**Ethical Considerations in Human-to-animal Chimera Research**

With the powerful tools, such as genome-editing technique using CRISPR/ Cas9 and chimera research using human pluripotent stem cells (PSCs), there exist enormous applications towards disease research and understanding the complexities of developmental processes. However, several ethical concerns arise particularly due to potential misuse and the uncertainty of the outcome with respect to these technologies. A major, ambitious goal of human-to-chimera research has been to generate animals capable of producing functional human organs and the components of central nervous system for transplantation. Human-animal chimeras, particularly those generated by transplanting human tumor cells in mice\(^1\), and creating a mouse-model of human immune system\(^2\) have been widely used in biomedical research. In addition, the successful organogenesis has been recently reported where blastocyst-complementation in pancreatogenesis-deficient pigs resulted in intra-species chimeras that harbored a functional pancreas\(^3\). While there is a likelihood of obtaining similar results in humans, several ethical concerns exist – particularly the crossing of ‘inviolable species barrier’ may result in chimeric animals harboring human neurons and germ cells\(^4\). In fact, NIH has recently issued a notice stating that research related to the transfer of human PSCs into non-human embryos will not be funded\(^5\). Obtaining post-implantation human fetal tissue is unethical, and it is impossible to simulate the environment to study human development. Human-chimera research may provide a valuable tool to study stem-cell development and hold keys to regenerative therapies and organ-transplantation. The ethical concerns associated with human-chimera research and the existing funding ban from NIH warrants a need for an extensive dialogue between researchers, healthcare organizations and policymakers to reform the regulations to decide the fate of chimera research, which if supported, will help uncover the complex process of human development and benefit the field of biomedical research and regenerative medicine.

**References.**


