

Modeling the Black Box of Human Development to Advance Regenerative Medicine

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I will present recent work from my team highlighting a human embryo model called heX-embryoid and its application to advance human regenerative medicine. Implantation of the human embryo launches a critical developmental stage with key biological events, including the formation of the body axis, germ layers and emergence of the hematopoietic system. However, early post-implantation stages of human development are difficult to study due to technical and ethical challenges. The heX-embryoid model shows self-organizing peri/post-implantation cellular programs, including the formation of the amniotic cavity and body axis generation. The extra-embryonic layer of heX-embryoids displays multilineage yolk sac morphogenesis with distinct waves of blood formation and high reproducibility and efficiency. The heX-embryoids will open untapped opportunities to shed light on obscure phases of human development, tissue engineering, and regenerative therapies.