

Transgenic ethics

□ Principles of 3 'R's

- **Reduction** of animal numbers
- **Refinement** of practices and husbandry to minimize pain and distress,
- **Replacement** of animals with non-animal alternatives wherever possible

Ethical Issues

1) Invasiveness of procedures

- **Inflict pain & distress**
- **Sacrifice of some animals**
- **Contradicts 2nd R - Refinement.**

2) Large number of animals required

- **only a small proportion (1%-30%) carry transgene**
- **large numbers of transgenic animals produced**
- **Contradicts 1st R – Reduction**

3) Unanticipated welfare concerns

- Negative welfare impacts
- Transgenic techniques - unpredictable & inefficient
- Incorrect site of integration of transgene (pro-nuclear microinjection)
 - unexpected outcomes
(eg. lameness, susceptibility to stress, diseases, ↓ fertility, lifespan)

4) Confidentiality culture

- Preservation of intellectual property & patenting
- Unnecessary duplication of transgenic animal lines.
- Challenges 1st 'R'

5) Beyond animal welfare

Before: *What is “possible” to do?*

Now: *What is “**acceptable**” to do?*

- To go beyond 3 'R's, animal health & welfare?
- To disregard & violate species integrity?
- To blur the lines between species?
(risk of altering ecosystems)

- **Debatable topic**