

An interspecies barrier to tetraploid complementation and chimera formation.

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Public Summary:

One way to generate functional organs from pluripotent stem cells is through chimera formation in a process called blastocyst complementation. However, there appears to be biological limitations when creating interspecies chimeras, which currently blocks generation of human organs for transplantation. Here, we used tetraploid complementation to explore these biological limitations and then examined their affect in specific regions with the aim of identifying strategies to more efficiently great interspecies chimeras.

Scientific Abstract:

To study development of the conceptus in xenogeneic environments, we assessed interspecies chimera formation as well as tetraploid complementation between mouse and rat. Overall contribution of donor PSC-derived cells was lower in interspecies chimeras than in intraspecies chimeras, and high donor chimerism was associated with anomalies or embryonic death. Organ to organ variation in donor chimerism was greater in interspecies chimeras than in intraspecies chimeras, suggesting species-specific affinity differences among interacting molecules necessary for organogenesis. In interspecies tetraploid complementation, embryo development was near normal until the stage of placental formation, after which no embryos survived.

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