**Physiological mechanisms of heat gain**

**Vasoconstriction**

- Sympathetically mediated vasoconstriction of superficial arterioles & vasoldilation of shunt vessels beneath the skin moves blood away from surface so heat is conserved
- Aided by layer of subcutaneous fat

![Diagram of vasoconstriction](image)

**Shivering**

- Involuntary contraction of skeletal muscle, which expands energy and helps to warm the body
- Can increase heat production in the skeletal muscles up to 2–5x

**Piloerection**

- Sympathetic nervous system triggers contraction of the arrector pili muscle which causes body hair to stand erect; traps insulating layer of air between the bumps which reduces heat loss;
- however, since much of boy hair has been lost through evolution this is not as effective

**Hot Environments**

**Integumentary structures involved in heat loss**