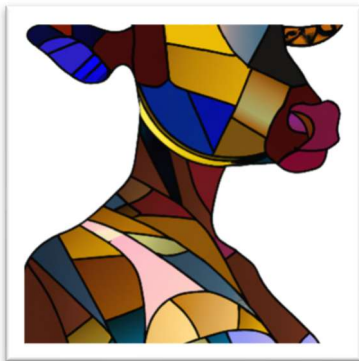
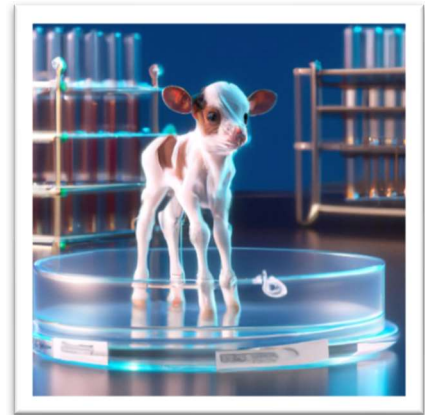


## Concerns for the use of fetal calf serum (FCS)

**Ethical:** Although we aim to reduce or stop the use of animals for research purposes by using NAMs, the use of FCS in cell culture protocols still requires that we kill animals for the purpose of performing research.

**Sustainability:** Less than a liter of serum is obtained from one fetal calf. The annual use of the Utrecht Science Park (USP) easily surpasses five hundred liters of FCS. This negatively impacts carbon emissions as well as sustainability goals of the University. Also, we cannot continue to produce this quantity of serum indefinitely considering the number of calves needed.



**Xenogeneic origin of FCS:** Unless you are studying bovine biology, it is inherently illogical to supplement your cell culture medium with a product derived from another species. This negatively affects the validity of your results as they may be confounded by reactions to the exposure of biological material from another species.



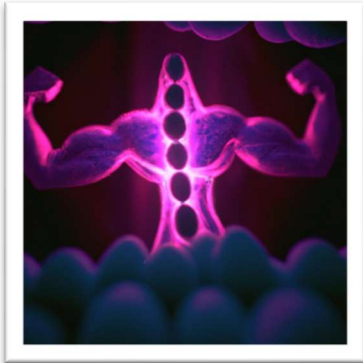
**Batch-batch variability:** For researchers, control is key to reproducibility. FCS is produced and sold in batches, and every batch is different from the previous one because it is produced from different calves. This negatively affects the reproducibility of your results.



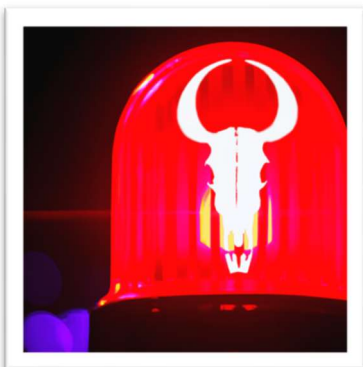
**Unknown composition:** We do not know the exact composition of FCS, and we do not know which or how many factors affect the cells in our culture. This negatively affects the validity, reproducibility and translatability of your results, as they may be confounded by reactions triggered by unknown components in FCS.



**Cost:** In many cases FCS is still cheaper than the currently available alternatives. But this depends on how you define 'Cost'. If you consider that the quality and the translatability of your results will increase if you eliminate the use of FCS, you may realize that cost is not only about EUR/USD. Also, FCS cost is expected to increase with the prices of cattle-derived products while the costs of alternative products are decreasing.



**Questionable physiological relevance:** The addition of FCS may alter the phenotype of your cells into proliferating tumor cell look-a-likes. Is FCS indeed the gold standard? Its use might negatively affect the physiological relevance of your results, especially if you are studying non-proliferating cells.



**Safety:** The use of FCS is incompatible with current safety regulations. Such regulations are taken to prevent possible contamination of animal-derived pathogens (such as e.g., prions or other zoonotic pathogens). Even if clinical application is far downstream, this negatively affects the applicability of your results.



**It's about time:** Progress sometimes requires adaptation. Humankind put a man on the moon, so culturing cells without using FCS sounds like a small step. Many alternatives have been developed over the last years. What stops you from testing them?

Please move along with us! For any questions or interests contact [j.j.bajramovic@uu.nl](mailto:j.j.bajramovic@uu.nl) . And if you are on the USP campus, feel free to join our [Gels & Sera working group](#).

