. Effectiveness of intermittent training in hypoxia combined with live high/train low. Eur J Appl Physiol. 2010;110(2):379-387. 10.1007/s00421-010-1516-5.

50. Saunders PU, Ahlgrim C, Vallance B, et al. An Attempt to Quantify the Placebo Effect From a Three-Week Simulated Altitude Training Camp in Elite Race Walkers. Int J Sports Physiol Perform. 2010;5(4):521-534.

51. Saunders PU, Telford RD, Pyne DB, et al. Improved running economy in elite runners after 20 days of simulated moderate-altitude exposure. J Appl Physiol. 2004;96(3):931-937. 10.1152/japplphysiol.00725.2003.

52. Saunders PU, Telford RD, Pyne DB, Hahn AG, Gore CJ. Improved running economy and increased hemoglobin mass in elite runners after extended moderate attitude exposure. J Sci Med Sport. 2009;12(1):67-72. 10.1016/j.jsams.2007.08.014.

53. Siebenmann C, Robach P, Jacobs RA, et al. "Live high-train low" using normobaric hypoxia: a double-blinded, placebo-controlled study. J Appl Physiol. 2012;112(1):106-117. Prepublished on 2011/10/29 as DOI japplphysiol.00388.2011 [pii]

10.1152/japplphysiol.00388.2011.

54. Siggaard-Andersen J, Petersen FB, Hansen TI, Mellemgaard K. Plasma volume and vascular permeability during hypoxia and carbon monoxide exposure. Scand J Clin Lab Invest Suppl. 1968;103:39-48. Prepublished on 1968/01/01 as DOI.

55. Singh MV, Jain SC, Rawal SB, et al. Comparative-study of acetazolamide and spironolactone on body-fluid compartments on induction to high-altitude. Int J Biometeorol. 1986;30(1):33-41. 10.1007/bf02192056.

56. Smith HP, Belt AE, Arnold HR, Carrier EB. Blood volume changes at high altitude. Am J Physiol. 1925;71(2):395-412.

57. Stokke KT, Rootwelt K, Wergeland R, Vale JR. Changes in plasma and red-cell volumes during exposure to high-altitude. Scand J Clin Lab Invest. 1986;46:113-117.

58. Surks MI, Chinn KS, Matoush LR. Alterations in body composition in man after acute exposure to high altitude. J Appl Physiol. 1966;21(6):1741-1746. Prepublished on 1966/11/01 as DOI.

59. Svedenhag J, Piehl-Aulin K, Skog C, Saltin B. Increased left ventricular muscle mass after long-term altitude training in athletes. Acta Physiol Scand. 1997;161(1):63-70. Prepublished on 1997/10/06 as DOI.

60. Takeno Y, Kamijo YI, Nose H. Thermoregulatory and aerobic changes after endurance training in a hypobaric hypoxic and warm environment. J Appl Physiol. 2001;91(4):1520-1528. Prepublished on 2001/09/25 as DOI.

61. Terzioglu M, Tuna N. Variations in Blood Volume at 1.85 Km Altitude. J Appl Physiol. 1954;6(7):417-422.

62. Turner HS, Hoffler GW, Billings CE, Bason R. An attempt to produce acclimatization to hypoxia by intermittent altitude exposure with vigorous exercise. Aerosp Med. 1969;40(9):971-976. Prepublished on 1969/09/01 as DOI.

63. Wehrlin JP, Marti B. Live high-train low associated with increased haemoglobin mass as preparation for the 2003 World Championships in two native European world class runners. Br J Sports Med. 2006;40(2). e3

10.1136/bjsm.2005.019729.

64. Wehrlin JP, Zuest P, Hallen J, Marti B. Live high-train low for 24 days increases hemoglobin mass and red cell volume in elite endurance athletes. J Appl Physiol. 2006;100(6):1938-1945. 10.1152/japplphysiol.01284.2005.

65. Whitten BK, Burlingt.Rf, Posiviat.Ma, Sidel CM, Beecher GR. Amino Acid Catabolism in Environmental Extremes - Effect of High Altitude and Calories. Am J Physiol. 1970;218(5):1346-1350.

66. Wolfel EE, Groves BM, Brooks GA, et al. Oxygen transport during steady-state submaximal exercise in chronic hypoxia. J Appl Physiol. 1991;70(3):1129-1136. Prepublished on 1991/03/01 as DOI.