

Thrombin in Intracerebral Hemorrhage

Previous studies demonstrated that thrombin is an important factor in [brain injury](#) after [intracerebral hemorrhage](#) and [intraventricular hemorrhage](#).

Intraventricular injection of thrombin causes significant [hydrocephalus](#) and white matter damage.

Results suggest decreasing CSF production by [acetazolamide](#) attenuated thrombin-induced hydrocephalus in rats ¹⁾.

Intraventricular injection of thrombin caused more white matter damage and hydrocephalus in rats with low aerobic capacity. A differential effect of thrombin may contribute to differences in the effects of cerebral hemorrhage with aerobic capacity ²⁾.

[Thrombin](#) is an essential component in the clotting cascade, and it is produced in the brain immediately after ICH induction ³⁾. However, thrombin can also participate in ICH-induced injury. The deleterious or protective effect of thrombin depends on its concentration ⁴⁾.

The potential mechanism of early [edema](#) around the clot is considered to be a vasogenic reaction to pro-osmotic substances such as [electrolytes](#) and protein, which are released from the acute hematoma. This is followed by activation of the [coagulation cascade](#) and increased [thrombin](#) expression, which may propagate swelling. After the first week, any further edema is related to the cytotoxic effects of [hemoglobin](#) breakdown and the formation of [reactive oxygen species](#) ⁵⁾.

[Experimental investigations](#) have indicated that [thrombin](#) formation, [red blood cell](#) lysis, and iron toxicity play a major role in ICH-induced injury and that these mechanisms may provide new therapeutic targets ⁶⁾.

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Balami JS, Buchan AM. Complications of intracerebral haemorrhage. Lancet Neurol. 2012 Jan;11(1):101-18. doi: 10.1016/S1474-4422(11)70264-2. PMID: 22172625.

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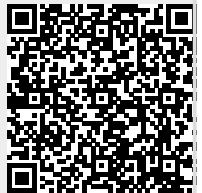
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