

Report 85: Tissue Engineering and Toxicology

Convener: Jonathan Pollock

Brief History: Toxicological assays have been problematic in cell culture assays. Cells line have deletions, duplications, and mutations that have adapted to growing in culture. There is a clear need for tissues that accurately reflect normal physiology for use in high throughput assays. Tissue engineering using stem cells offers an opportunity to better model normal physiology.

Discussion Highlights:

Need to define cell type in term of molecular phenotype and epigenome to provide a standard to recreate tissues that exist in the organism.

Understand mechanisms needed to recapitulate the desire cell type for toxicological screening.

Needs to be adapted to high-throughput screening platform

Question concerning using homogeneous population of cells derived from stem cells is better than trying to recreate organ.

Develop tissue engineering to ameliorate the consequences of environmental insult.

Leverage IKMC resources and gene traps to engineer tissues to examine gene environment interactions.

Create iPS cells from susceptible/affected individuals to identify mechanism affecting susceptibility

Create ES and iPS cells from Collaborative Cross and Diversity Cross mouse strains for tissue engineering to examine interactions among genome, epigenome, and environmental insult.

Recommendations:

See above.

Discussion Participants: Stavros Garantziotis, Jonathan Pollock, Rick Finnell