Heat and The Driver's Internal Engine: Part 2

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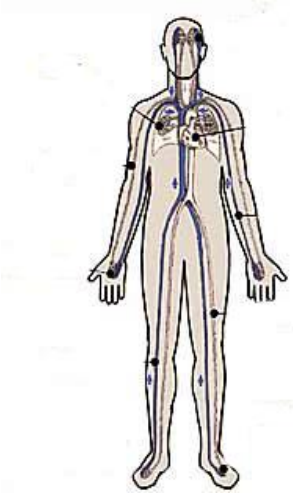
As part two of a three-part series *Heat and the Driver's Internal Engine*, our first segment focused on how the hot environment in a racecar affects the driver's physical well-being and their abilities on the track. In this segment, we look at how the body handles this excessive heat.

Race car drivers are in the hot seat in more ways than one. It has been estimated that temperatures inside a race car's cockpit can soar to a sweltering 140 to 160 degrees. It is not common for drivers to endure blisters and burns due to the excessive heat flooding into the cockpit. That extreme heat comes through the engine firewall, transmission tunnel, and floor. High temperatures, in fact, have led to many totally exhausted drivers being hauled out of their cars after a grueling meet. Chances are you know someone this has happened to or maybe it happened to you.

Your hypothalamus, located at the base of your brain, is your body's thermostat. It monitors your core temperature and creates the reactions that your body has as your core temperature rises and falls. It tries to warm you when you get cold and cool you when you get hot.



Your body is constantly generating heat, even while you are at rest. The average human blood capacity is 5.6 liters or 6 quarts. This blood makes about three circulation cycles per minute as your heart beats. For normal heat loss in a 72 degree environment, your hypothalamus signals your body to send about one-quarter of a liter of blood to your skin's surface per minute for cooling via perspiration. As you are racing (*at Sebring in August, remember?*) your body temperature increases as a result of your environment and physical exertion. Your perspiration increases dramatically *and 6 to 8 liters of blood flow to your skin's surface per minute* for evaporation. This is up to *one-half* of your body's normal blood supply.

So, if all of this blood is racing to your skin's surface to attempt to cool you, where is it coming from? Where else…*your muscles and organs*. *Now your body's muscles, brain and other vital organs are working on only* ONE-HALF *of what is normally required.* What is the result of this?

- ***Heavy perspiration and potential dehydration***
- ***Increased heart rate***
- ***Mental fatigue***
- ***Decreased alertness and decision making abilities***
- ***Decreased reaction times***
- ***Muscle fatigue and body ache***

This increased blood flow to the skin's surface and the resulting perspiration it causes is one of four ways the body can expel its heat and control its core temperature. These are:

EVAPORATION: **the release and evaporation of perspiration through the sweat glands on the skin surface**

RADIATION: **when the environmental air temperature is lower than your body temp, thus your body "radiates" its heat**

CONVECTION: **heat loss to air and water vapor around your body which must be lower than your skin temperature**

CONDUCTION: **the transfer of heat from your warm body to cooler objects by direct contact**

When the temperature in your environment surpasses 95 degrees F, *RADIATION, CONVECTION and CONDUCTION stop working.*

EVAPORATION is all you have left, which is only 25% of heat loss. And, remember, you have on protective clothing totally encapsulating your body. And with the helmet, drivers suit, the Nomex underwear, the gloves, socks and shoes, evaporation all but completely stops.

This is when alternative cooling methods must come into play if you as the driver are to remain safe from heat exhaustion and all of its adverse effects. Keeping you cool and controlling your core temperature is as much an important protection as are your *roll cages, 5-point harnesses, fire suits and nomex underwear*.

All of your safety devices only protect you IF YOU CRASH. Driver cooling systems can prevent that crash.

In our next and final part of this series, we'll look at the various methods of driver cooling, which are the most effective and why. Be sure to join us!