Functional hyperemia

As we process information, associated blood response

Mosso experiment (6.9)

Replicated by Field and Inman, 2014

Far removed – be very aware of our limitations

Dependent on rx bx neural firing, CBF

Blood flow

Basic anatomy

Artery -> arterioles -> capillaries -> Venule -> Vein -> Sinus

Factors – blood pressure, diameter of vessel, density of blood cell

Important – pressure and resistance

Decreasing resistance -> increase local flow

Resistance

Dilate -> increased flow, no change in pressure (6.16)

Feedback – neural metabolic byproducts -> dilation

K+, Adenosine, Lactate

Slow (seconds), sustained

Feedforward – neurons regulate blood flow

Extrinsic – PNS (6.18)

Ganglia -> Pial artery (gross)

ACh, NOS, NA, etc

Ngai 1988

Intrinsic – CNS (6.18)

Astrocytes, neurons -> arterioles, capillaries (local)

Neurotransmitters, ACh, NOS

Krimer 1998

Upstream dilation (6.21) - Limit spatial resolution

CMR02 mismatch – much glucose/02 supplied

Increased CMRglu, only small amount of glu required

Overshoot – helps maintain partial pressure of oxygen in distant tissue

Only overshoot for proximal, not distal tissue

Capitalize on overshoot for fMRI

Oxygenated – diamagnetic, deox – paramagnetic, so different magnetic properties that will affect spin systems