

Athletes' 'sweat and tears' linked to asthma

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An athlete's ability to sweat may do more than keep the body cool. It also may prevent the development of exercise-induced asthma (EIA), a common respiratory condition among trained athletes. New research appearing in the September issue of *CHEST*, the peer-reviewed journal of the American College of Chest Physicians (ACCP), shows that athletes with EIA produce less sweat, tears, and saliva than those who do not have breathing problems.

Warren Lockette, MD, lead study author and advisor to the University of Michigan's NCAA Division I women's swimming team, has worked with many Olympians and future professional athletes with EIA. "It is unclear why so many elite athletes have exercise-induced asthma," he said. "It is possible that they manifest symptoms of exercise-induced asthma simply because their levels of exertion and breathing rate are so high compared with the average, competitive sportsman."

As the head of clinical research at Naval Medical Center San Diego and a former medical officer with the US Navy SEALs, Dr. Lockette also knew that a diagnosis of asthma would preclude many young sailors from becoming Navy divers or special warfare operators. He teamed up with investigators at Naval Medical Center San Diego to try to understand the mechanisms by which asthma attacks are precipitated during exercise in otherwise healthy individuals.

Lockette and colleagues analyzed the relationship between fluid secretion rates (sweat, saliva, and tears) in 56 athletic subjects suspected of having EIA. Air movement through the lungs, i.e., the "FEV1," was

measured in otherwise healthy volunteers before and after the administration of methacholine, a drug that can cause airways to constrict in patients with EIA. Researchers then measured responses to the application of pilocarpine, an agent used to induce sweating and saliva production. Individuals who were most sensitive to methacholine, i.e., who had the greatest fall in FEV₁, were the least sensitive to pilocarpine-induced sweat secretion—meaning, those subjects who had the most hyperreactive airways tended to sweat the least. Conversely, mean sweating rates were significantly higher among those subjects who were relatively unresponsive to methacholine—the subjects who showed no signs of EIA.

Researchers also found a correlation between the net sweat fluid excretion and net sweat sodium excretion, with sodium excretion rates being higher in subjects who were unresponsive to methacholine compared with those who were responsive. Additionally, a significant correlation was found between sweat secretion and unstimulated salivary gland flow rates and tear secretion.

"There were many Olympic hopefuls whose competitive chances were potentially limited by exercise-induced asthma," said Dr. Lockette. "We found that by controlling air quality during workouts, as well as by providing individualized attention to our athletes' hydration and nutrition, we could reduce the limitations imposed by hyperreactive airways in many individuals."

Although Dr. Lockette and his team were not able to establish a cause-effect relationship between the increased incidence of EIA and diminished sweat sodium excretion, they speculate that the mechanism responsible for determining sweat volume is the same mechanism responsible for the volume of water secreted by the airways. As a result, individuals who sweat less also have drier airways.

"It now appears that how much fluid your airways secrete could be a key determinant in protecting you from exercise-induced asthma," he said. "So, if athletes sweat, drool, or cry, at least they won't gasp."

"Exercise-induced asthma may be common among elite or highly trained athletes, but recreational athletes can also suffer from this condition," said Alvin V. Thomas, Jr., MD, FCCP, and President of the American College of Chest Physicians. "Otherwise healthy individuals who experience asthma symptoms, such as chest tightness, unusual shortness of breath, or extreme fatigue during exercise, should consult with their physician."

Source: American College of Chest Physicians

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