

# Why the brain has 'gray matter'

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By borrowing mathematical tools from theoretical physics, scientists have recently developed a theory that explains why the brain tissue of humans and other vertebrates is segregated into the familiar "gray matter" and "white matter."

The theory is based on the idea that maximum brain function requires a high level of interconnectivity among brain neurons but a low level of delays in the time it takes for signals to move through the brain ("conduction delays").

Based on no fewer than 62 mathematical equations and expressions, the theory ("Segregation of the Brain into Gray and White Matter: A Design Minimizing Conduction Delays") provides a possible explanation for the

structure of various neurological regions including the cerebral cortex and spinal cord.

The research was carried out at Cold Spring Harbor Laboratory on Long Island by theoretical neuroscientist Dmitri Chklovskii and graduate student Quan Wen.

Source: Cold Spring Harbor Laboratory

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