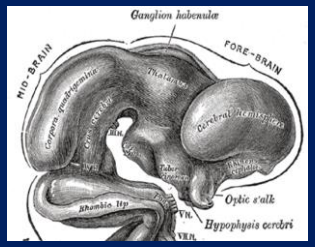
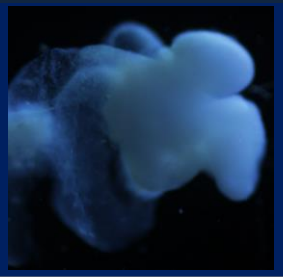
Human Stem Cell Models of Brain Diseases - *New Tools for Advancing Precision Genomic Medicine*

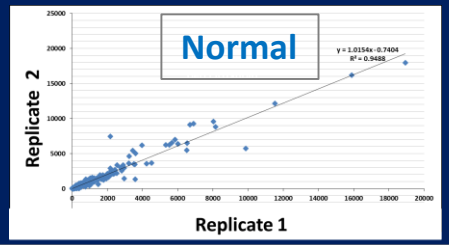
Presenter: Rene Anand

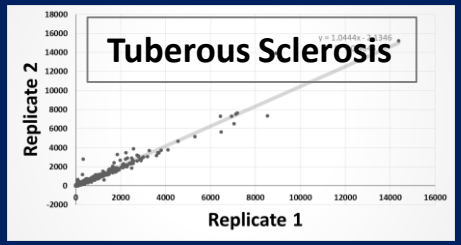
I. Neural Organoid Human Brain Models

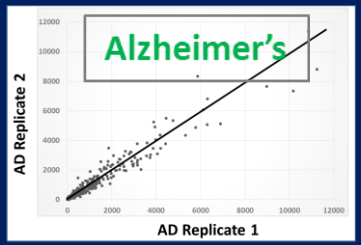
➢ **Models are Highly Replicable, Reliable & Robust**











II. Model Validity, Utility, Molecular Biomarkers

➢ **Corroborated by Clinical Studies**

Tuberous Sclerosis (TSC2 mutation) - Tumors & Autism

Alzheimer's disease (APP gene duplication)

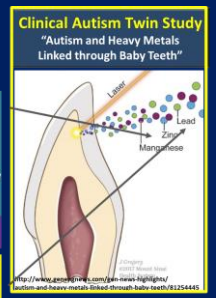
Multi-Organ Tumor Markers

Tumor Genes					Fold Change	Comments
Gene	TSC2	TSC2	N	N		
A2M	0.3	3	110	76	60x	Astrocytoma
AHSG	1	9	374	235	50x	Head / Neck/ Breast Cancer
ADAM19	223	133	25	23	7x	Ovarian Cancer
ADAMTS1	52	78	279	226	4x	Cancer Metastasis
ATXN3L	4	6	1	1	3x	Breast Cancer
BCL6B	0.5	1	8	9	8x	Gastric Cancer
ERG	0.3	1	4	7	5x	Oncogene
HAS2	534	340	142	144	3x	Breast Cancer Malignancy

Pb++ toxicity, & Zn++, Mn++ Deficiency

Neural Organoid Model

Gene/Function	Fold Change	"Predicted" Clinical Symptoms
ALB *Albumin*	4x	Zinc Deficiency
DMT1 *Mn++ Importer*	3x	Manganese Deficiency
DHCR7 *Cholesterol Biosynthesis*	3x	Cholesterol Deficiency
ATP7B *Copper ATPase*	5x	Copper toxicity
HBE1 *Hemoglobin Epsilon 1*	400x	Lead Toxicity



Infections Agents

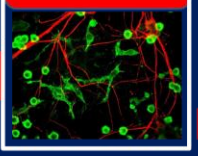
Does Microglia Status Increase AD Risk?

Stem Cell AD Model

Neuroprotection Inflammation

Clinical AD Studies

Gene	CHANGE	COMMENT
SPI1(PU.1)	5x	Immune
TREM2	4x	Immune



SPI1 (PU.1)
TREM2
Microglial Immune Cells

III. Early Detection

- *Role of Nutrition & Environment*

NeuRenaisson

➢ **"Baby Mental Wellness Program"**