Virginia Tech Students for the Advancement of Regenerative Medicine (VT-SARM) appreciates the opportunity to comment on the "2016 NIH consideration of certain research proposals involving human-animal chimera models." We are a multidisciplinary group of PhD students—from fields of biomedical sciences, business, engineering, philosophy, and veterinary medicine—who share an interdisciplinary mission to advocate for regenerative medicine research.

The following comments are a composite of our various individual views as future regenerative medicine researchers for the NIH steering committee's consideration:

First, with respect to the scope of research, generation of certain human organs (e.g., pancreas) using human-animal chimera models poses tremendous potential to mitigate the current shortage of donated organs and efficiency issues within transplantation networks. Yet, the knowledge base surrounding induced pluripotent cells (human or otherwise) is still incomplete and lacking standardization. Similarly, the state of transplantation science is underdeveloped, particularly with regards to immuno-compatibility, zoonotic transmission, and organ-specific modifiable genes. These challenges underscore major priorities for the field of chimera model research because they will determine the practical use and feasibility of such models in the first place.

Second, the special attention paid to modification of the animal brain by human cells assumes clear divisions between human and animal consciousness, which is controversial. Furthermore, the exclusion of brain research from chimera models dismisses the urgent need of patients with neurodegenerative disorders, who may benefit from improved translational research models of disease. Nevertheless, fetal termination of chimera models (prior to birth) and/or environmental enrichment policies, such as those already used with non-human primates, could be implemented in human-animal chimera research protocols as additional humane measures.

Finally, we laud the NIH for its practice of the precautionary principle with the 2015 moratorium. Given the promising evidence emerging from Japanese chimeric animal research and the utility of human cells for scientific studies ultimately aimed at curing human diseases, the lifting of NIH funding ban in the United States is understandable. We also acknowledge that many of the research questions posed for human-animal chimeras can be answered using animal-animal chimeras. Perhaps with advancements in mechanical organ development systems, we can eschew the need for animal-based bioreactors altogether. Overall, we emphasize the need to prioritize research on stem cells, developmental biology, immunology, and genomics as synergies for human-animal chimera animal models going forward.