

Emotions, Aggression and Stress (Ch.15) IV

- When good emotions go bad
 - Neurobiological basis of aggression
- Neurobiology of fear learning
- Note: Review session for midterm on Friday
 - (notes from this review session will NOT be posted online)

Types of Aggression

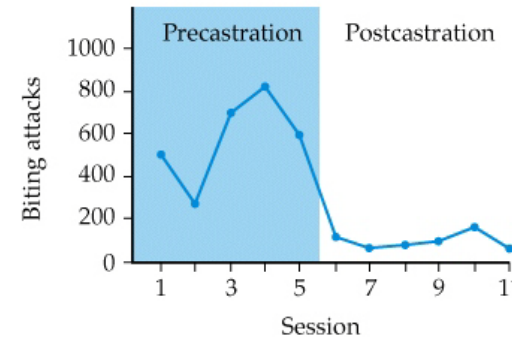
- **Aggression** defined empirically: behaviours whose primary function is to inflict harm
 - **Predatory**: may be viewed as feeding behaviour
 - **Defensive**: aggression in response to attack by conspecifics or other species
 - **Social**: unprovoked attack at conspecific for establishing/maintaining social hierarchy: in mammals, mostly in males
- Most "aggressive" interactions can be viewed as on a continuum between aggressive and defensive behaviours
 - e.g.: cat's "playing" with mice are actually defensive behaviours; give antianxiety drug, less play time, more efficient killing



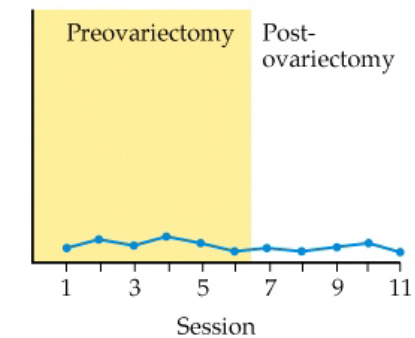
Testosterone and Aggression (I)

- **Animal studies:** Castration in males decreases social aggression
- Testosterone replacement reinstates aggressive behaviour

(a) Males



(b) Females



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- **Humans:** Not nearly as clean cut a story
 - Correlational studies with T levels and aggression = inconclusive (some show +/-ve correlation, some no effect)
 - Not eliminated by castration
 - Aggressive behaviours not reliably increased by testosterone injections

Testosterone and Aggression (II)

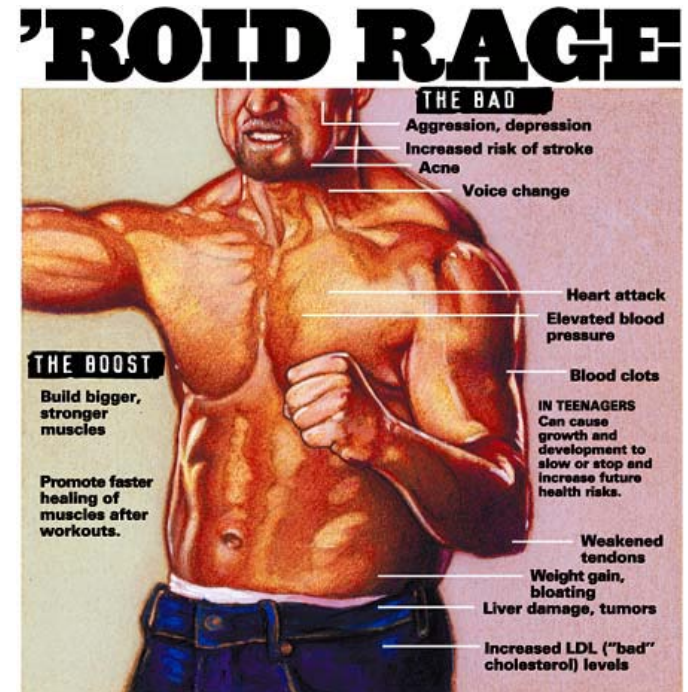
- **Confounds:**

- Experience can alter T levels; winners show \uparrow T, losers show \downarrow T levels (both animals and humans)
- T levels may be related to *dominance* more than aggression
- Many aggressive outbursts in humans are overreactions to "threat"; better viewed as defensive aggression
- In animals, T levels **not correlated** with defense

- **Anabolic steroids**

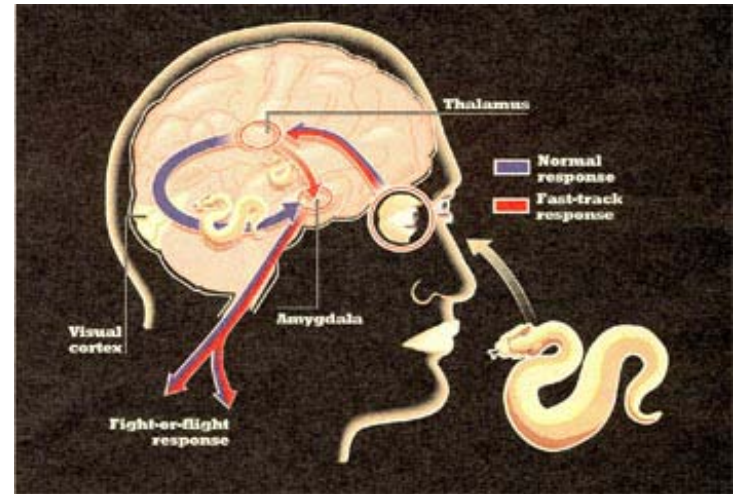
- Anecdotal evidence that steroids increase aggression

- T has been linked to aggression, maybe expectation?
- Many who use steroids (athletes) may have been aggressive before
- Indirect consequence of muscularity?
- Steroids much more potent than T; individual differences (personality types) may play a role



The Amygdala and Fear

- Fear is an adaptive trait
 - Keeps us away from bad things
- Some stimuli evoke an innate fear response (no learning required)
 - Snakes, spiders, big moving objects, novelty



- Animals or humans with lesions to the amygdala display "fearless" like behaviours
 - E.g.; Primates innately scared of snakes, but lesions of the amygdala abolish this fear
- With many other harmful things in our environment, we learn to be afraid of them
 - Amygdala plays an essential role in learning to be afraid of potentially harmful things

Pavlovian (Classical) Conditioning (I)

- Virtually all animals display Pavlovian conditioning
 - Helps organism prepare for biologically significant events in response to cues that predict those events



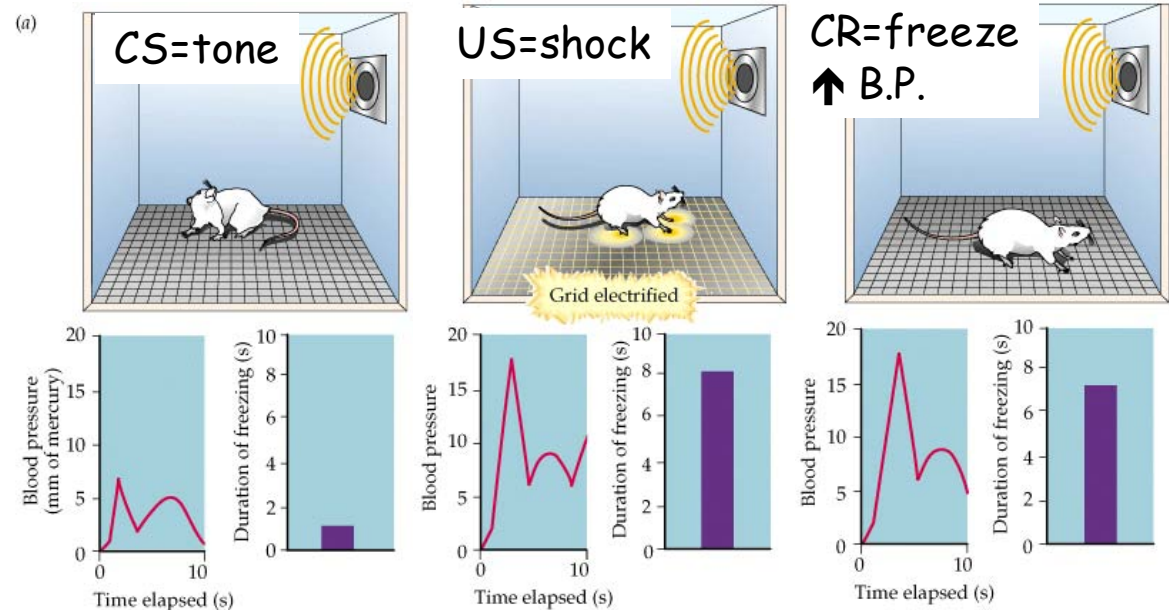
- Four main elements
 - **Unconditioned Stimulus (US)** = the biologically significant event (meat powder in Pavlov's dog's mouth) a.k.a: primary reinforcer
 - **Unconditioned Response (UR)** = normal response to significant event (salivation)
 - **Conditioned Stimulus (CS)** = *Previously neutral cue* that reliably predicts significant event (bell predicts meat powder)
 - **Conditioned Response (CR)** = The body's response to the CS alone (salivating to the bell)

Pavlovian (Classical) Conditioning (II)

- Five important points:
- 1) The CS must reliably predict the US
- 2) Delivery of CS and US are **uncontrollable** to organism
- 3) The CR is also **uncontrollable**
 - Typically an autonomic response (e.g.: heart rate) but can also be motor (Pavlovian approach)
- 4) In humans, the CR typically occurs in the absence of conscious knowledge.
- 5) Very long lasting:
 - Can be extinguished, but reinstated very quickly with another CS-US pairing

The Amygdala and Fear Conditioning (I)

Auditory Fear Conditioning:
-Freezing natural defensive response for rodents
-In the lab, tones easier to deal with than visual cues



- Lesions of different subnuclei of the amygdala abolish ↑ freezing and autonomic response to the **tone (CS)**
- These lesions **do not effect** response to shock
- Lesions made prior to conditioning (**acquisition**) or after conditioning (**expression**) both disrupt conditioned response
- Similar results in human studies
 - Amygdala damage = no fear conditioning (blood pressure, heart rate)