In vitro models of early placentation in humans/engineered proteins and peptides as tools in cell biology

Research emphasis:

Early placental development in humans is poorly understood due to ethical and legal constraints on research with human embryos and limited availability placental samples from early gestation. To overcome these limitations, we are using human embryonic stem cells (hESCs) for developing in vitro models for early placental development in humans. We have also developed a molecular toolbox – the ability to make proteins and peptides with tailored binding affinities and specificities for a given target. We are using this toolbox to enable applications in live cell imaging, biosensing, separations and generation of custom biochemical inhibitors.

Application:

- Fundamental studies in placental development
- Regenerative potential of placental cells
- Unique tools for cell biology

Collaboration potential:

- New reagents for separation, biosensing, live cell imaging, custom inhibition or other custom applications
- Making engineered cells/organisms with tailored pathways using tailored proteins
- Toxicity testing in an in vitro placental model
- Immune system interactions in the placenta

Selected publications:


Menegatti, S., Hussain, M., Naik, A. D., Carbonell, R. G.*, and Rao, B. M.*, mRNA display selection and solid-phase synthesis of Fc-binding cyclic peptide affinity ligands, Biotechnology and Bioengineering 2013 Mar; 110(3) 857-870 * corresponding authors