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ONCOLOGY

New anti-tumoral approach: peptides targeting the hexokinase 2 protein

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TRL scale

Discovery

Lead Optimization

Preclinical

Clinical Phases

What's needed for?

The invention consists in the design, realization and administration of peptides that display antitumoral activity. A portion of the Hexokinase 2 (HK2) protein was engineered in order to allow its specific activation inside the tumor, entry in tumor cells and induction of their death.

HK2 contributes to metabolism, growth and death inhibition of tumor cells and its expression is associated with bad prognosis and chemotherapeutic/radiation resistance in diverse solid and hematopoietic tumors. In this scenario, has been developed an invention that induces specific and rapid tumor cell death in different neoplastic models by targeting HK2 without inhibiting its enzymatic activity. In addition, we have utilized a molecular design that minimizes potential side effects in HK2 expressing healthy tissues by exploiting a tumor-specific system of activation of the targeting peptides.

Advantages

- Thanks to its unique design, this invention is specifically released and activated inside tumor masses, where it accumulates in tumor cells rapidly killing them
- This specificity in tumor delivering limits off-target toxic effects in healthy tissues
- The invention is designed for not being metabolized or pumped out of tumor cells, where it can accumulate, thus maximizing its toxic effect
- The invention triggers the apoptotic program and induces cancer cell death in minutes. Apoptosis induction has the advantage of rapidly and selectively clearing tumoral cells without eliciting inflammation, thus avoiding potential toxic effects caused by the inflammatory process
- The specific release system and the molecular weight of the invention prevent its entry in cells that could metabolize/inactivate it, lowering its degradation rate and maximizing its efficacy as an anti-tumor tool

Applications

- Treatment of benign and malignant tumors expressing HK2
- Treatment of solid and hematopoietic tumors expressing HK2
- Treatment of metastatic tumors expressing HK2
- Treatment of drug/radiation resistant tumors that over-express HK2