

RISK MODIFIERS IN THE DEVELOPMENT OF CONGENITAL HYDROCEPHALUS

Lance Lee, PhD is a faculty member in the Children's Health Research Center at Sanford Research. Dr. Lee studies the genetic causes of primary ciliary dyskinesia, which has been linked to hydrocephalus. In his study, *Genetic Modifiers of Congenital Hydrocephalus*, Dr. Lee will study genes that modify the risk of developing hydrocephalus. By identifying these genetic modifiers, new drug targets may emerge to prevent or cure congenital hydrocephalus.

GOAL

Identify genes that modify the risk of developing hydrocephalus.

THEORY

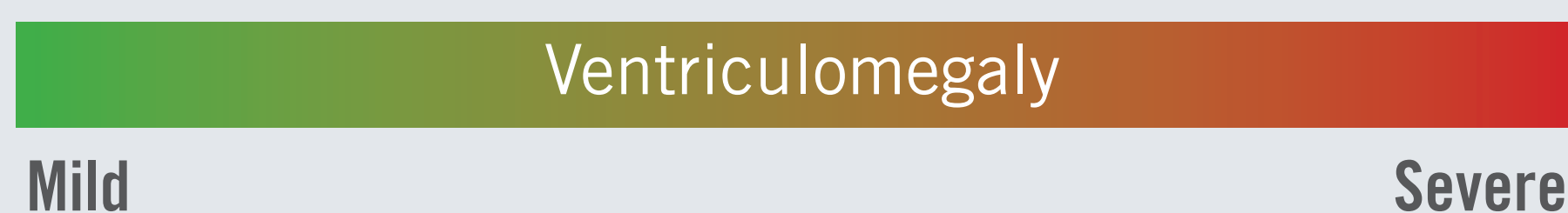
People and mice are genetically heterogeneous

Some mice (and people) are at a higher risk of developing hydrocephalus

This difference in risk is linked to a person's genetic makeup

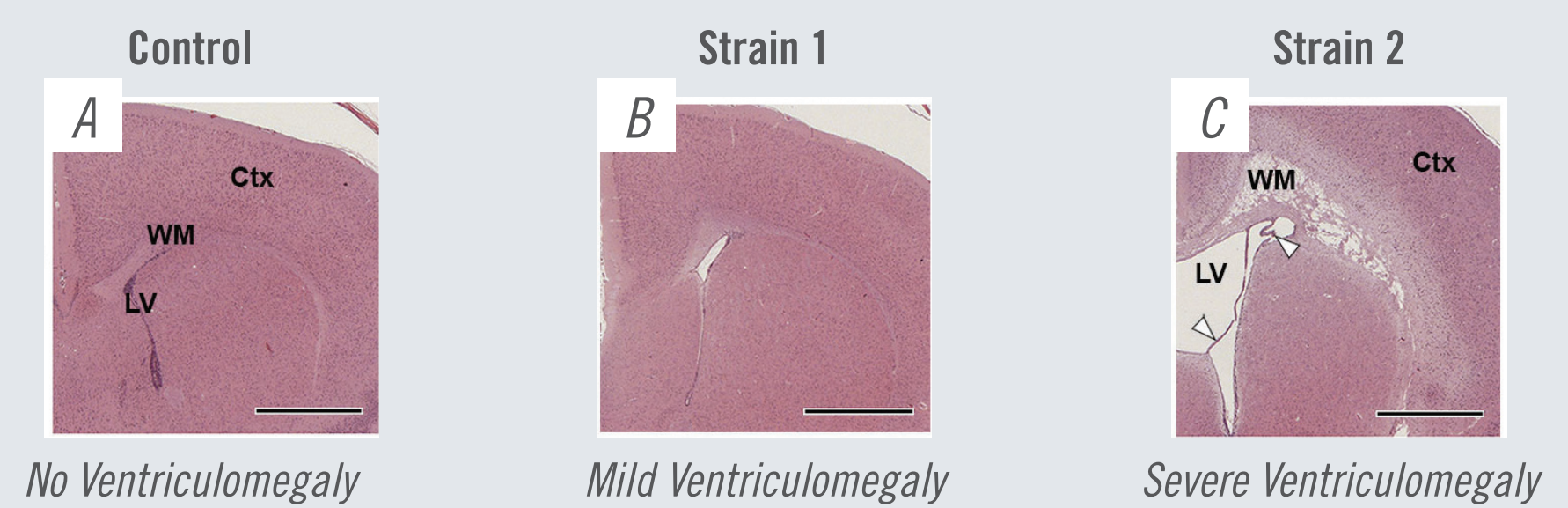
EVIDENCE

MODEL: SAME MUTATION – DIFFERENT OUTCOMES



This is dependent on the strain (genetic background)

SAME GENETIC MUTATION

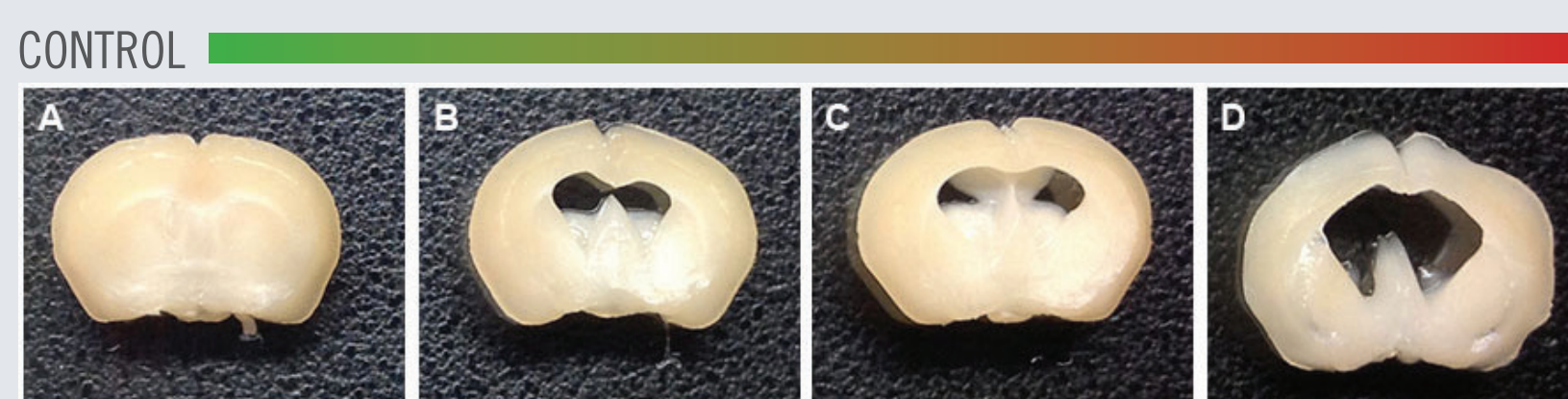


How do we find the responsible genes?

QUANTITATIVE TRAIT LOCUS (QTL) ANALYSIS

1 Mate animals from different strains

2 Identify mice with varied levels of ventriculomegaly



3 Identify the genetic differences between these animals

WHY IS THIS WORK INNOVATIVE?

1 Identify new molecular pathways
New avenues for drug development

2 Identify genetic susceptibility
Potential for early risk assessment