



# DILEK COLAK

BUILDING MINI-BRAINS TO DECODE THE ORIGINS OF MENTAL ILLNESS

FIRST AUTHOR  
**Science**  
**2014**

FRAGILE X RNA SILENCING

**3,900+**  
CITATIONS

**Science**  
CELL · MOL PSYCHIATRY  
TRANSL PSYCHIATRY · PNAS

**17+**  
YEARS AT  
WEILL CORNELL

**SFARI**  
SIMONS FOUNDATION  
INVESTIGATOR

## 01

### Fragile X & RNA Silencing

SCIENCE 2014

- Discovered that FMR1 mRNA forms an RNA-DNA duplex that silences its own gene during development
- Revealed a fundamentally new type of RNA-directed epigenetic silencing in the most common inherited cause of autism
- A drug blocking this mechanism prevented gene silencing in human embryonic stem cells, suggesting therapeutic avenues
- Mechanism may extend to 20+ other trinucleotide repeat expansion diseases
- Work conducted during postdoctoral training under Samie Jaffrey at Weill Cornell

## 02

### Brain Organoids & Schizophrenia

MOLECULAR PSYCHIATRY

- Grew patient-derived 3D cerebral organoids ("mini-brains") from iPSCs of 25 human donors to model early schizophrenia pathology
- Identified depleted BRN2 and pleiotrophin as convergent mechanisms driving reduced neurogenesis and cell death
- Single-cell RNA sequencing revealed cell-type-specific neuropathology encoded on a cell-by-cell basis
- Discovered altered endothelial permeability and angiogenesis patterns in schizophrenia organoids
- Mapped the developing schizophrenia proteome using 16-plex isobaric barcoding and quantitative mass spectrometry

## 03

### Astrocytes, Autism & RNA

TRANSLATIONAL NEUROSCIENCE

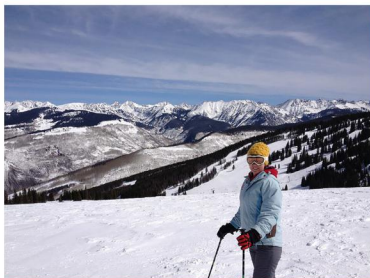
- Transplanted ASD patient-derived astrocytes into healthy mouse brains: induced repetitive behavior and impaired memory
- Demonstrated that non-neuronal glial cells alone can drive core autism phenotypes in vivo
- Identified exaggerated calcium fluctuations in ASD astrocytes within chimeric brains
- NIMH R01 grant (2022-2027) investigating astrocyte RNA degradation pathways in cognition
- Simons Foundation grant probing the novel ASD-risk gene GIGYF1 in brain development

## 04

### Journey & Vision

FROM SAKARYA TO NEW YORK

- Born in Sakarya, Turkey; BS from Hacettepe University, Ankara; PhD under Magdalena Götz in Munich
- A childhood memory of a boy with mental illness watching from his balcony while others played ignited her path to neuroscience
- Champions collaborative integrity: failed experiments shared without fear are as valuable as successes
- Advocates for holistic research metrics beyond high-impact journals and quantitative reductionism
- Heroes: all trailblazer women; most admired living person: Malala Yousafzai



*“I have never followed the bandwagon in research. I investigate questions that arise from my clinical work. The best science happens when researchers feel safe to share failed experiments without fear of judgment.”*

BRAIN ORGANOIDS

RNA BIOLOGY

STEM CELLS

TRANSLATIONAL SCIENCE

MENTORSHIP

GENOMIC PRESS INTERVIEWS  
THE BRILLIANT MINDS BEHIND THE SCIENCE

Weill Cornell Medicine · New York, USA · 2026  
Source: [Genomic Press Interview](#) · Genomic Psychiatry · 2026