



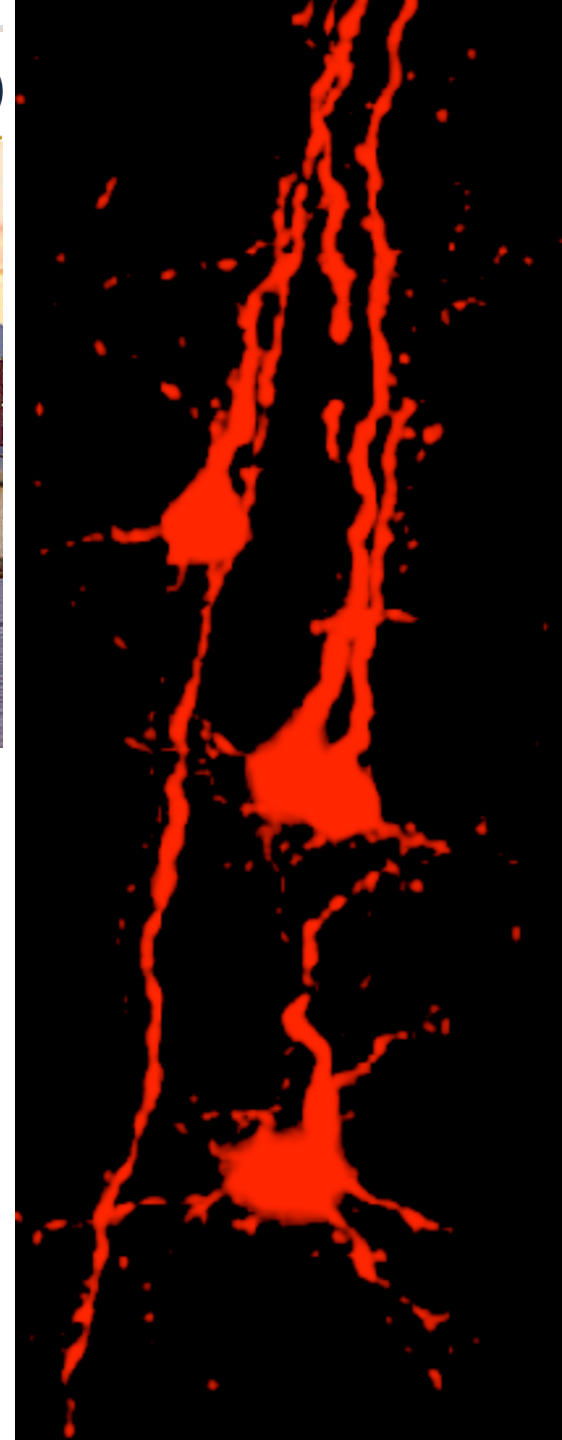
Robert F. Hevner, MD, PhD

Director of Neuropathology

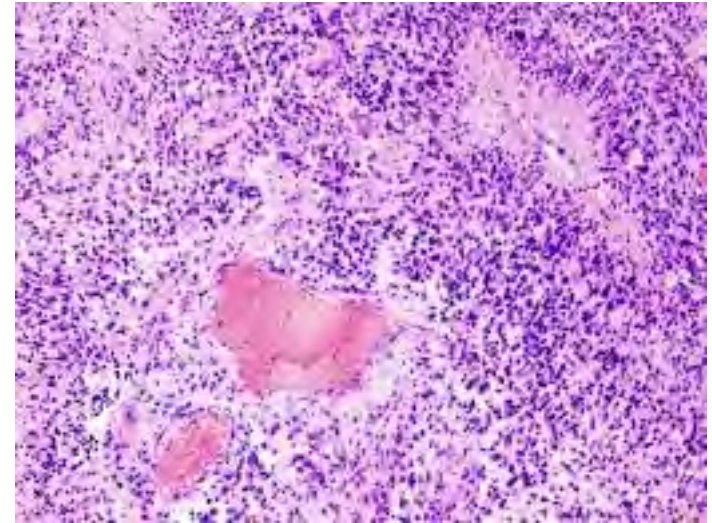
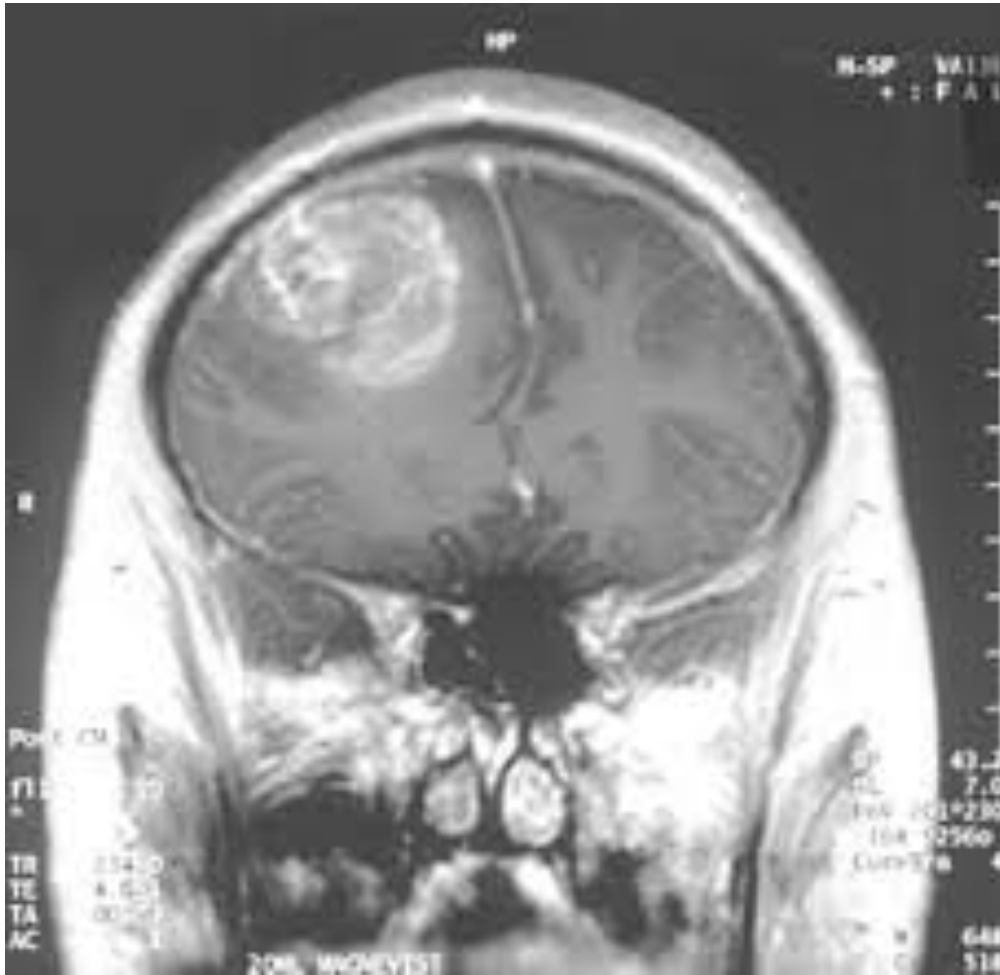
UCSD Research IT Showcase

Atkinson Hall, JSOE

10/23/2018



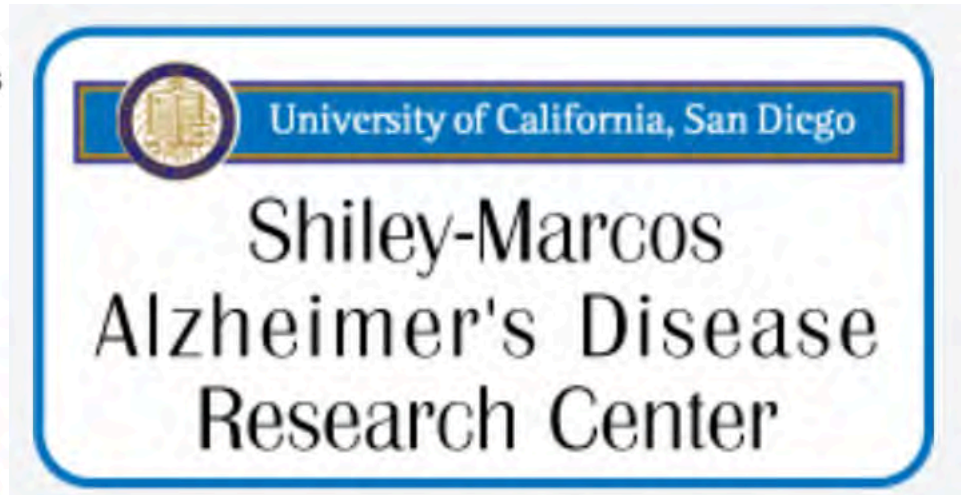
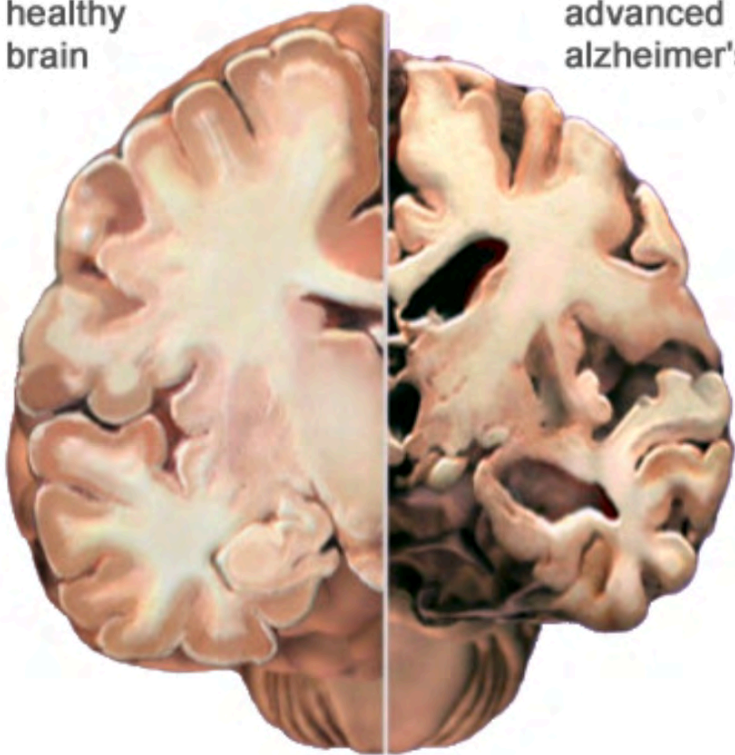
Glioblastoma



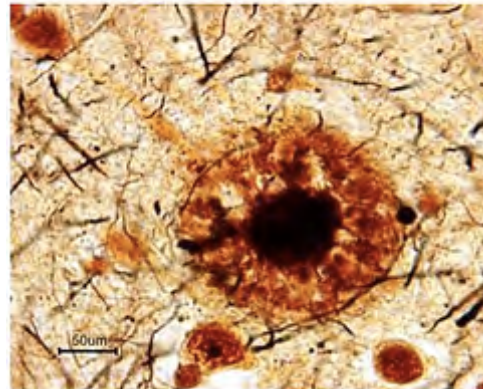
Alzheimer's Disease

healthy
brain

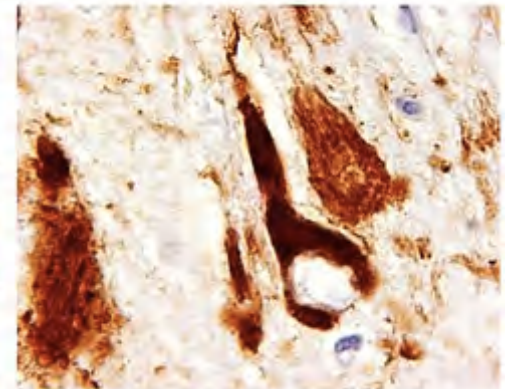
advanced
alzheimer's



Plaques

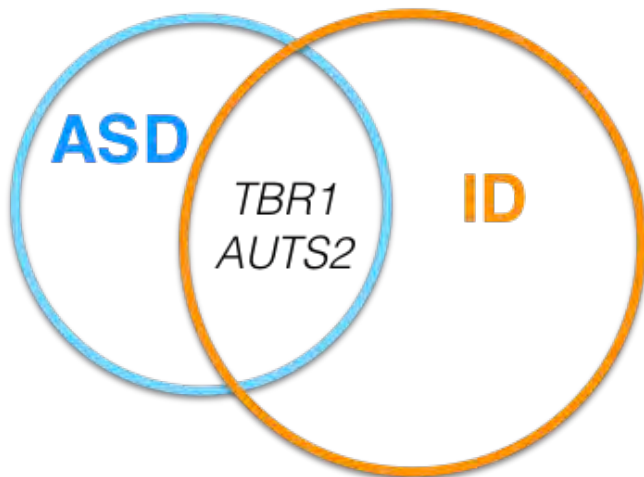


Neurofibrillary Tangles



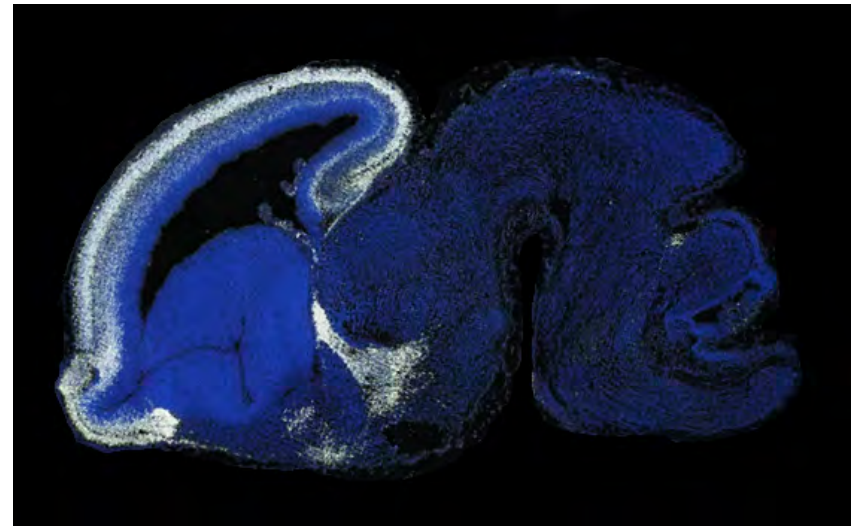
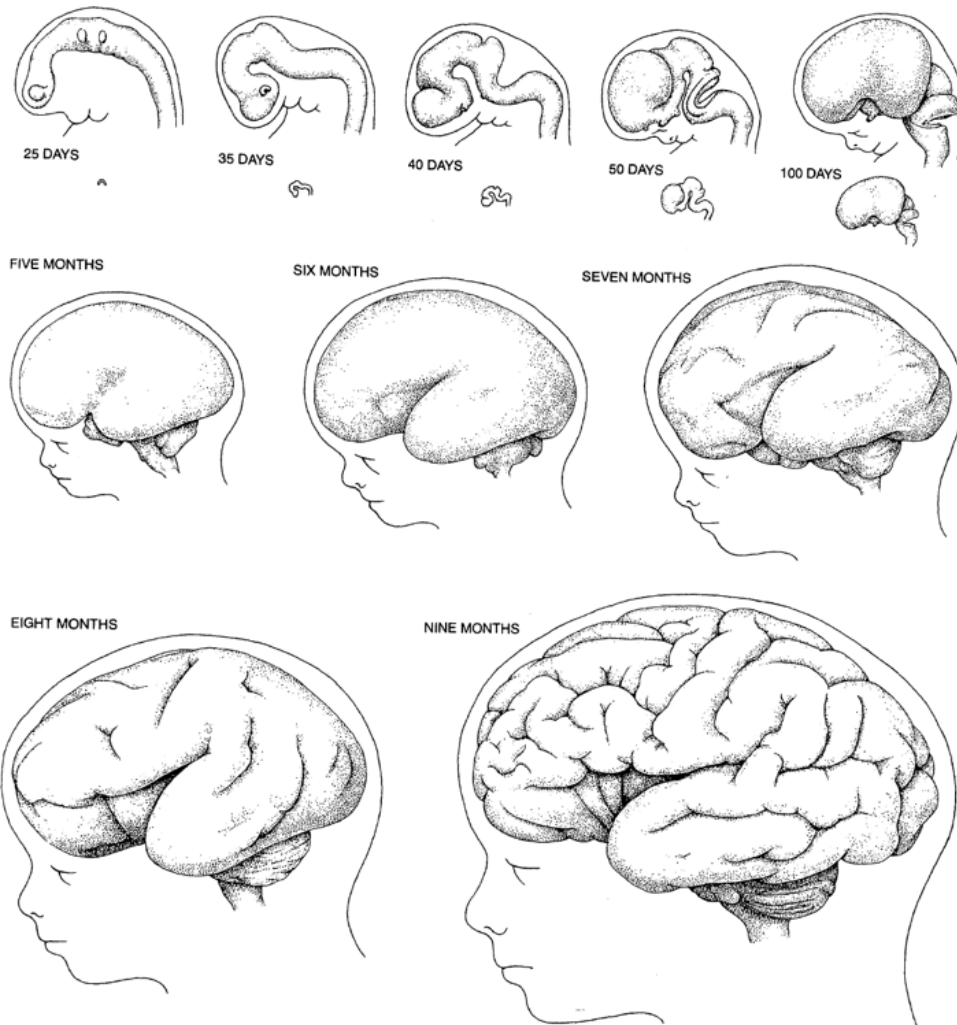
TBR1 : A Neurodevelopmental Disease Gene

- Intellectual Disability – 100%
- Autism – 74%
- Neurological (e.g. epilepsy) – 82%

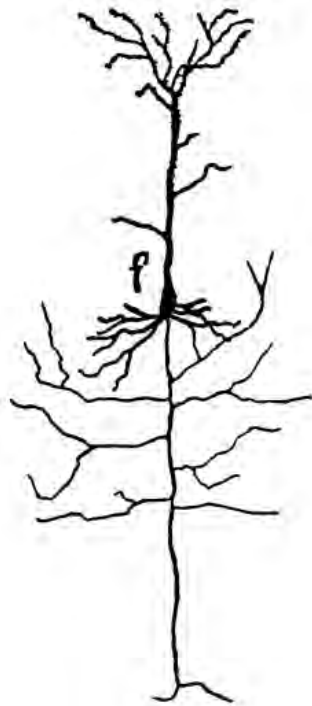


Mild	<ul style="list-style-type: none"> • 25% of ID Population • Cognitionally, less reading, writing and math skills between third and sixth grade levels. May have jobs and live independently.
Moderate	<ul style="list-style-type: none"> • 12% of ID Population • May be able to learn some basic reading and writing; able to learn functional skills, such as safety and self-help. Require some basic oversight/supervision.
Severe	<ul style="list-style-type: none"> • 5% of ID Population • Presumably not able to read or write, although they may learn self-help skills and routines. Require supervision in their daily activities and living environment.
Profound	<ul style="list-style-type: none"> • 1% of ID Population • Require intensive support. May be able to communicate by verbal or other means. May have medical conditions that require ongoing working with a team.

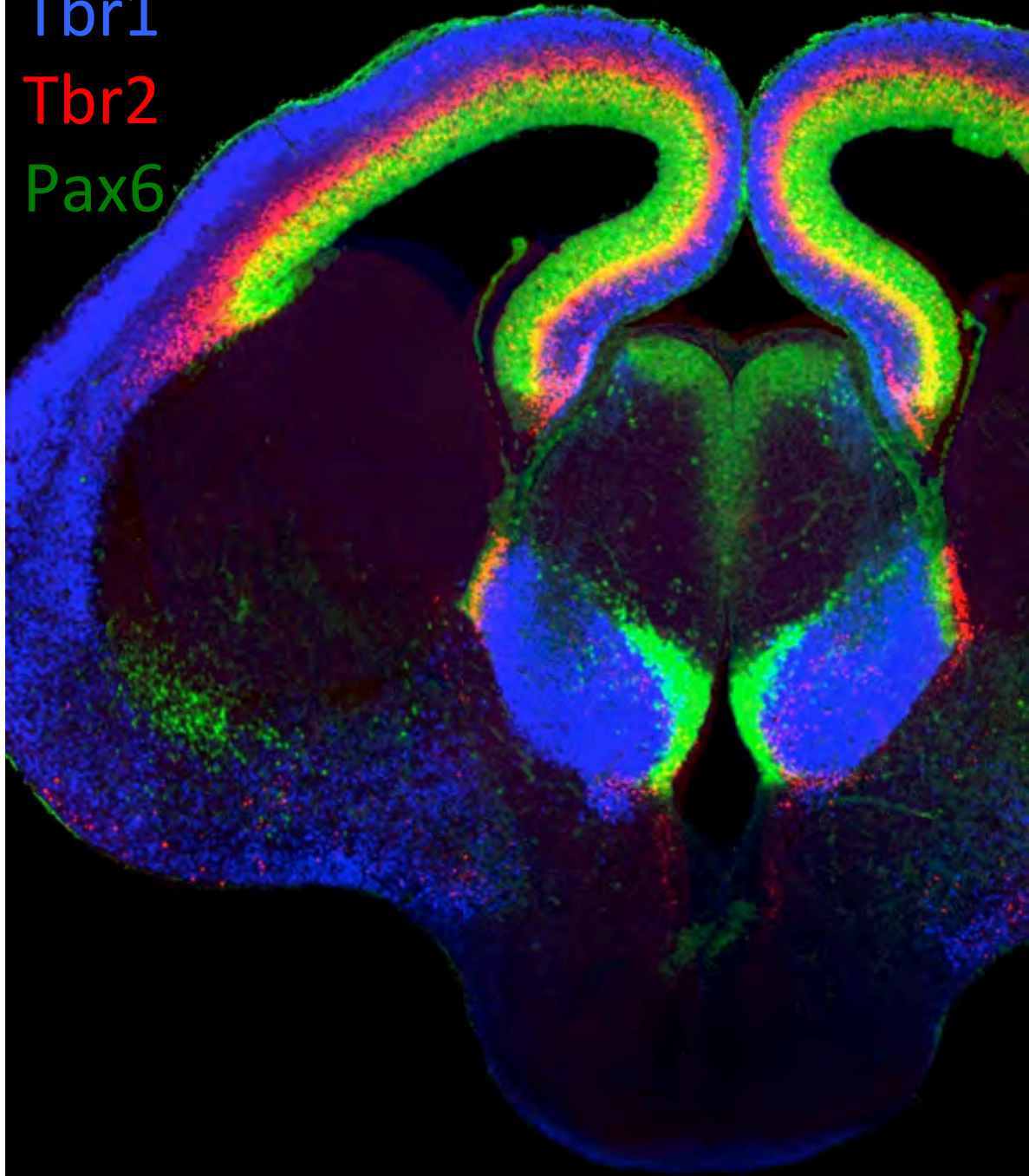
T-brain-1 (TBR1) is a Transcription Factor Expressed in Developing Cerebral Cortex



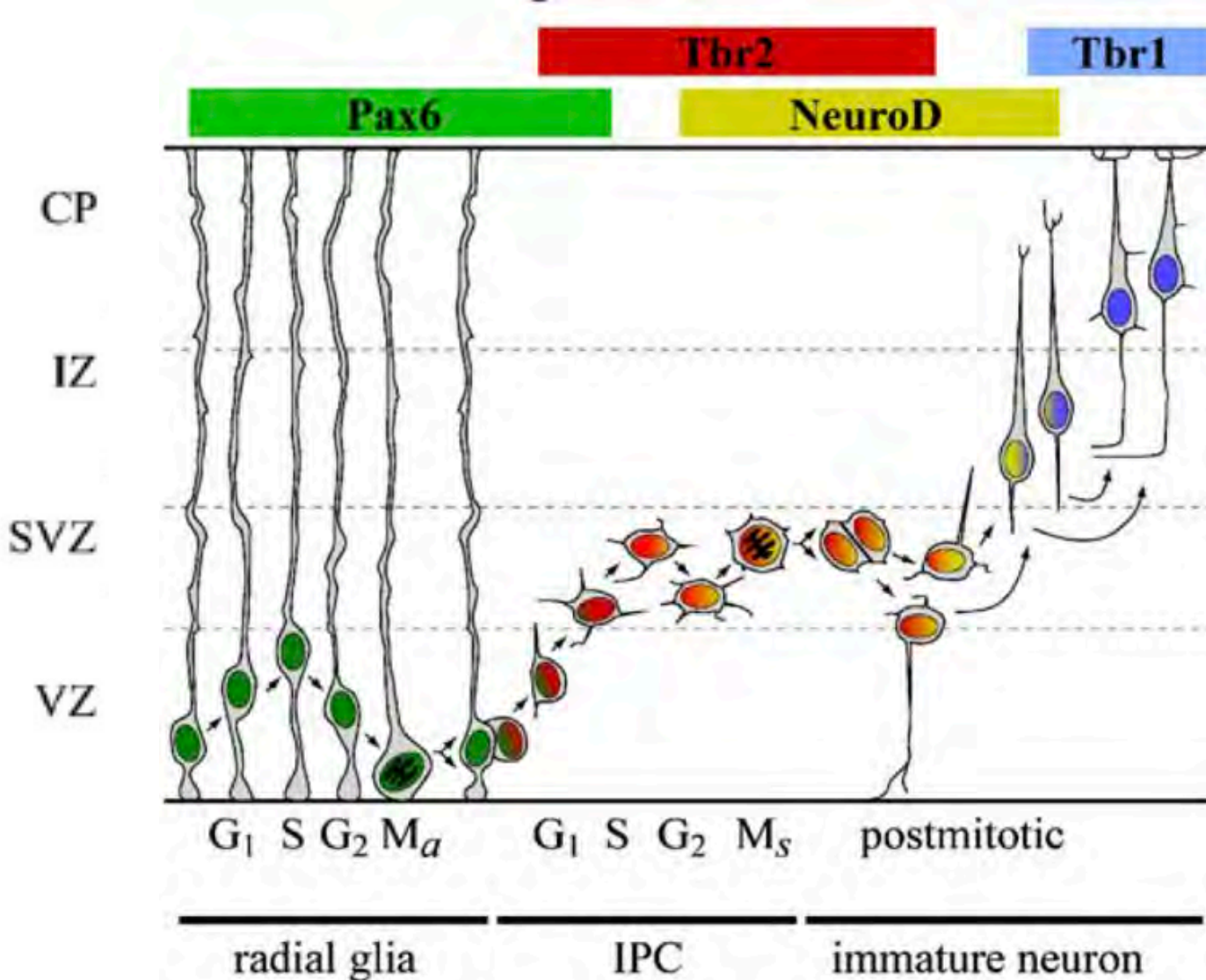
Tbr1 is expressed in the cortical plate where new neurons differentiate



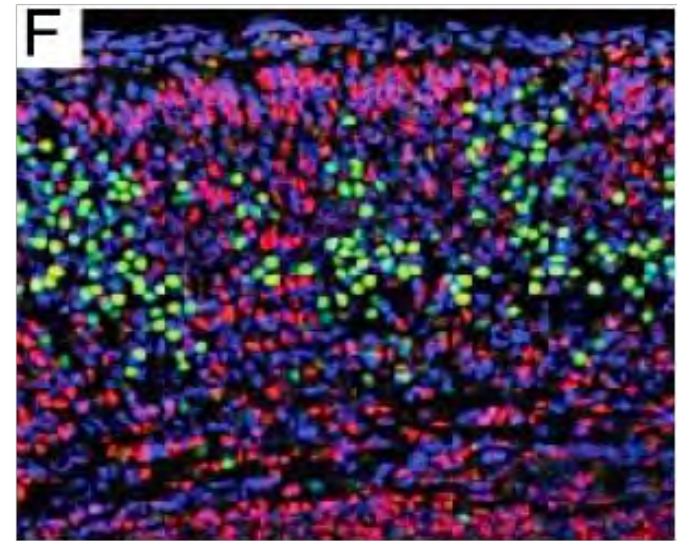
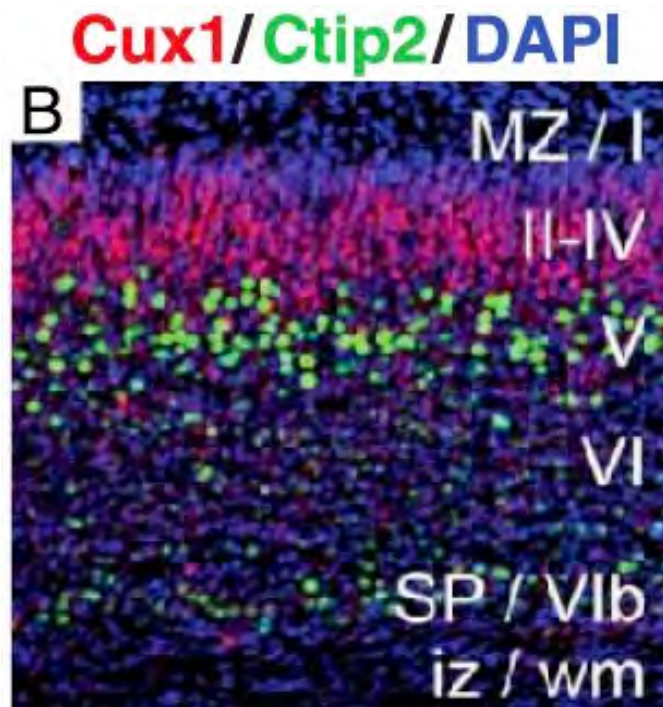
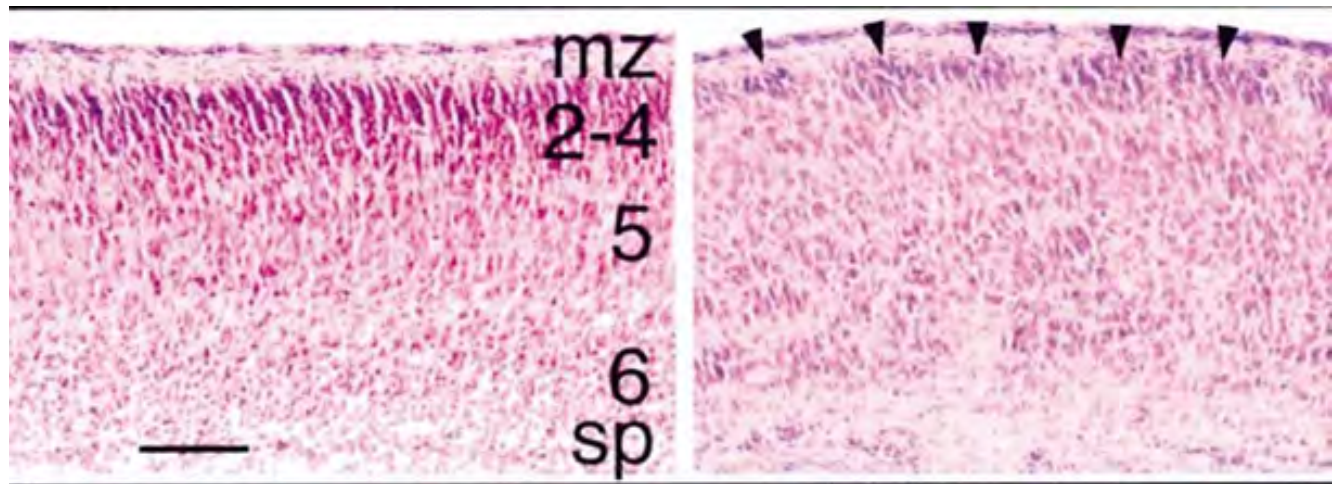
Tbr1
Tbr2
Pax6



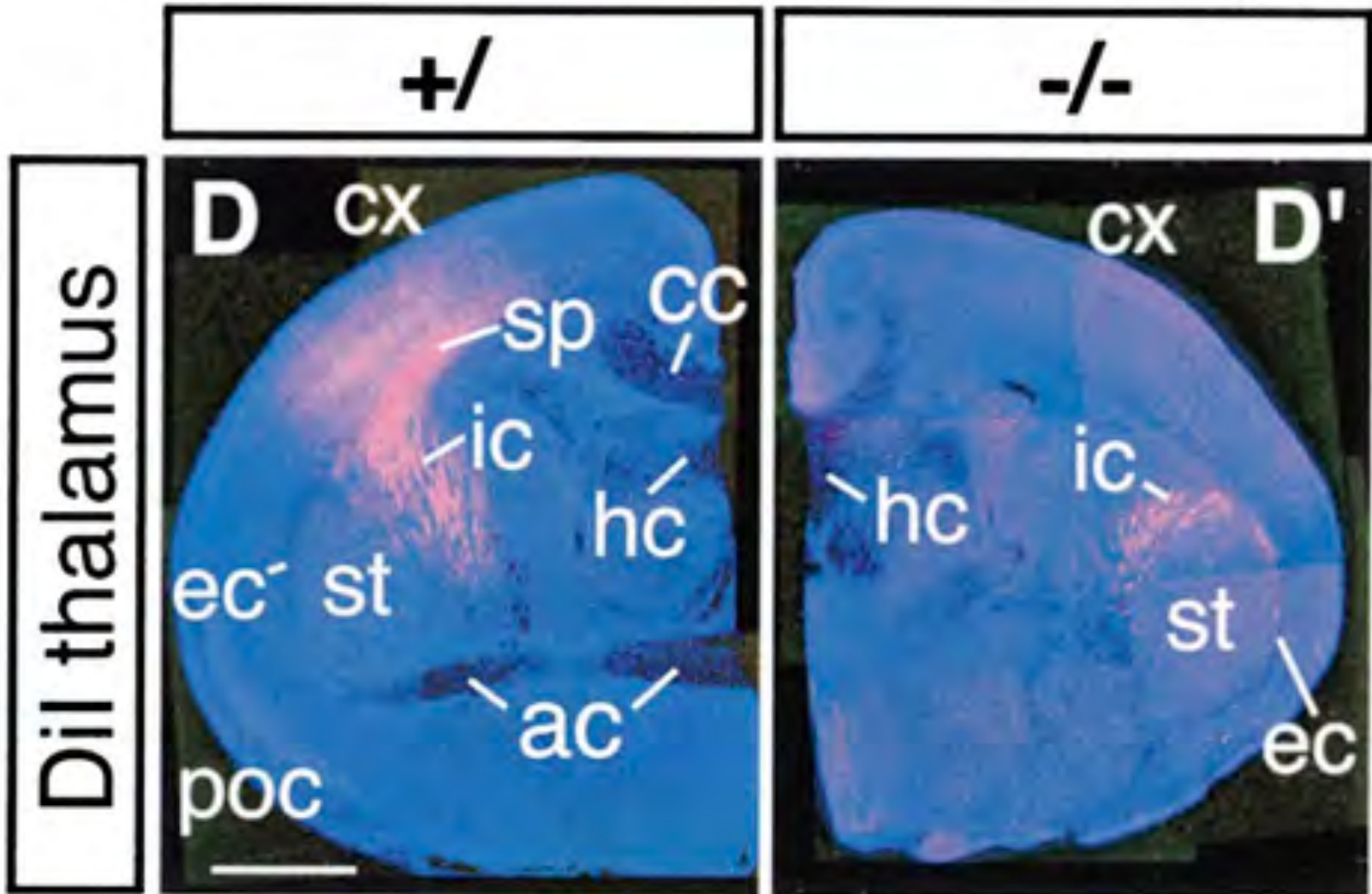
Tbr1 is expressed in cortex neurons



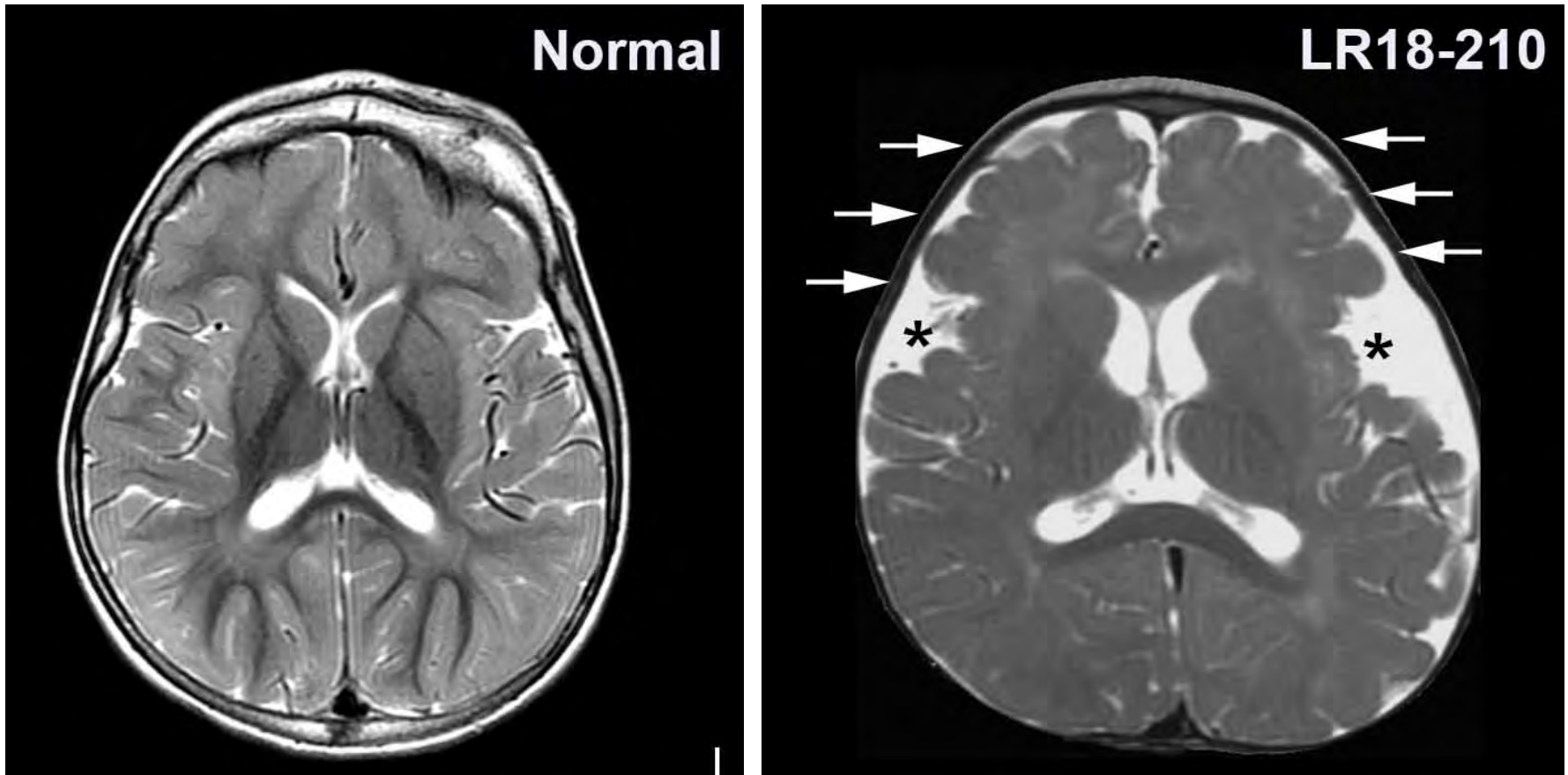
Tbr1 mutant mice have disorganized cortical layers



Tbr1 mutant mice have abnormal neural connections between the thalamus and cerebral cortex



Humans with pathologic *TBR1* variants have cortical dysplasia (abnormal growth & development)



Thus ID and ASD in *TBR1* syndrome are due to abnormal cortical organization & Connections

How We Intensively Use Computers and Data

1. Microscopy: modern microscopes are run with computers
 - Digital images & confocal slices (RGB) - MB sizes
 - Confocal stacks – 10's of MBs
2. Time-lapse video microscopy: multiple computers involved
 - 100's of MBs
3. Data Storage and Connectivity
 - Local storage rapidly fills on imaging computers
 - Servers & connectivity (internet) are essential



Time-lapse video of dividing cortical progenitors



UNIVERSITY of CALIFORNIA, SAN DIEGO
SCHOOL OF MEDICINE



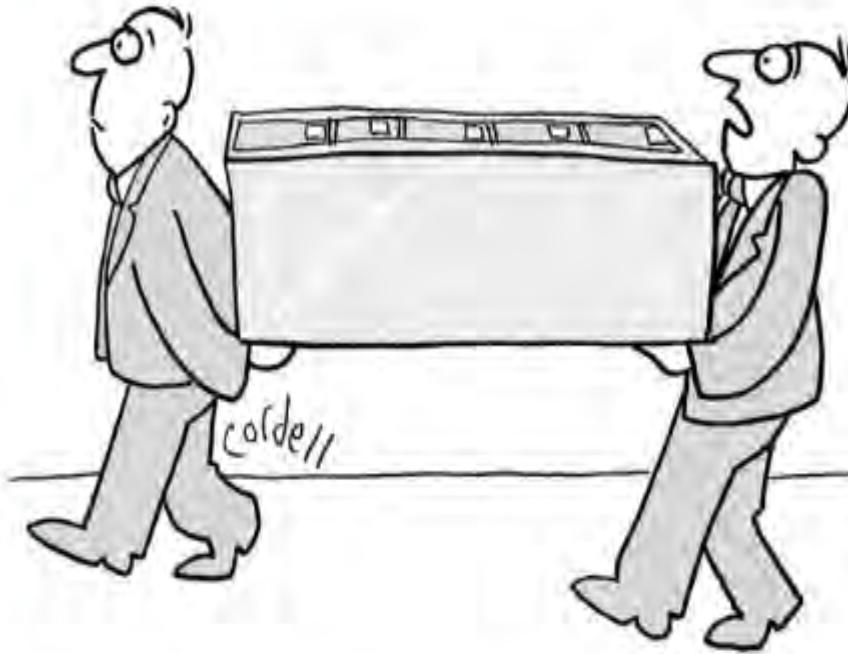
Sanford Consortium for Regenerative Medicine



UCSD Jacobs Medical Center

Thank you!

UC San Diego



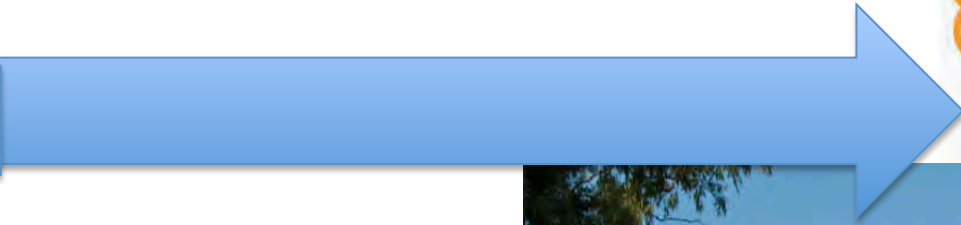
“Surely there’s an easier way of moving files?”

Goal

Transfer the Hevner lab's ~8 TB worth of research data from Seattle to UCSD safely and securely.



Hevner
Data



Seattle Children's
HOSPITAL • RESEARCH • FOUNDATION



SCRI Network:

- *Fort Knox like security because of Personal Health Information (PHI).
- *Hospital servers
- *No administrator rights on lab's workstations
- *Guardian Edge encryption on everything!



Transfer Options

1. SECURE FTP

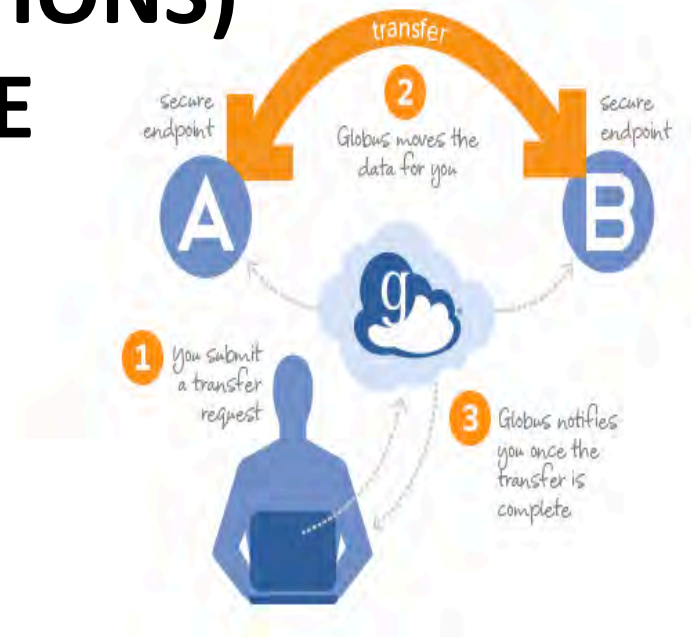
-UCSD FIONA

2. SECURE CLOUD SERVICE

-GLOBUS (BOTH INSTITUTIONS)

3. EXTERNAL HARD DRIVE

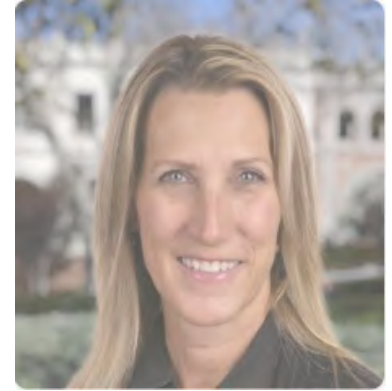
-NOT RECOMMENDED



UCSD Research IT team:

*Cyd Burrows-Schilling

*Claire Mizumoto,
Director Res IT Svcs



Globus-Paul Hodor

SCRI IT-Russell Ison

Ongoing Projects!
Network imaging computers
for both Hevner lab and
Sanford Consortium with
help from Research IT



THANK YOU for your
attention!