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## Developing multi-species brain-strain-based scaling law using finite element analysis

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Developing multi-species brain-strain-based scaling law using finite element analysis (FEA)

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Traumatic brain injury (TBI) posed serious threats to social and economic development. Effective prevention, diagnostics, and therapeutics need to be discovered. TBI is mostly caused by rapid linear and rotational acceleration, induced by direct blunt impact to the head or neck-involved inertia loading. From the perspective of biomechanics, the strain could serve as an effective evaluator of potential brain injury severity and risk, because axons will be damaged when exceeding their elongation limit. However, the challenge is that the in vivo observation of brain strain was obstructed by the skull and short impact duration. The main contribution of this research is to look into both human and animal brain strains among both real-world impacts and laboratory settings using FEA, and then developed codes and methods to compare and scale animal head kinematics, to better understand available animal TBI and design future animal TBI that is more relevant to human TBI.