

## Stress protocols

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## Approaching stress and stress response research - Key issues

- The rationale for the study
- Appropriate choice of animal species
- Information about effect of the stress
  - Of this type
  - Of this duration
  - On this animal species / age / sex
- Generalisability of the findings
- Potential value of the findings
- Alternative approaches

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## A truism ?

- Stress protocols in animals cause stress to those assessing them

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## Stress Perception → Response

- Innate perception of threat
  - Learned from experience
  - Higher order – learned from others' experience
  - RESPONSE
    - Psychological
    - Physiological
      - Brain neurotransmitters
      - Nerves (sympathetic/ parasympathetic)
        - Heart rate
        - Sweating
        - Piloerection
        - Dilated pupils
      - Hormones ( adrenal medulla, adrenal corticosteroids )
- In man "excitement" AKA "pumped" and "stress" are physiologically similar

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## Acute vs chronic stress

- Severe stress may have impact on brain neurotransmitter levels beyond 48 hours after the exposure to the stress
- Chronic stress can have similar (> 48 hour ) impact beyond the end of the stress
- Habituation (desensitising) can occur with chronic stressful stimuli

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## Chronic stress

- Induces excess cortisol state
- Impact on cerebral neurotransmitters
- Behavioural disturbance
  - Appetite
  - Grooming
  - Sleep
  - Mating
  - Complex behaviours – respect for social order
  - Cohabitation
  - Susceptibility to self-rewarding behaviours

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### Late effects of stress

- Weight
- Coat
- Skin integrity
- Bone density
- Fecundity
- Litter size
- Litter survival
- Longevity

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### Chronic stress

- Food deprivation
- Water deprivation
- Day/night reversal
- Cold water swim
- Confinement in small space
- Co-housing with aggressive same sex
- Co-housing with aggressive opposite sex
- Exposure to cold air
- Mild Noxious stimuli .. Toe compression

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### Stress protocols have a potential role in study of many diseases

- Psychological / psychiatric especially depression/ anxiety / addiction
- Pain syndromes
- Rehabilitation from injury
- Blood pressure disorders
- Sudden death / cardiac dysfunction
- Adrenal and other endocrine gland disorders
- Diabetes / response to low BSL
- Immunological disorders
- Gastrointestinal disorders
- Learning disorders

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### Minimising severity of stress

- Duration
- Frequency
- Severity
- Predictability
- Reward for endurance
- Altering sequence
- Escape route

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### Moving forward safely

- Literature
- Experts
- Pilot studies
- Physiological monitoring
- Videosurveillance of behaviour
- Review of progress

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