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# **Proteoglycans in the central nervous system: plasticity, regeneration and their stimulation with chondroitinase ABC.**

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## **Abstract**

After injury to the mammalian central nervous system (CNS), neurons are not able to regenerate their axons and recovery is limited by restricted plasticity. Axon regeneration is inhibited by the presence of the various inhibitory molecules, including chondroitin sulfate proteoglycans (CSPGs) which are upregulated around the injury site. Plasticity after the end of critical periods is restricted by extracellular matrix changes, particularly the formation of CSPG-containing perineuronal nets. Enzymatic removal of chondroitin sulfate (CS) chains with chondroitinase ABC promotes axon regeneration and reactivates plasticity. This review details the structures and properties of the different CSPGs in the normal and damaged CNS, the use of the enzyme chondroitinase ABC to promote neural regeneration and plasticity, and discusses mechanisms of action and possible therapeutic uses of this enzyme.

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