

Badwater Ultramarathon – 2008

Measures of water turnover, body temperature, activity and heat strain during the Badwater ultramarathon.

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Background:

This proposed research would evaluate the effects of environmental stress on measures of hydration, total body water turnover, core temperature, and heat shock protein response during the 2008 Badwater ultramarathon.

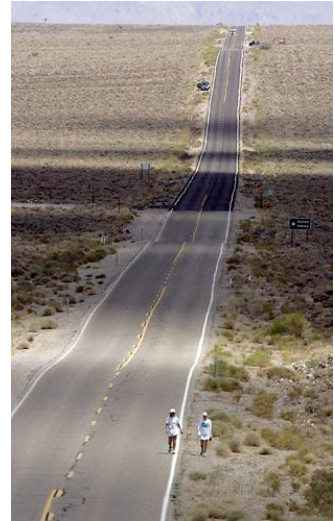
Water turnover offers a dynamic measure of hydration demands by quantifying the magnitude of total body water loss coupled with partial or complete replacement over a given period of time. The unique measure of water turnover is not simply a measure of how much water is consumed and how much water is lost, it is an all inclusive measure of water flux through the human system. A 75 kg reference man contains about 45 L of water (~60% of total body weight). During some of our previous field investigations with wildland fire fighters, Air Force Combat controllers, and Ironman athletes our laboratory has demonstrated 12-24hr water turnover values in the range of 6-18 L (up to 40% of total water volume). Even with this data we have no indication that these activities have stressed the human hydration system to its full capacity. Further research, as proposed here, is needed to determine the human ceiling for water turnover in order to further characterize the hydration needs for extended work in hostile environments.

Because these types of events may capture the human ceiling for extended muscle work in the heat, these data will provide valuable insight towards the cellular protection associated with a change in heat shock protein response patterns. Moreover, this approach will assist in determining human factors that limit or sustain performance during an extended period of activity. The data collection we are planning for Badwater 2008 will extend our past research because of the unique environment and duration of the event.

Methodology:

We would like to recruit racers having previous ultramarathon success (example: prior Western States or Badwater experience) as our research participants (n=12).

Following subject recruitment, study participants will receive University IRB approved consent form (forwarded to each perspective research participant as pdf file via email. Additional information to be collected will relate to geographic location of residence. **Only racers residing in the western half of the US will be used as study subjects (due to variability in background levels of the stable isotope $^2\text{H}_2\text{O}$ provided).**



Once study participants are selected, a package will be sent to these racers for early study data collection. These will be sent Fed Ex the week prior to the race. Subjects will be required to complete some sample collection procedures on their own prior to the check in and pre-race meeting Sunday July 13.

The pre-race “self data collection” will include some measures of body weight (scale will be provided), periodic urine collection, and taking the deuterium stable isotope tracer. This is a non-radioactive tracer provided in a very small quantity (approximately 9-10 grams, 10% enrichment). This poses no risk to the user but does allow us to track dynamic patterns of water loss, intake and overall rates of water turnover.

Additional measures and data collected prior to, during and after the race include the following...

- | | |
|-----------------|---|
| July 13 | Pre-Race measures –
nude body weight, blood draw (5ml, 1 tsp), urine sample, outfit with temperature recording system |
| July 14, 15, 16 | Stovepipe Wells and/or Panamint Springs
nude body weight, urine sample (unless collected by crew), blood draw (5 ml, 1 tsp) |
| | Post Race measures -
nude body weight, blood draw (5ml, 1 tsp), urine sample |



Interested Participants??

Please contact Brent Ruby initially by email

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before June 20th !!

Racer/Participants will receive a detailed race report of their personal data, a complete final report of the project, photos, and a super cool shirt commemorating the WPEM/Badwater 2008 research project.

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