

7th Global Neurologists Annual Meeting on

Neuro Surgery and Interventional Radiology

August 22-24, 2016 Vienna, Austria

Febrile Seizures

Alexandra Kunz
Harvard University, USA

Introduction: Febrile seizures (FS) are always a relevant topic; thermoregulation and febrile responses, complex processes, are important aspects of the unsolved puzzle.

Methods: Here, FS are explored from comparative “evolutionary pressure” data-sets for insights/contributing factors to age dependent vulnerability and for potential MRI data acquisition for evidence-based medicine.

Results/Discussion: Thermoregulatory responses’ evolutionary quest is for maximal performance at optimal temperature, experimentally shown for insects’/viruses’ population growth, not performance. Relying on external heat sources, ectotherms’ narrow range of performance thermal sensitivities is explained by natural selection, not thermodynamics; endotherms’ birds’/mammals’ thermally constrained set-points evolved promoting heat loss, not enhancing performance. Mammalian brains’ selective brain cooling (SBC) is a special evolutionary case within the thermal core because hyperthermia, causing febrile seizures, limits performance; SBC separates brain temperature (T) regulation independently from the body to keep $T_{\text{brain}} < T_{\text{trunk}}$, $p < 0.01$.

Species-specific SBC mechanisms during hyperthermia promote reversing normal blood flow, from brain->skin to skin->brain, to cool/maintain constant cerebral metabolism. A 4-part venous pathway connects extracranial diploic/emissary veins with intracranial meningeal veins/sinuses; the richly vascularized/complex human diploe has an age dependent developmental pattern, fully established, age 5, large variations at each age. Primate emissary veins respond immediately to hyperthermia; their parietal/mastoid/condyloid/post-glenoid foramina prominence shifts in an evolutionary pattern: Tarsius 0%,0%,0%,100%; Lemurs 0%,74.4%,0%,99%; orangutan 3%,81.6%, 1%,2%; chimpanzee 8.7%,14%,16.5%,0%; human 60.5%,68%,77%,0.6%. Furthermore, intrinsic brain geometry plays an important evolutionary role in thermoregulatory patterns/heat distribution. Notably, perinatal discontinuity of ontological size/shape changes in chimps/humans at 4-6 months, $p < 0.0044$, produces topographical changes in vascular system; an expanded human frontoparietal volume, now globular, with highest concentration of diploic/emissary veins, richly anastomosed/reticulated, affects heat dissipation. Brain surface:volume ratio values for chimps’/humans’ heat loading, 1.59 vs 0.91, respectively, confirms globular shape decreases thermic values in heat transfer.

Conclusion: In light of evolution, human ontological variations from MRI measurements may offer an option to FS’ unsolved puzzle for evidence-based medicine.

Biography

Alexandra Kunz has completed her Undergraduate studies in Dentistry (Periodontal Hygienist) Graduate studies in Medicine and Post-graduate: Evolutionary Anthropology. Her goal is to bring evolution to Medicine for clinical relevance. Her current research approaches the unsolved puzzle of febrile seizures using an evolutionary understanding and with the intent of making a tool to predict febrile seizure potential in children, as a part of a routine well baby check-up, worldwide.

alexandrakunz@earthlink.net

Notes: