

THE CNS, AUTONOMIC AND NEUROENDOCRINE SYSTEMS AND STRESS NOTES

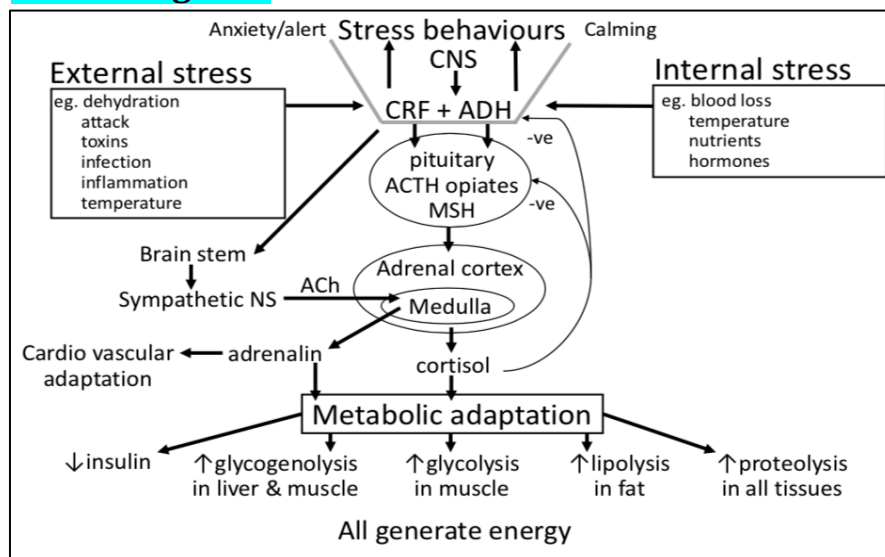
PROF MILLAR

Anything highlighted in Blue is a possible test/exam question

Introduction to stress :

- Homeostasis is constancy of the internal environment
- External and internal stresses threaten homeostasis
- Stress induces coordinated behavioural, autonomic, CNS and endocrine changes to restore equilibrium
- Corticotropin Releasing Factor (CRF) is the main regulator of ACTH and downstream adrenal cortisol stress response.
- CRF coordinates behavioural, autonomic, reproductive, growth hormone, metabolic and thyroid responses to stress
- Acute stress is transient and beneficial for survival, while chronic or inadequate stress responses lead to pathology.
- A secondary stress pathway activated in the CNS is the sympathetic pathway through the brain stem
- Acetyl choline neurons activate the adrenal medulla to release adrenaline
- Endocrine and sympathetic stress pathways are activated by stress through the adrenal cortex (cortisol) and medulla (adrenaline) respectively.

Stress diagram:



Acute stress/ cortisol:

- Acute elevation of cortisol are highly beneficial
- Mobilises glucose for energy
- Stimulates brain activity and behaviours
- Suppresses superfluous activities (eg immune , appetite and reproductive systems)
- Works with adrenaline

Effects of Hypothalamic-pituitary-adrenal axis on other systems:

Behaviours

- ↑ anxiety
 - ↑ startle
 - ↑ arousal
 - ↓ food consumption
 - ↓ sexual behaviour
 - ↓ sleep
 - ↓ maternal behaviour
 - Later ↑ calming behaviour (CRF receptor 2)
- (CRF receptor 1)

Reproduction

Stress → ↑ CRF → ↓ Kisspeptin → ↓ GnRH →
↓ Gonadotropins → ↓ gonad activity

Thyroid function

