Staying Cool in the Summer Sun

It's summer and that means school is out, dairy queens are open and the local pool gets filled. This all gives us the incentive to leave our winter dens and get back to the cycling grind. It's a wonderful time of year, but the warmer temperatures can prove difficult when we aren't used to the heat or unaware of the appropriate management skills to fight off heat illness.

Fundamentally, the body is constantly interacting with the ambient temperatures surrounding it, working to maintain constant core temperature. This is known as *thermal homeostasis*. We gain and lose heat through several mechanisms: evaporation (sweating), convection (between the body and the air), conduction (direct contact between the body and another object), and radiation (between the body and infrared waves). While riding on hot summer days, the body has ample opportunity to gain heat through these different mechanisms. The figure below demonstrates several ways this happens on the bike. In addition to your surroundings, your body gains heat from the physical work of turning the pedals. The harder you work, the warmer you become!

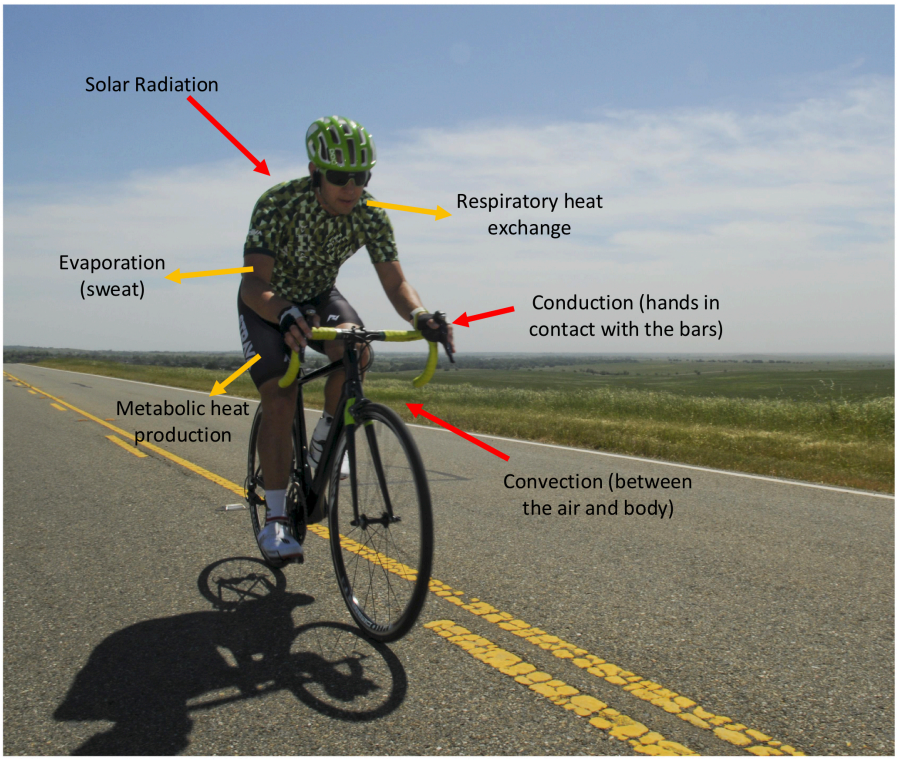

Figure 1 – Pathways of heat exchange

The human body, however, has mechanisms to shed heat and keep you from reaching dangerous core temperatures. Primarily, the body shuttles warm blood from the core to the skin where it can be cooled through evaporation. This requires your heart to keep blood moving fast and sweat glands on overdrive. This can cause dehydration and stress on your cardiovascular system, not to mention a lot of laundry! In hotter environments riders see higher heart rates, decreased strength, inefficient oxygen exchange and poor reaction times! Eventually when the cooling mechanisms in the body fail to keep up with the heat load, core body temperature will increase and may result in heat-related illnesses that range from heat cramps to a potentially fatal, yet rare, condition called heat stroke. That being said, we have three strategies that can be used to help when training and racing in the heat: hydration, heat acclimation, and fitness.

Hydration

The first and most intuitive strategy for combatting summer heat while on the bike is proper hydration. In the heat, we sweat more so we need to drink more to replace the loss, simple enough. In addition to just water, the body is also losing electrolytes through sweat, making electrolyte replacement important as well. The American College of Sports Medicine published a position stand on exercise fluid replacement in 2007 and is the standard for recommendations on the topic.[2] If you are interested in the topic, that is a great place to dig deeper. While the position stand does give general recommendations, it is important to keep in mind that every individual is different in how much they sweat and how much fluid replacement is needed.

Pre-hydration should be done at least several hours prior with the goal of normalizing urine output and keeping it light in color. Current recommendations suggest slowly intaking about 5-7mL/kg body weight 4 hours before going out.[2] If haven't gone to the bathroom or your urine looks like apple juice, slowly drink another ~3-5 mL/kg body weight.[2] Think about drinking sodium rich drinks (Gatorade) or snacks (pretzels) to help retain the fluids you drank and to maintain your thirst. To make sure your hydration strategy was optimal, it is suggested that you weigh yourself first thing in the morning and again after riding. In general, you should avoid losing more than 2% of your body weight! Post-ride hydration should aim to return your body weight to that in the morning.

Heat Acclimation

The second strategy is heat acclimation, or getting used to cycling in the heat. Self-control can be difficult on that first 80-degree day after a painfully cold winter! That being said, gradually exposing yourself to hotter environments can help prevent cooking yourself right off the bat. Anywhere from 4-14 days has been shown extensively to provide beneficial thermoregulatory and cardiovascular adaptations. Most importantly your sweat rate increases, resulting in increased heat dissipation and decreased cardiovascular strain. This allows your heart to work harder at keeping your muscles going as opposed to keeping you cool.

Sweating more, although a positive adaption to heat, results in quicker dehydration. Therefore, you need to be even more diligent about hydrating properly and making sure you aren't loosing too much body weight through sweating while out on the bike.

Fitness

The final strategy in combating heat illness is being fit! This is good news for us because cycling is great at getting you in shape. Studies have shown that lower aerobic performance is correlated with increased skin and core temperature. Going back to the role of the heart. If your heart is strong, it is more likely to be able to manage both the demands of the activity as well as heat stress. If you plan on staying inside during the winter, make sure you are keeping your fitness up whether it's on the trainer, running or spending some time in the gym. Once again, as fitness increases so does your sweat rate. Make sure you are drinking water in addition to salty snacks or electrolyte drinks.

High heat and humidity provides a particularly challenging environment to ride bicycles, especially at higher intensities. Our cardiovascular system is challenged to manage both your muscles and core temperature. Proper hydration, heat acclimation and improved fitness can help take the load off your heart and allow you to cope in the sun. For more in depth calculations of how much you should be hydrating and heat acclimation protocols, especially if you are competing in races, we go more in depth in our article on the site (LINK).

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