

Caffeine decreases exercise-induced myocardial flow reserve.

[Namdar M](#), [Koepfli P](#), [Grathwohl R](#), [Siegrist PT](#), [Klainguti M](#), [Schepis T](#), [Delaloye R](#), [Wyss CA](#), [Fleischmann SP](#), [Gaemperli O](#), [Kaufmann PA](#).

Cardiovascular Center, Nuclear Cardiology, University Hospital, Zurich, Switzerland.

OBJECTIVES: We studied the acute effect of caffeine on myocardial blood flow (MBF) at rest and exercise in healthy volunteers at normoxia and during acute exposure to simulated altitude. **BACKGROUND:** Caffeine is a widely consumed stimulant, although its cardiovascular safety remains controversial and its effect on MBF is unknown. **METHODS:** 15O-labeled H₂O and positron emission tomography (PET) were used to measure regional MBF at rest and immediately after supine bicycle exercise in healthy volunteers at normoxia (n = 10; mean workload, 175 W; 98% predicted; mean age, 27 +/- 6 years) as well as during hypoxia, simulating an altitude of 4,500 m by inhalation of a mixture of 12.5% oxygen (n = 8; 148 W; 78% predicted; mean age, 29 +/- 4 years). Measurements were repeated 50 min after oral ingestion of caffeine (200 mg). Myocardial flow reserve (MFR) was calculated as the ratio of hyperemic to resting MBF. **RESULTS:** Resting MBF was not affected by caffeine at normoxia (1.05 +/- 0.36 ml/min/g vs. 1.17 +/- 0.27 ml/min/g; p = NS), although it was significantly increased at hypoxia (1.71 +/- 0.41 ml/min/g vs. 2.22 +/- 0.49 ml/min/g; p < 0.001). By contrast, exercise-induced hyperemic MBF decreased significantly at normoxia (2.51 +/- 0.58 ml/min/g vs. 2.15 +/- 0.47 ml/min/g; p < 0.05) and hypoxia (5.15 +/- 0.79 ml/min/g vs. 3.98 +/- 0.83 ml/min/g; p < 0.005 vs. baseline; p < 0.005 vs. normoxia). The MFR decreased by 22% at normoxia (2.53 +/- 0.69 to 1.90 +/- 0.49; p < 0.01) and by 39% at hypoxia (3.13 +/- 0.60 to 1.87 +/- 0.45, p < 0.005; p < 0.05 vs. normoxia). **CONCLUSIONS:** In healthy volunteers, a caffeine dose corresponding to two cups of coffee (200 mg) significantly decreased exercise-induced MFR at normoxia and was even more pronounced during exposure to altitude.

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