

GENETICALLY MODIFIED ANIMALS

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Laura Guidry-Grimes

TERMS

- ▣ **Transgenic:** transferring genes from one species to another

- ▣ **Hybrid:** mixing sperm of one species with ovum of another species

- ▣ **Chimera:** mixing cells from embryos of different species
 - **Admixed embryos:** Human + non-human material

- ▣ **Genetically modified animal (GMA):** umbrella term for the above

INTRODUCTION

- ▣ Paul Root Wolpe on TEDTalks:
<http://youtu.be/ovV7v2XYJAI>
- ▣ Glow-in-the-dark cat:
http://youtu.be/4UPw_bFqwng



POTENTIAL USES OF GMAS

- ▣ **Improved models for medical research**
 - Avoids many objections to human embryonic stem cell research
- ▣ **Disease-resistant species**
- ▣ **Useful products (e.g., BioSteel)**
- ▣ **Xenotransplantation (improved uptake of organs)**

TEST CASES

- ▣ If we could modify all farm animals to reduce or eliminate their perception of physical pain (“altered sentience”), should we pursue that technology?



- ▣ If we could radically modify pigs to carry a human fetus (“xenogestation”), should we ever use the technology?



ETHICAL EVALUATION: FIRST STEP

▣ **Moral status evaluation**

- Species membership, sentience, higher cognitive functioning?
- Once we have our criteria, *how do we know* if a new type of animal has sufficient status?
 - ▣ → Requires sophisticated, diverse, multi-layered research

▣ **“Err on the side of sympathy and generosity”** (Savulescu 653)

- **Do you agree that erring in the favor of the chimera is always the best course of action? What are some challenges to this principle?**

ETHICAL EVALUATION: SECOND STEP

- ▣ **Critically analyze the *reasons* for creating a GMA**
 - What counts as enhancement depends on long-term, broad, contextual factors of animals' welfare needs

- ▣ **Enhancement-for-Self**
 - Depends on **a)** animals' welfare, **b)** long-term consequences of intervention, **c)** “accurate prediction of the likely natural and social environment in which the animal would **exist from among those in which it is just to exist**” (654, emphasis added)
 - ▣ **Is this list caveat sufficiently justified? What might be problematic about this stipulation?**

- ▣ **Enhancement-for-Others**
 - How should interests of GMA be weighed against interests of benefitting parties?

ETHICAL EVALUATION: SECOND STEP

▣ **Identity determining, altering, or preserving?**

- Genetic modification can change what/who this particular animal is
- Altering the identity of a creature is “equivalent to killing and would be wrong if the original had sufficient moral status conferring a right to life” (656)
 - ▣ **Are these concerns compelling?**
 - ▣ **If the choice is to create GMA 1 or GMA 2, and GMA 1 would have a better quality of life than GMA 2, is it wrong to create GMA 2 instead?**

▣ **Well-being of GMA**

- “the attitudes and practices of others make the life go well or badly in virtue of the biological modification” (658)

ETHICAL EVALUATION: THIRD STEP

- ▣ **Assess risks and benefits**
 - Reasonability of risks in proportion to benefits
 - Reduction of risks, exploration of alternatives
 - Problematic to exploit a GMA to benefit others?

- ▣ **Solicit consent if possible**
 - **Is surrogate consent a feasible and justified alternative for non-autonomous animals?**

ETHICAL EVALUATION: FOURTH STEP

▣ Preventing harm

- Direct harms from (e.g.) transferring GMA embryonic stem cells to human recipients
- Dual-use problem: biotechnology could be used for good or evil purposes



RESPONSES TO COMMON OBJECTIONS TO GMAs

▣ Threat to humanity?

- *Express our humanity through creation of GMAs if do so for good reasons*
- Depends on whether GMA lacks “essential” human attributes
- **If humans’ moral status is no longer special or unique (if it is now), does that threaten our humanity?**

▣ Absolute deontological constraints?

- Is anything necessarily evil about GMA creation?



RESPONSES TO COMMON OBJECTIONS TO GMAS

▣ **Playing God?**

- Usurping God's role? Failing to recognize our limitations?
- “only valid as a caution against premature or ill-informed action” (663)
- **Is this more to this objection? How should this concern make its way into policy discussions—if at all?**



▣ **Slippery slope**

- “mistake to prevent some valuable course of action because of the mere risk of adverse consequences” (664)
- **Is the bottom of the slope all that bad?**



QUESTIONS? COMMENTS?