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## Brain tumours: non-invasive techniques to treat invasive pathologies

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## Abstract

Brain and other central nervous system tumours are cancers of poor prognosis, for which current therapeutic possibilities do not match the expectations regarding a curative objective. If the treatment of central nervous system tumours is so difficult, it is partly due to the blood-brain barrier and the blood-tumour barrier, which need to be crossed to access the tumour. Driven by these insufficient results, more and more techniques and technologies are being explored and are evolving: progress of surgery and radiotherapy, growing place of immunotherapies, or apparition of new non-invasive techniques. The latter ones are those which interests us here, where promising advances are taking the leap to clinical trials. Nose-to-brain delivery, receptor-mediated transcytosis and microbubbles-associated focused ultrasounds are three therapeutic propositions with encouraging results regarding the improvement of drug access to the brain. Even though they might have their share of limits and adverse effects, benefit-risk balance looks promising, and they may appear as new options to treat patients in the future.

**Keywords:** Barrière hémato-encéphalique; Blood-brain barrier; Brain tumour; Clinical trials; Essais cliniques; Non-invasive strategies; Stratégies non-invasives; Tumeurs cérébrales.

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