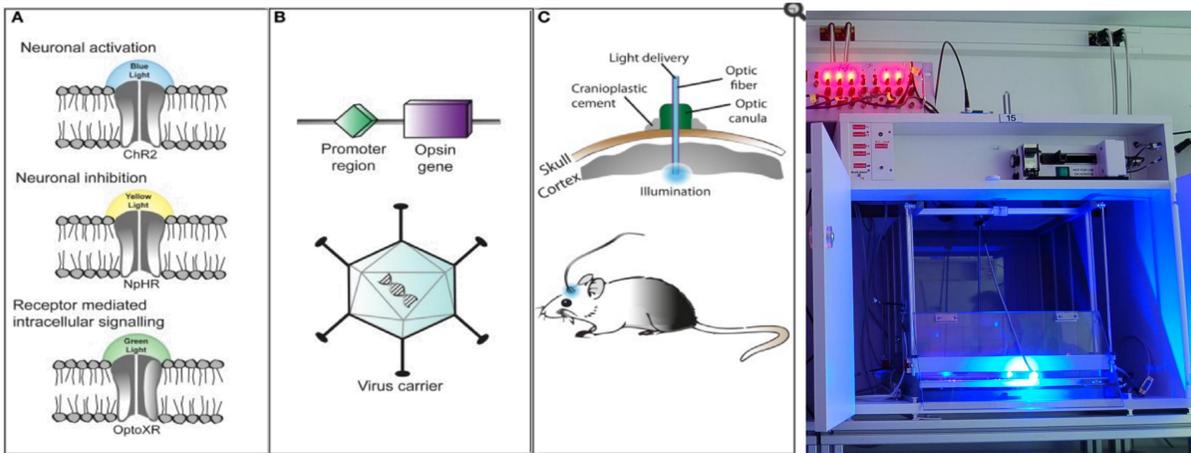


INTRODUCTION

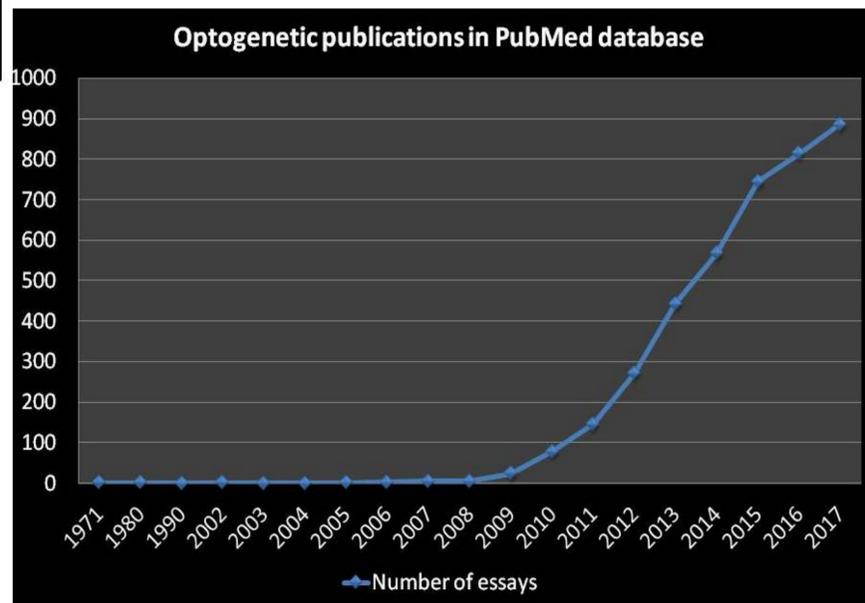
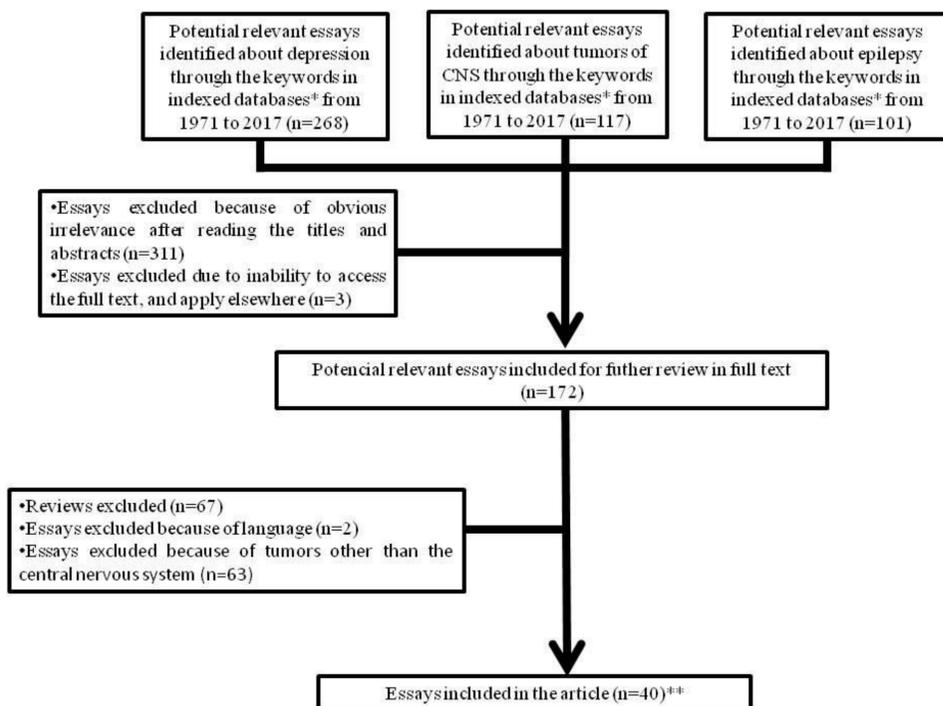


The optogenetic tools have been described as valuable techniques to study neural activity through light stimulation, as well as potential neuromodulator approaches in the management of several CNS diseases. It has been focused changes in cellular biological behavior in several types of proteins involved in cytoskeleton regulation, motility and gene expression.

OBJECTIVE

Discuss the experimental results, molecular mechanisms and potential clinical applications of optogenetic tools in patients affected by medically intractable epilepsy, as well as its applicability in the treatment of CNS tumors.

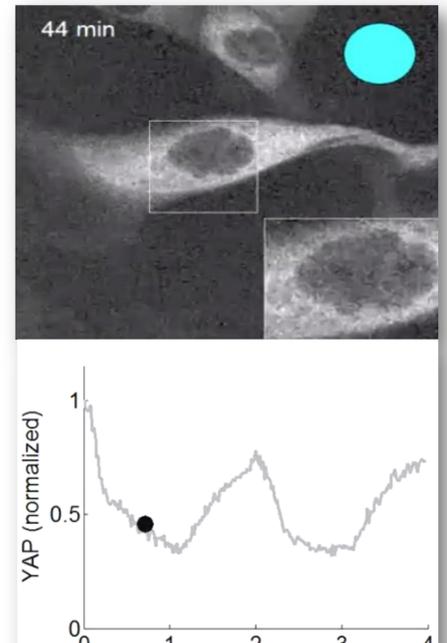
METHODS



RESULTS AND DISCUSS

Among 486 potential papers of optogenetic tools, it was included in this review four papers about CNS tumors, eight essays about depression and twenty-eight essays about epilepsy. Such that, the **Ca²⁺ translocating channelrhodopsin (ChR2)** and **Neurologin-3 (NGLN3)** are common biomolecular pathway presented in the diseases evaluated in optogenetic essay.

ChR2		NGLN3	
CNS TUMORS	EPILEPTIC ASSAYS	CNS TUMORS	EPILEPTIC ASSAYS
Decreased cell progression and proliferation;	Activation of GABA interneurons causes entrainment of hippocampal CA3 pyramidal cells by a GABA-A mediated mechanism;	Inhibition of PI3K-mTOR pathway and mitotic activity	Inhibition of excitatory drive in hippocampus can delay seizure onset
Increased of mitochondria-dependent apoptosis	Activation of enorhinal CaMKII α -positive neurons inhibited hippocampal neurons activity and reduced severity of hippocampal electric activity		Inhibition of pyramidal neurons was sufficient to acutely attenuate cellular activity.



CONCLUSIONS

The authors show a significative lack of literature with regards to the applicability of optogenetic techniques in the CNS tumors and depression. Furthermore, new studies still will be needed for the standardization of methodologies and reproducibility experimental in vitro and in vivo results before being implied in the clinical practice in humans.

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