

# BRAIN 2021



## SESSION 4: MODERN GENETICS

A major driving force in the modern neuroscience revolution has been the advent of new technologies that improve our ability to study (and alter) brain function. This work is all over the media – it is impossible to go a day without hearing about a new MRI scan, interventional approach, or other way in which artificial intelligence is upending everything. The challenge for the modern psychiatrist is intense: we need to not only keep up with all of the new science but also figure out when and how to integrate it into clinical practice.

Within this space, one of the fastest areas of modern scientific development is genetics. (It's hard to believe that it's been less than 20 years since the Human Genome Project was completed!) New findings are transforming medicine and stand poised to do the same for psychiatry.. or do they?

This session will guide you through some of the cool things we've discovered, review areas of ongoing controversy, and give you a sneak peek at what we hope the future will hold!

### On Your Own

#### Read:

**Leveraging the Power of Genetics to Bring Precision Medicine to Psychiatry: Too Little of a Good Thing**

**Polygenic Risk Scores: What Are They Good For?**

**Small RNAs May Answer Big Questions in Mental Illness**

**Leaping Forward: The Surprising Role of Jumping Genes in Psychiatric Genetics**

#### Watch or Read:

**The Jam Jar Model**

**"Moving from Single Genes to Pathways"**

or

**Genes Orchestrating Brain Function —**

#### Listen:

**Ten to the Fifteenth: Episode 2: *de novo***

### With Your Pod (Or on Your Own)

**Psychiatric Pharmacogenetics: Tomorrow and Today**

### Assessment

At the end of Session 4, you should be able to answer the following:

- 1. How did scientists conceptualize the genetic basis of psychiatric illness before the completion of the Human Genome Project? (hint: think Mendel and Cystic Fibrosis)**
- 2. How has this thinking changed over the past 20 years? (hint: key concepts should include complexity, rare variants, gene expression, etc.)**
- 3. You're asked to see a patient with bipolar disorder who has a strong family history of psychiatric illness. She's worried that her daughter may develop the same condition and that her life would be irrevocably ruined. How would you respond?**
- 4. Pharmacogenomics is all the rage these days – what are the two major ways in which the approach could, theoretically, be helpful? What are the current limitations?**
- 5. Under what psychiatric circumstances is genetic testing currently clinically indicated?**



**When you're ready, click here to submit your responses.**

### Fun Extras!

#### Watch:

**Jehannine Austin: Jam Jar case illustration or Full Grand Rounds**

**"Far from the Tree"**

#### Read:

**21st-Century Genetics in Psychiatric Residency Training: How Do We Get There?**

**Psychiatric Pharmacogenomics: How Close Are We?**

**All for one and one for all: heterogeneity of genetic etiologies in neurodevelopmental psychiatric disorders**