THE MOUSE GRIMACE SCALE

A NOVEL PAIN ASSESSMENT TOOL FOR LABORATORY MICE

UCSF IACUC COMMITTEE CONTINUING EDUCATION

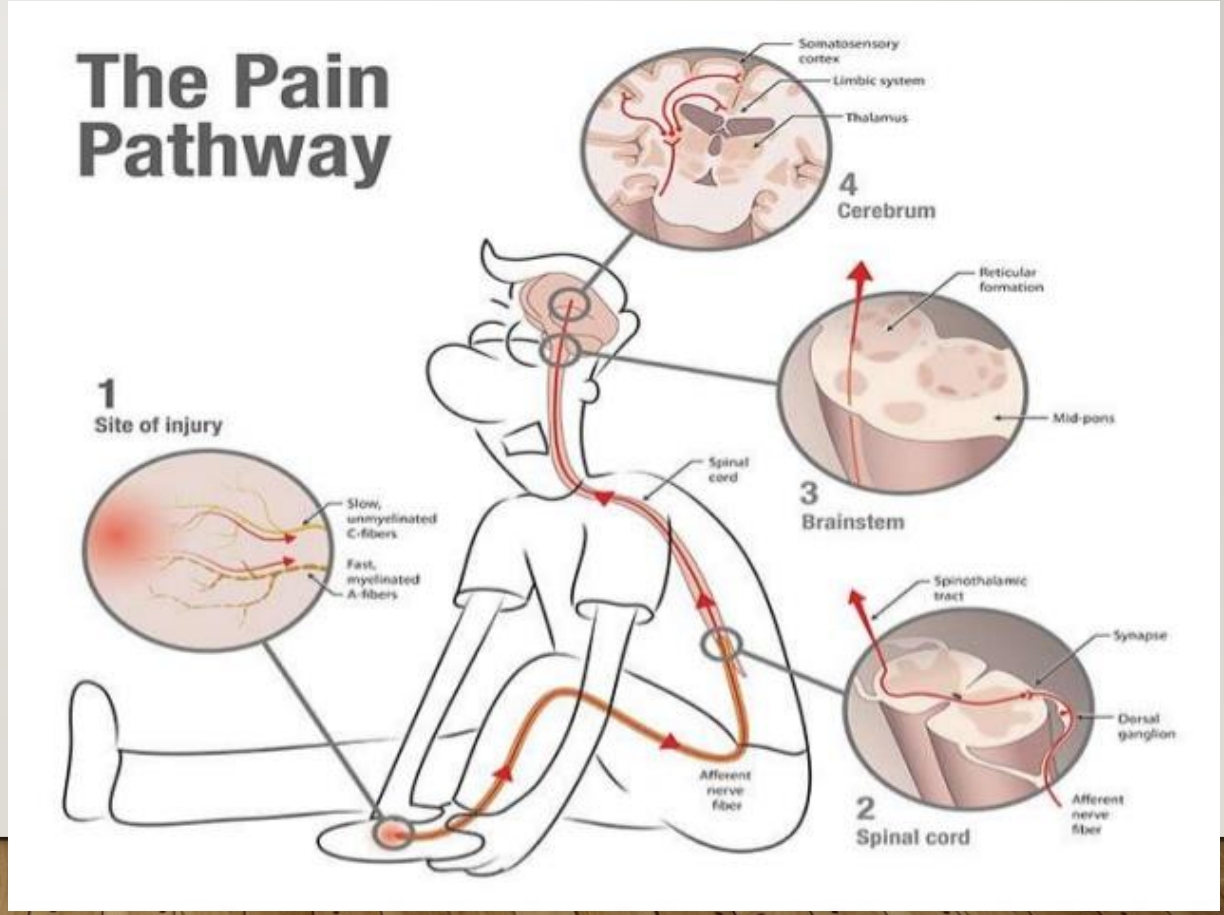
11/21/17

WHY DOES IT MATTER?

- There is plenty of evidence that animals DO feel pain
  - -anatomy/physiology,
  - -learned avoidance
  - -response to analgesics/self-medication
  - -suspension of normal behavior
- Research experiments cause pain intentionally or unintentionally
- Key assumption ⇨ what is painful to humans might be painful to animals unless proven otherwise
- Failure to recognize pain in laboratory animals constitutes major welfare challenge
- Much progress can be made in pain recognition, assessment and alleviation

BASIC PAIN BIOLOGY

- Nociception ≠ Pain
- Nociception: detection of and ability to respond to noxious stimuli
- Pain is an affective state; includes an unpleasant emotional experience
- But…has adaptive function



ARE THERE ANY OBJECTIVE MEASURES OF PAIN?

- Physiological:

  -Glucocorticoids, catecholamines

  -BP/HR/RR

  BUT physiological indicators are non-specific, require handling, not useful as cage side technique

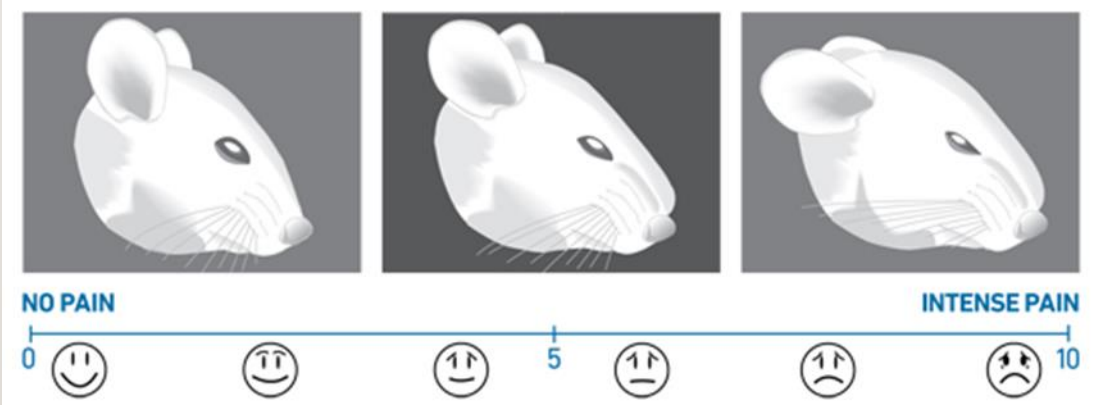
- Behavioral:

  - ↑ "pain behaviors", ↓ in normal behaviors BUT can be very subtle with several confounding factors

- Best if measurement can be scored → Mouse Grimace Scale

MOUSE GRIMACE SCALE

- History: Facial expressions are widely used to assess pain in human infants ➡ Langford et al. developed a similar grimace scale for mice in 2010
- Purpose: To become a useful measurement tool in pain research and in clinical assessment of mice



METHODOLOGY

- Consists of 5 Facial Action Units independently scored
- Can be performed via live scoring or recorded images
- Final score can easily be calculated via Excel
- Mean difference scores can be analyzed for significance
- Does not require extensive training
- Potential to be highly accurate, reliable and repeatable