Targeting The Hypoxia Responses of Solid Tumors as a Novel Therapeutic Approach (Hadasit)

code: 8-2016-321

Shahar Frenkel, Hadassah Ein Kerem, Opthalmology

Investigators: Shahar Frenkel, MD, PhD; Alik Honigman, PhD

Market Need

Solid tumors are known to continually form hypoxic microenvironments because the proliferating tumor cells grow faster than they can attract blood vessels towards them. In hypoxic microenvironments, where there is a lack of oxygen, there is no effector for radiotherapy, and there is a lack of sufficient concentrations of chemotherapeutics / biological agents. Tumor cells surviving in hypoxic areas have also been found to be more aggressive and the ones responsible for metastatic spread. A therapeutic approach that specifically targets the response to hypoxia of dividing tumor cells can facilitate more effective treatment for patients with solid tumors. The solid tumor therapeutics market is expected to register a CAGR of 15% between 2019 and 2024, where a crucial driving factor is the increasing incidence of cancer.

Innovation

The use of armed retroviruses that propagate only in dividing cells to target transcription factors controlling the cellular response to hypoxia, thereby abrogating cellular response to hypoxia in specific tissues. The armed retroviruses will be used in combination with chemotherapy.

Findings

- Knockdown of hypoxia-responsive transcription factors HIF-1 and CREB in hepatocellular carcinoma and uveal melanoma cell lines (as POC) using retroviruses which express shRNAs.

- Marked effect on tumor cell viability in vitro.

- In vivo POC for the effect of CREB and HIF-1 knockdown on tumor growth alone or in combination with chemotherapy in hepatocellular carcinoma, uveal melanoma, and retinoblastoma.

Indications/Applications:

The approach can be applied in multiple types of solid tumors in combination with chemotherapy, thereby reducing the dosing and producing a safer and more effective therapy for patients. Specifically, the project contains in vivo POC in hepatocellular carcinoma, uveal melanoma, and retinoblastoma. In the future, additional types of solid tumors are to be tested.

Competitive Advantage

The advantage in the solution presented here is the use of replicative retroviruses that propagate only in proliferating cells and are active in hypoxic areas which are hardly accessible for chemotherapy/ biological agents and irradiation.

Contact for more information:

Tal Almog ✉, 054-3187538

Hadasit Medical Research Services & Development Ltd
Mother & Child Pavilion, Hadassah Ein Kerem, Jerusalem , 91120 Israel
Phone: +972-2-6778757, Fax: +972-2-6437712, E-mail: skimhi@hadassah.org.il