

Surprising benefits of training in the heat

By Meaghen Brown, *Outside*

One of the highest sweat rates ever recorded was that of marathon runner Alberto Salazar at the 1984 Olympics in Los Angeles. In the months leading up to the games, which were expected to be oppressively hot, the marathoner was put through a regimen of temperature acclimation training with the goal of helping him adapt to running in the heat. While Salazar placed only 15th overall, the program was deemed a success, physiologically speaking—vitals taken after the race found that Salazar's hormonal and thermoregulatory systems were completely normal. His body had compensated by causing him to sweat at an incredibly high rate—about three liters per hour, compared to the roughly one liter per hour for an average human.

Researchers have been looking at the effects of heat on athletic performance for decades, and their results have been consistently surprising. Studies have found that, in addition to an increased rate of perspiration, training in the heat can increase an athlete's blood plasma volume (which leads to better cardiovascular fitness), reduce overall core temperature, reduce blood lactate, increase skeletal muscle force, and, counterintuitively, make a person train better in cold temperatures.

In fact, heat acclimation may actually be more beneficial than altitude training in eliciting positive physiological adaptations, says Santiago Lorenzo, a professor of physiology at Lake Erie College of Osteopathic Medicine and a former decathlete at the University of Oregon.

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