

## Organ-growth in non-human animals?

The creation of human/non-human animal chimeric organisms opens the perspective of generating personalized human organs. This technology could potentially solve the organ scarcity problem. However, there are serious ethical issues that have to be discussed before implementing such a practice. The issues at stake shall be addressed in a dialogue between Annette and Stefan, who are brothers and sisters. Annette, 29, after finishing her medical studies, has worked for several years in the transplantation surgery department of University Hospital Basel. Her daily experience shows her the suffering caused to people in need of an organ. She is therefore convinced that society should raise chimeras for the growth of human organs. Stefan does not agree at all. During his studies of philosophy, he got more and more interested in ethics, especially animal ethics. He is convinced that societies in the western world should not use animals for their purpose. As usual, the two of them meet for a Saturday hike in the Swiss Alps.

**Annette:** Stefan, I am deeply touched by an experience, which happened during the past week. I was caring for a 15-year-old patient with innate heart defect. He was in desperate need of a new heart to survive. Unfortunately, there was no heart available, despite waiting several months. This wonderful young boy had no chance anymore to survive – he died.

**Stefan:** That's tragic. I am sorry.

**Annette:** But, you know, I am hopeful that such cases can be prevented in the future. Several research groups have got very far in growing human organs in animals. Have you heard about that?

**Stefan:** Yes, but could you explain to me what exactly a chimera is?

**Annette:** Of course: A chimera is an organism that consists of cells originating from different organisms that are genetically distinct.<sup>1</sup>

**Stefan:** Sounds like a precise scientific definition. I think it's a very interesting option, which nevertheless requires very careful assessment.

**Annette:** What assessment are you talking about?

**Stefan:** To a lot of people, it may cause disgust<sup>2</sup> to get an organ implanted which has been part of, say, a pig.

**Annette:** If I were to die, I guess I'd thankfully take any organ.

**Stefan:** Yes, I see your point. The prospect of saving human lives indeed is promising. But I read in a research paper recently, that such a practice could increase the risk of pandemics because it increases the risk of... something with zoo.<sup>3</sup>

**Annette:** Zoonosis probably. This is an infection that is naturally transmissible from animals to humans.<sup>4</sup>

**Stefan:** Ah perfect, thanks. As we have seen in the last months, such an infection can cause a pandemic with devastating consequences: people dying, people being ill, people being isolated and all the economic problems...

**Annette:** This is an issue that should not be underestimated. Nevertheless, as the technique gets filed out, this risk should be controllable. Only in the UK, for example, three people are dying every day because they don't get an organ.<sup>5</sup>

**Stefan:** Probably. It seems questionable to me whether the benefits of creating a new source of organs are worth outweighing the potential harms. But it is an empirical question. This is rather your domain.

**Annette:** Indeed. Another advantage is, that chimeras would enable us to generate personalized human organs. Nowadays we have a lot of problems with rejection of organs after transplantation. Therefore, patients who received an organ transplant suffer a lot of health-related restrictions in their lives after the transplantation. They have to take medications that suppress their immune system to reduce the level of rejection. Therefore, they are very vulnerable. A personalized organ could reduce these important side-effects and thus improve their life remarkably.

**Stefan:** A friend of mine is living with those restrictions. I agree that they are not promoting life quality. But imagine we grew such a chimera, say a pig with a human organ. Would this still be a pig, or would it be human?

**Annette:** If we grew a pig with a human kidney, how could this not be a pig. We are not talking about replacing brain cells. This would be a more complicated discussion.

**Stefan:** But what if such a pig got a human organ of the reproductive system and would then be able to produce human gametes?

**Annette:** This can only be problematic if we grant human gametes some kind of worth.

**Stefan:** Yes, we could grant them either an intrinsic or an instrumental worth. Granting them intrinsic worth means attributing moral status. A being possesses moral status when "in its own right and for its own sake, it can give us reason to do things such as not destroy it or help it".<sup>6</sup>

**Annette:** Since human gametes have no interests, they are unable to give us such reasons. Even if we accepted the intrinsic worth, it is difficult to see how this value should be ignored by creating them. Obviously, human gametes possess instrumental worth, for example they are used in in-vitro fertilization. However, there is no moral status following from this.<sup>7</sup> On top of that, we could simply sterilize the pigs bearing human organs.<sup>8</sup>

**Stefan:** In humans, we would not consider sterilizing a morally defensible procedure.

**Annette:** Not at all. But here we have to weigh a human life against an animal life. Most human societies have been eating meat and other animal products for centuries. Today, I think that meat consumption, at least in economically developed countries, is not an existential need. It is rather a treat. This seems to me a weak justification for killing animals. But if the purpose is to save a human life, it is much more legitimate.

**Stefan:** Meat production is indeed very reprehensible. If we allow meat production, it is hard to decline the use of animals for organ production from an animal welfare perspective. But we should do neither. Animals do have interests as well.

**Annette:** I agree. But similar issues have been raised previously by medical techniques that nowadays are accepted such as the application of porcine heart valves or porcine insulin.<sup>9</sup>

**Stefan:** Such applications may as well be questionable. You seem to have a speciesist position. This means, your moral treatment of individuals differs based on their species membership. Though it is true, that animals lack a lot of human abilities, especially cognitive abilities. But nobody would allow killing newborns or people with neurological disease impacting their reasoning capacities. Animals, as humans, are the experiencing, conscious subject of a life.<sup>10</sup> Such a subject wants and prefers things, believes and feels, has memories and expectations. Those are all dimensions that make a difference for the quality of life. Hence we should probably attribute an inherent value to such subjects. Mistreating or killing animals or humans means to disrespect this inherent value, which is morally wrong.

**Annette:** So, every animal has an inherent value, meaning we are not allowed to kill flies, for example?

**Stefan:** This is a question to be answered. Our daily experience shows us, that dogs, cows and comparable animals have needs and feelings. This applies to most of the animals we consume or would use in organ creation.

**Annette:** But then, we have to draw the line somewhere in the animal kingdom.

**Stefan:** Indeed. But this does not mean that we should, for simplicity, draw the line around the human species.

**Annette:** Hmm. It's getting complicated. Are there no other ethical positions, besides of this intrinsic value position?

**Stefan:** Of course there are. Maybe you have heard of Peter Singer, a famous and controversial utilitarian philosopher. What matters according to him, are the preferences of living beings. The principle of equal consideration of interests is central. It states that one should include all affected interests when calculating the rightness of an action and weigh those interests equally. This analysis embraces all feeling beings since such beings are assumed to have an interest in avoiding pain. To be a person, a being must have rational self-consciousness, as it is usually the case in humans or great apes whereas chicks lack it.<sup>11</sup> Pigs,

a potential host for human organs, are somewhere in between. Besides, the creation of a pig-human chimera would promote well-being under the condition that this organism is enabled to live a life under fair conditions. From this utilitarian perspective, the creation of such chimeras seems justifiable since the interest of the human person not to die weighs heavily and the chimera would otherwise not even come to existence. Though, if we consider meat production, the interest of a human person in eating meat, which is not essential for surviving, seems unable to outweigh the interest of the animal.

**Annette:** This sound like a profound philosophical formulation of what I had tried to argue.

**Stefan:** I rather prefer the inherent value argument. Otherwise, we could use humans or animals as a means if the benefit in terms of preferences is big enough. Suppose a surgeon has 4 patients in adjacent rooms. Three are in urgent need of an organ, and the fourth ne has all these organs. Should the surgeon kill the fourth patient to save the three lives? I don`t think so, which is why some kind of inherent value is absolutely necessary for a solid moral theory.

**Annette:** Wouldn`t there be a way to combine the two views? What if, instead of simply following rational weighing of benefits and preferences, we add some important “basic rules”, which for example prohibit killing people.

**Stefan:** Maybe John Stuarts Mill`s rule utilitarianism could be a solution. In this version of utilitarianism, the criterion of maximizing happiness or preferences satisfaction is applied to rules rather than single actions. It focuses more on the intention of the act and “long-term” outcomes.

**Annette:** So, we could in this way justify raising chimeras if we take as a basic rule that saving a human life at the price of an animal life in the long term is beneficial from a moral perspective.

**Stefan:** I am not totally sure about that. But, as you see, philosophy and ethics is often about discussing and finding examples. There is no ultimate solution. It is important to first start the reflection process. Everything is getting more complicated then. But, as you said, living beings with cognitive abilities such as human beings do enjoy, should probably admit that they cannot simply ignore the responsibility which derives from those abilities. But now, let aside such altruistic thoughts, I am really thirsty and would love to have a cold beer!

**Annette:** Great idea!

## References

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