Photo courtesy MATHIAS STEINACH

HARD AT WORK – Mathias Steinach works with serum samples in his improvised lab at the Pelly Crossing checkpoint of the Yukon Arctic Ultra.

Photo by YANN BESREST-BUTLER - WWW.YANNBB.COM

MISSION ACCOMPLISHED – Jessie Thomson-Gladish (left) and Julie Pritchard, a research subject, are seen at the Yukon Arctic Ultra finish line in Dawson City.

Space researchers study Arctic Ultra athletes

By JESSICA SIMON
Special to the Star

What does the Yukon have in common with outer space?

Dr. Mathias Steinach of the Center for Space Medicine and Extreme Environments in Berlin conducted research on eight participants of the 300- and 430-mile distances of the Montane Yukon Arctic Ultra (MYAU) to find out.

"Runners of the Yukon Arctic Ultra share several environmental influences with astronauts," Steinach explained.

Psychosocial isolation, sleep and sensory deprivation, dependency on technology and changes in day-night (circadian) rhythms are just some.

And while every astronaut dreams of landing their re-entry capsule on a tropical beach, it hasn't happened yet.

"Astronauts have to undergo survival training in the event that they land in a hostile environment such as the Arctic or other cold regions on Earth."

Steinach, who ran the experiment on a test basis with 430-mile athletes on the 2013 MYAU, is part of a team of researchers who have studied human performance in extreme heat, at high altitude, in the deep seas, and in isolated and confined spaces.

Of all the extreme races in a northern climate, Steinach chose the Arctic Ultra for its adverse environmental influences, long-distance exercise and harsh environment.

"I also found it to be superbly well-organized, and the race director, Robert Pollhammer, was very open and supportive of the research."

Athletes had a pre-race briefing and assessment, gave details about the calories they packed, and wore a device to record heart-rate and energy expenditure on the trail, plus sleep values.

Hormonal changes in response to stress were analyzed pre- and post-race and at Carmacks and Pelly Crossing, where racers also answered questionnaires self-evaluating their well-being.

Influences, such as the -45 C temperatures at the start of this year's race or the euphoria of the weather warming up later on, also have a measurable effect so real weather values are recorded for the entire 13 days of the race.

Athletes volunteered for the research for various reasons.

Whitehorse master racer Shelley Gellatly took part in the 2013 study. She learned to take better care of herself, sleep and eat more.

"But now I'm experiencing full-blown menopausal symptoms," she said.

"Hot sweats that soak my clothes, waking up every hour on the hour with night sweats, not having a clue when my period will come and when it does, I need another sled just to carry feminine hygiene products. I'm not sure how it will affect the data, but it will be interesting to see."

Gellatly withdrew from the Ultra at Braeburn, but she'll receive her personal data and can compare them to results from a similar study she took part in on the Lost Souls race in Alberta.

Germany's Nicole Doerr signed up for the experiment because "I would have liked to be part of it in 2013, but I 'only' did the 300 miles. So this time, I was sure I want to be part of it."

Although she did not finish the long distances, she has more than 100 miles of data to help prepare for her next ultra.

Repeat subject Réjean Moreau from Quebec is curious to know what exactly goes on in his body while he's racing.

"Is it dangerous, what we're doing? And at what level?" he asked.

Moreau underwent surgery following his race in 2013.

"The measurements will let me know how I healed from last time."

Also, he's 61 years old this year. "I'm wondering if it's good or bad to keep racing."

Data collected from Britain's Julie Pritchard will contribute to the overall findings.

Pritchard, a rookie to this race, has extensive ultra experience.

Minus a section of trail from Pelly Crossing to Pelly Farm, where Pritchard teamed up with Whitehorse racer Jessie Thomson-Gladish, she trekked 400 miles and reached Dawson in just over 12 days.

Steinach can compensate for factors such as the missing data and a small field of subjects.

"It will have far less of an impact than the influence of exhaustive exercise and the environment."

Pritchard said, "I expect the data will show an adaptation to the race conditions after a few days, maybe a lower heart rate." A slow but steady pace is typical for endurance activities.

She may be surprised, though, as Steinach was in 2013.

"I found high-exercise intensities during some phases of the race. This was unexpected, as participants of the 430-mile were expected to be in the rather lower ranges of the exercise-heart-rate."

In total, four research subjects returned usable data this year.

Steinach hopes to extend the research with a larger sample in 2017.

The preliminary findings are available in the book **Human Physiology in Extreme Environments** by lead researcher Prof. Hanns-Christian Gunga and published by Academic Press/Elsevier this spring.

Once complete, the research will be available for comparison with similar data collected aboard the International Space Station.

When asked who gets to compare his data to that of Canadian astronaut Steve McLean, ISS commander Chris Hadfield or German commander Thomas Reiter, Steinach shrugged and smiled.

"This research shows what the human body is capable of in extreme environments," he said.

"Space, and human work and residence there – such as aboard the ISS – is the most hostile and extreme environment one could think of.

"Eventually, it is up to the scientific community and space agencies to use the knowledge to increase human health and safety as well as mission success in space."

*The Whitehorse writer is the author of **From Ice to Ashes**, a Yukon/Alaska borderlands thriller, and **Seven Packs of Sugar**, a Dempster Highway romance in the 2013 **Canadian Tales** anthology.*

Photo courtesy MATHIAS STEINACH

EQUIPMENT AT THE FINGERTIPS – Mathias Steinach's case is seen with the various devices, from the blood collection tubes (left) in the zip bag behind the BIA-device, to a safety box to safely discard sharp needles. To the right is the polar-belt that is attached to the chest and transmits the heart rate. It's behind a box with spare batteries.