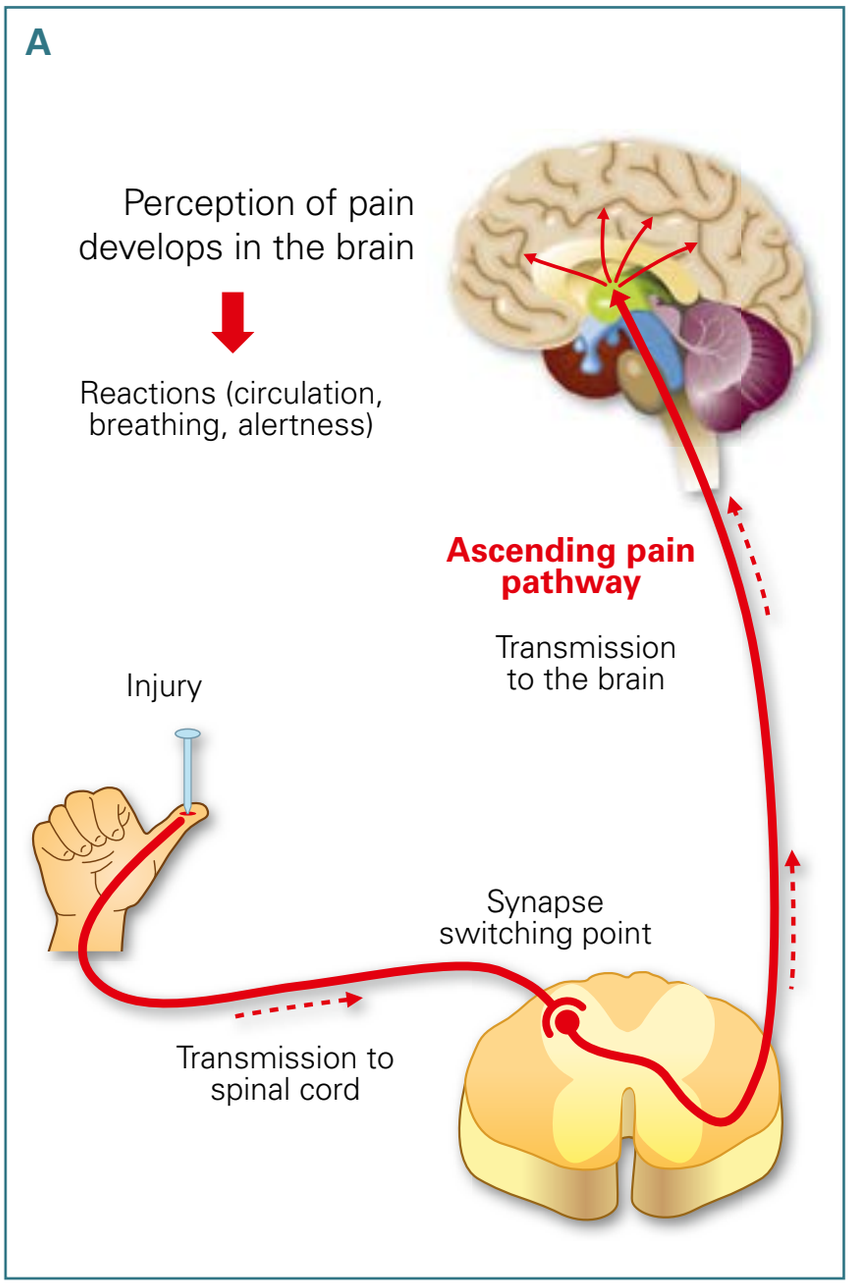
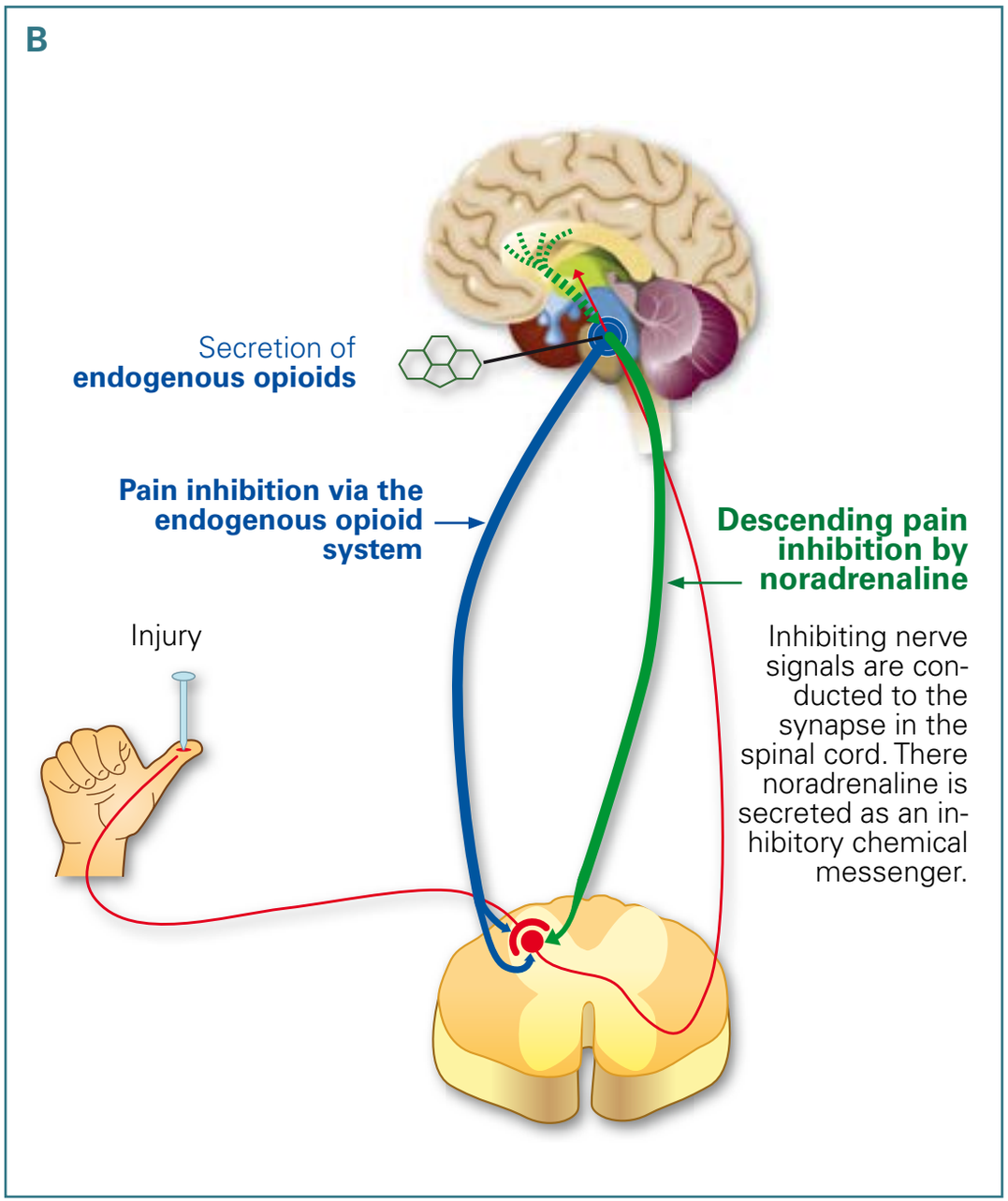
Pain perception arises in and is regulated by the brain

Development of the perception of pain



Inhibition of the perception of pain



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A Development of pain perception

The pain signal is conducted via the spinal cord to different areas of the brain. The perception of pain arises here.

Pain unconsciously leads to **various reactions** (rise in blood pressure, accelerated breathing).

Mild pain leads to increased alertness, while extremely severe pain can lead to unconsciousness.

B Inhibition of pain perception

The brain has highly efficient systems for reducing pain:

- **Endogenous opioids [1]** are predominantly secreted in various regions of the central nervous system (brain and spinal cord) by interneurons (regulating "between-nerve cells"). This mechanism is controlled by corresponding functional areas of the brain.

  Opioids block pain transmission at the synapse in the spinal cord.

- **The descending pain inhibitory system [2, 3]** sends inhibitory nerve signals from the brain directly to the synapse in the spinal cord. These cause the secretion of inhibitory substances that block the transmission of the pain signal, e.g. noradrenaline.

In extreme cases, for example following an accident, pain perception may even be completely switched off, in order to keep the body as capable of action as possible.

[1] Holden JE et al. AACN Clin Issues (2005) 16(3): 291 - 301.
[2] E Benarroch. Neurology (2008) 71(3): 217 – 221.
[3] K Bannister et al. Neurotherapeutics (2009) 6(4): 703 – 712.

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