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# Glioblastoma multiforme targeted therapy: The Chlorotoxin story.

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## Introduction

Glioblastoma multiforme (GBM) is the most common malignant primary brain neoplasm having a mean survival of <24months. Scorpion toxins are considered promising cancer drug candidates, primarily due to the discovery of chlorotoxin, derived from the venom of the Israeli yellow scorpion.

## Methods

This intriguing short peptide of only 36 amino-acids length and tight configuration, possess the ability to bind to GBM cells in a grade-related manner with ~100% of GBM cells staining positive and no cross reactivity to normal brain. Chlorotoxin has an anti-angiogenic effect as well. Molecular targets for Chlorotoxin include voltage gated chloride channels (GCC), calcium-dependent phospholipid-binding protein Annexin-2, and the inducible extracellular enzyme Matrix Metalloproteinase-2 (MMP-2). Of all its targets, MMP-2 seems to bear the most anti-neoplastic potential. Chlorotoxin is a promising tumortargeting peptide. Its small size and compact shape are convenient for intracranial delivery.

## Results

The structure, biological activity, molecular targets and possible clinical role of Chlorotoxin are discussed. Chlorotoxin can be utilized as a targeting domain as well, attaching different effector functions to it. Clinical applications in GBM therapy, intraoperative imaging, nano-probes and nano-vectors based technology; targeted chemotherapy and immunotherapy are discussed as well.

## Conclusions

Chlorotoxin is likely to play a significant role in effective GBM immunotherapy in the future.

## Learning Objectives

the role of chlorotoxin in future GBM treatment

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