



Alicia Lane

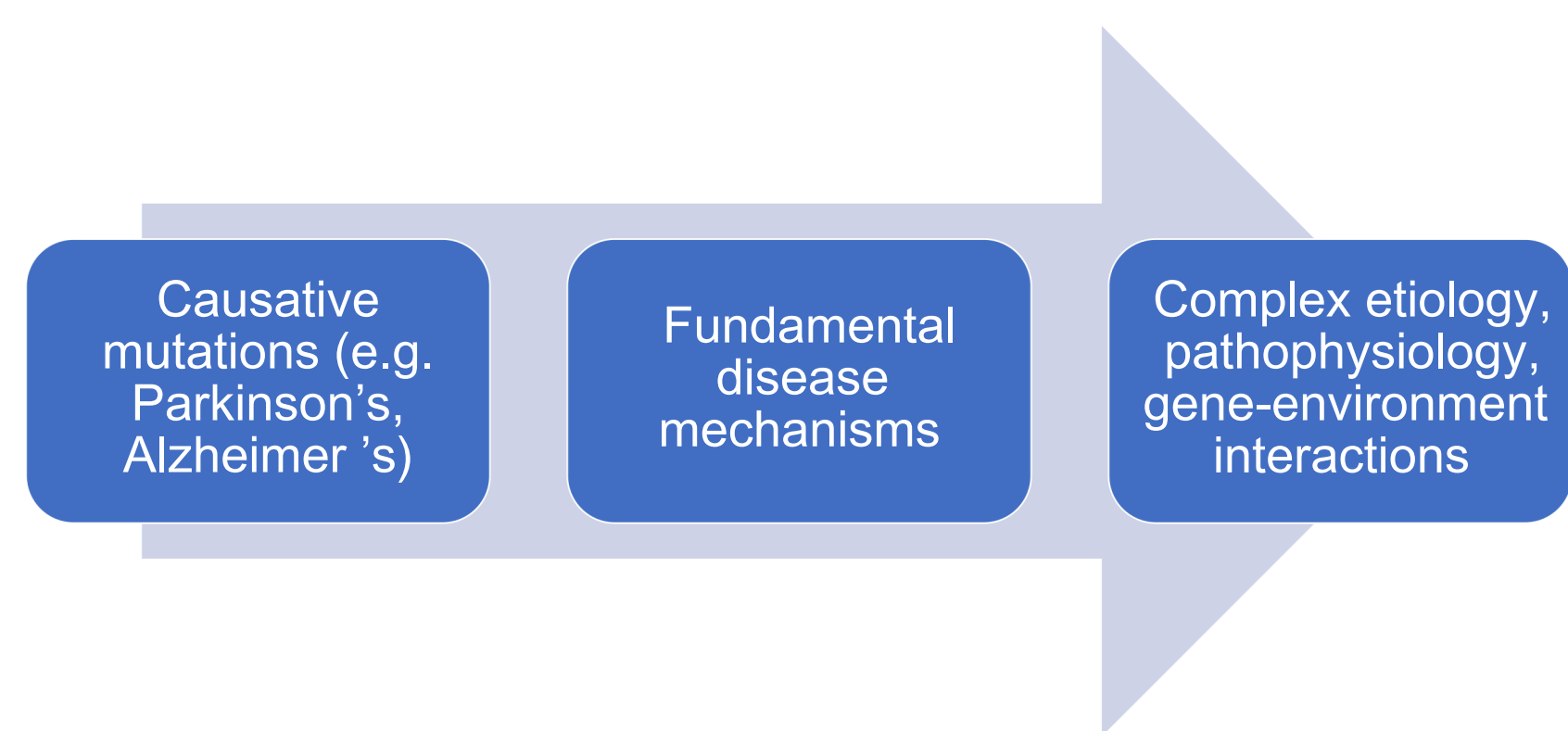
Ph.D. Student, Neuroscience
Second Year ARCS Scholar
Reid/ARCS Award



EMORY
UNIVERSITY

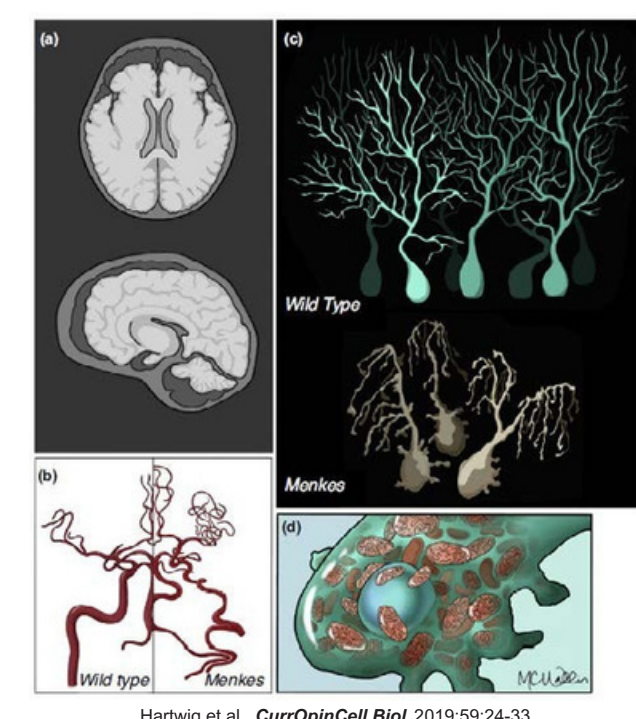
Metabolic mechanisms of copper-dependent neuronal dysfunction in Menkes disease

Framework

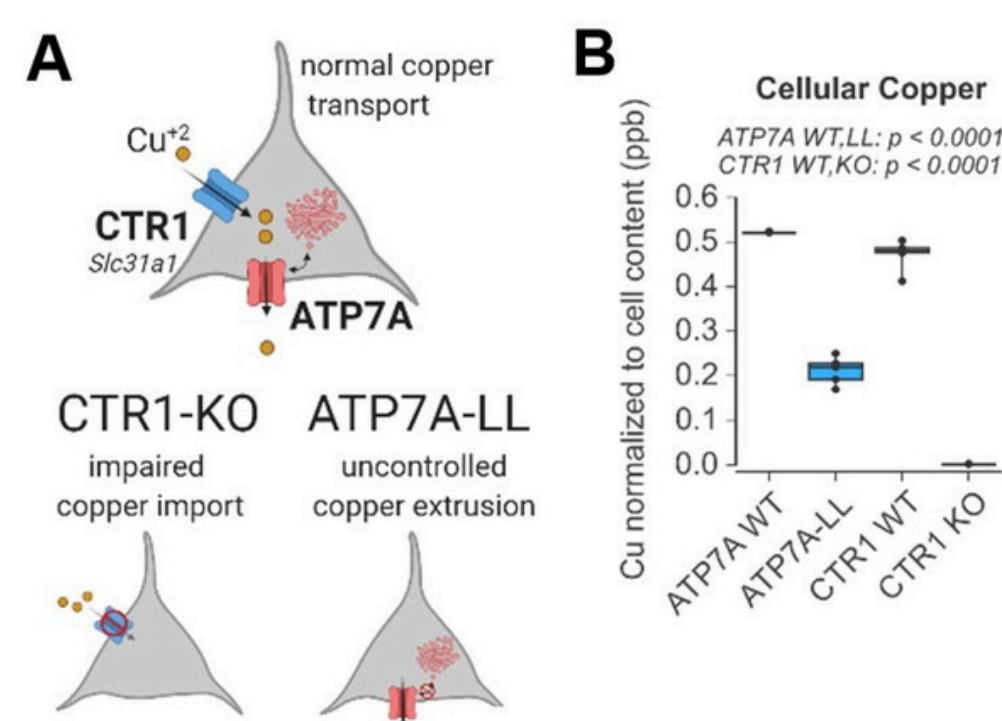


Menkes Disease

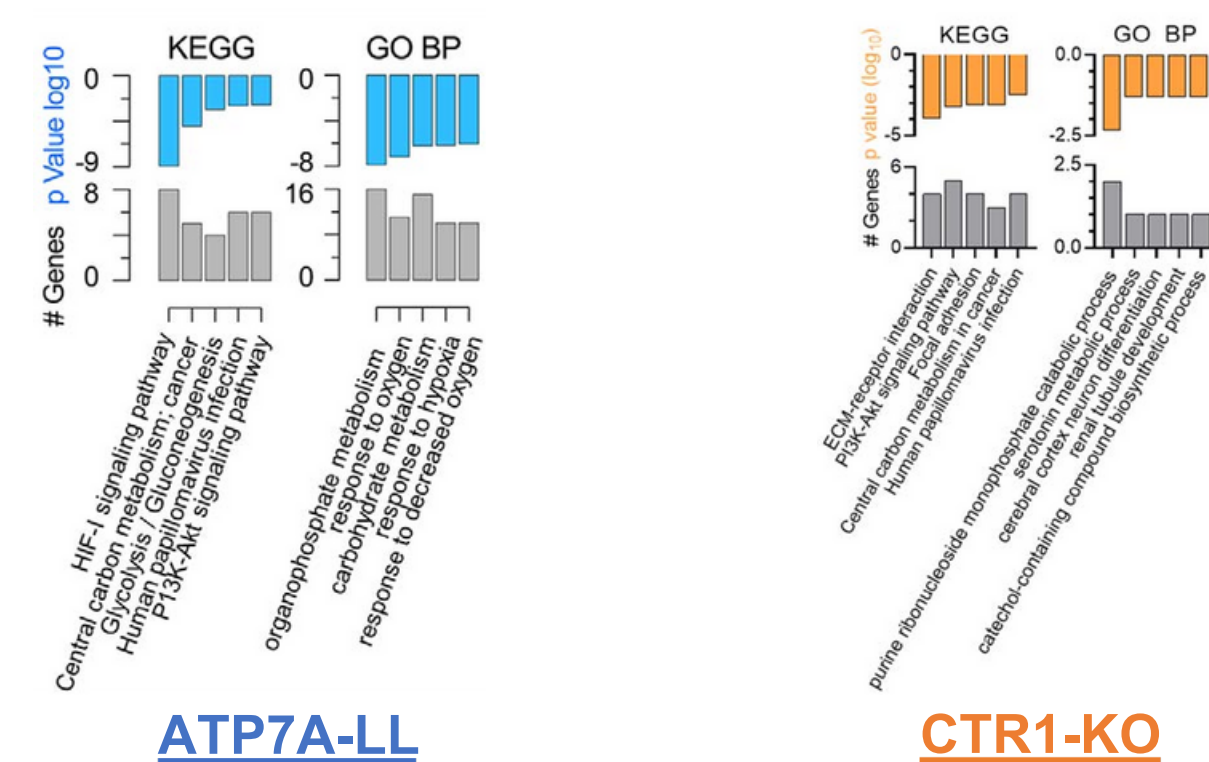
- **Cause:** Mutations in ATP7A; copper depletion in the brain
- **Symptoms:** Neurodegeneration, epileptic encephalopathy
- **Treatment:** Early diagnosis, administration of copper (*not always efficacious*)



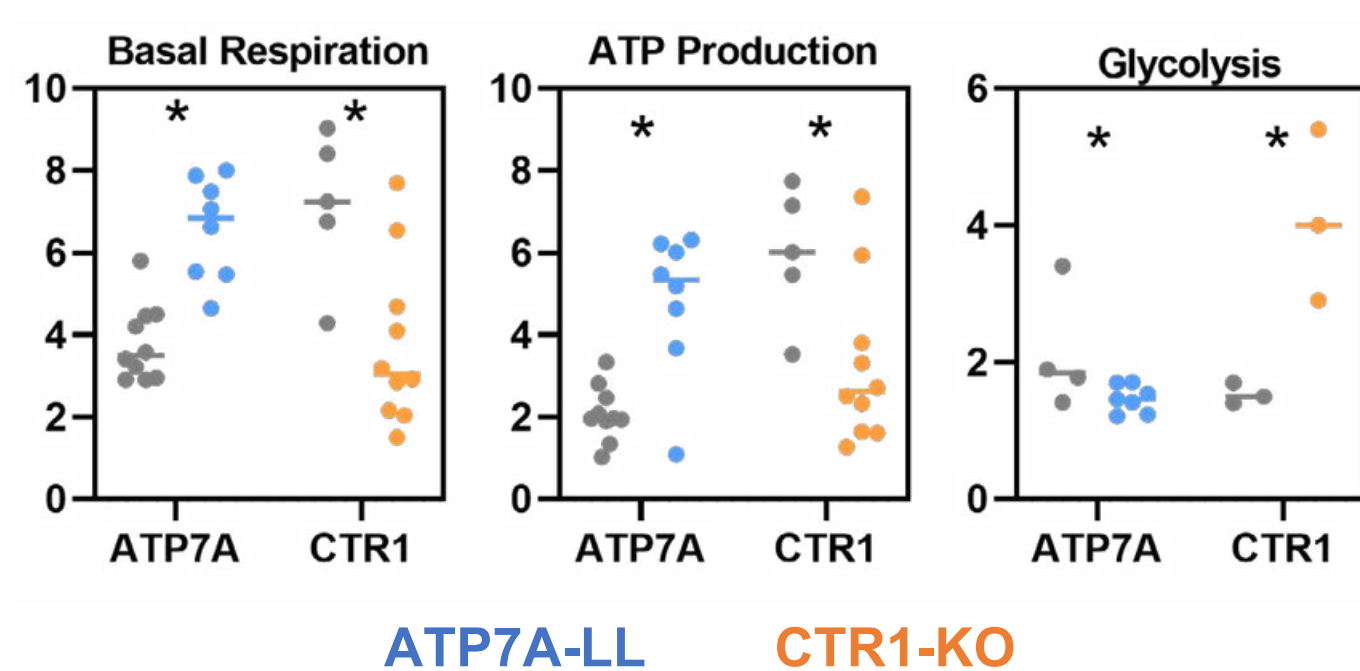
Models: ATP7A-LL + CTR1-KO



Metabolic Gene Expression



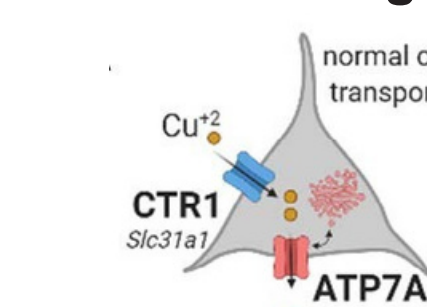
Cell Metabolism



Summary & Conclusions

Copper Depletion: ATP7A-LL ≠ CTR1 KO

Further investigation:



Ultimate Goal: Improved understanding of the neuropathology of copper-associated diseases

	ATP7A LL	CTR1 KO
HIF-1 activity	↓	↓
Basal respiration	↑	↓
Maximal respiration	↑	↓
ATP-linked respiration	↑	↓
Proton leak	↓	↓
Non-glycolytic acidification	↓	↓
Glycolysis	↓	↑
Glycolytic capacity	↓	↑
Glycolytic reserve	↓	↓

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Scholar Awards Celebration
November 17, 2022