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Repurposing drugs for glioblastoma: from bench to bedside

João Basso, Ana Miranda, João Sousa, Alberto Pais, Carla Vitorino



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Abstract

Glioblastoma multiforme is the most common, aggressive and lethal type of brain tumour. It is a stage IV cancer disease with a poor prognosis, as the current therapeutic options (surgery, radiotherapy and chemotherapy) are not able to eradicate tumour cells. The approach to treat glioblastoma has not suffered major changes over the last decade and temozolomide (TMZ) remains the mainstay for chemotherapy. However, resistance mechanisms to TMZ and other chemotherapeutic agents are becoming more frequent. The lack of effective options is a reality that may be counterbalanced by repositioning known and commonly used drugs for other diseases. This approach takes into consideration the available pharmacokinetic, pharmacodynamic, toxicity and safety data, and allows a much faster and less expensive drug and product development process.

In this review, an extensive literature search is conducted aiming to list drugs with repurposing usage, based on their preferential damage in glioblastoma cells through various mechanisms. Some of these drugs have already entered clinical trials, exhibiting favourable outcomes, which sparks their potential application in glioblastoma treatment.

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