

Traumatic Brain Injuries Antibodies

A traumatic brain injury (TBI), also known as an intracranial injury, is an injury to the brain caused by a blow or jolt to the head from blunt or penetrating trauma. The injury that occurs at the moment of impact is known as the primary injury.

Primary injuries can involve a specific lobe of the brain or can involve the entire brain. Sometimes the skull may be fractured, but not always. During the impact of an accident, the brain crashes back and forth inside the skull causing bruising, bleeding, and tearing of nerve fibers. A large percentage of the people killed by brain trauma do not die right away but rather days to weeks after the event; rather than improving after being hospitalized, some 40% of TBI patients deteriorate. Primary brain injury is not adequate to explain this deterioration; rather, it is caused by secondary injury, a complex set of cellular processes and biochemical cascades that occur in the minutes to days following the trauma.

Secondary injury events include damage to the blood–brain barrier, release of factors that cause inflammation, free radical overload, excessive release of the neurotransmitter glutamate (excitotoxicity), influx of calcium and sodium ions into neurons, and dysfunction of mitochondria. Injured axons in the brain's white matter may separate from their cell bodies as a result of secondary injury, potentially killing those neurons. Other factors in secondary injury are changes in the blood flow to the brain; ischemia (insufficient blood flow); cerebral hypoxia (insufficient oxygen in the brain); cerebral edema (swelling of the brain); and raised intracranial pressure (the pressure within the skull). As a result, cerebral perfusion pressure (the pressure of blood flow in the brain) is reduced; ischemia results.