



Evolution and Wilderness Medicine - Human Adaptation to Extreme Environments

Park City, Utah
August 1, 2018

A new frontier in wilderness medicine: how evolutionary biology and ecology can inform patient care in extreme environments

Schedule of Events

August 1, 2018

7:30 am Registration and Continental Breakfast

Morning: Altitude Medicine - Acclimatization and Limitations of Physiology

8:00 am Evolution and Wilderness Medicine Intro & Overview – Joe Alcock

8:30 am Altitude and Acute Mountain Sickness, The Super Sherpa Experience - Scott McIntosh

9:15 am Three High Altitude People - adaptation to altitude in Tibetans and Andeans and
Ethiopian Highlanders – Cynthia Beall

10:00 am Oxygen – Less is more? Diane Rimple

10:45 am Break

Midday/Afternoon: Marine Medicine, Heat Illness and the Microbiome

11:00 am Sea Nomads: A novel system for the study of acute hypoxia - Melissa Ilardo

11:45 pm Extreme Heat – limits of adaptation – Blair Wolf

12:30 pm Lunch discussion – additional applications of evolution in wilderness medicine

1:15 pm Evolution of the Stress Response - Michael Lauria

2:00 pm Heatstroke and the Microbiome – Joe Alcock

2:30pm Expedition Nutrition – food for extreme environments – Rick Henriksen

3:15 pm Wrap-up and Evaluation

3:30 pm Adjourn

Faculty

Joe Alcock MD @JoeAlcockMD

UNM Department of Emergency Medicine, Albuquerque, NM

Cynthia Beall PhD @CMBAltitude

Distinguished University Professor and Sarah Idell Pyle Professor of Anthropology, Case Western University; Co-Director, Center for Research on Tibet

Rick Henriksen MD @RickHenMD

Kestrel Wellness, Salt Lake City, UT. Physicians for Ancestral Health

Melissa Ilardo PhD

Department of Molecular Medicine at the University of Utah in Salt Lake City

<https://www.nytimes.com/2018/04/19/science/bajau-evolution-ocean-diving.html>

Michael Lauria, MD, NRP, FP-C @ResusPadawan

Former Paramedic Special Ops Medic, Emergency Medicine Residency, University of New Mexico

Scott E. McIntosh, MD

Director of the Wilderness Medicine Fellowship, University of Utah. Director, Wilderness Medical Society Diploma in Mountain Medicine Program, Editor in Chief, Wilderness and Environmental Medicine

Diane Rimple MD @DianeRimple

Professor of Emergency Medicine. UNM Mountain Medicine Program, Dept. Emergency Medicine, Albuquerque, NM. Innovation in Education, EMS, Disaster Medicine

Blair Wolf PhD

UNM Department of Biology, Albuquerque, NM

Lab focuses on the physiological ecology of animals in extreme environments

Description

A core competency of wilderness medicine is to understand how human physiology responds to extreme environments. Most human existence has taken place in environments without modern medicine. This legacy has shaped physiologic responses to extreme conditions, including temperature, altitude, dehydration, and other stresses. This session explores how adaptive responses to environmental challenges, their constraints and trade-offs, can inform wilderness medical care.

Natural selection has provided us with a capacity to cope with many environmental challenges. These adaptive responses have evolved over time and can be a patient's best friend. They are responsible for acclimatization and for healing.

Evolution is also responsible for vulnerabilities that cause disease after exposure to extreme wilderness conditions and pathogens. One vulnerability is explained by gene-environment mismatch, occurring when we encounter conditions not experienced during human evolution. Free diving and SCUBA diving also pose unique challenges. Breathing compressed gases during SCUBA diving, or experiencing hypobaric hypoxia at altitude may trigger maladaptive responses, disability, and death.

Another area of risk (and protection) is our co-evolution with the microbiome. Gut microbiota are involved in heat stroke, kidney injury after extreme endurance events, and might exacerbate acute mountain sickness. Nutritional approaches aimed at the microbiome can protect us from environmental stresses, not to mention travelers diarrhea. The aim of this pre-conference is to explore how evolutionary concepts illuminate these domains of wilderness medicine and learn how this knowledge translates into better wilderness medical care.