Antapodia Nanotherapeutics

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Nanoparticle siRNA therapies halting metastasis

When primary tumors turn metastatic, prognoses become poor and survival time drastically shortens even with the best available therapies, including new immunotherapies. Antapodia Nanotherapeutics, Inc., is striving to meet the unmet needs of patients with advanced cancers with therapies that inhibit tumor growth and prevent metastases by targeting the common and key drivers of these malign processes.

One of the earliest events in the transition to a metastatic cancer cell is the development of finger-like projections called invadopodia that extend from the surface of the tumor cell. These invadopodia are able to dissolve the surrounding extracellular matrix (ECM) and act like feet that allow the cancer cell to 'walk' through the space created in the ECM. From here, invadopodia enable cancer cells to breach and enter the endothelium of blood vessels, travel to new locations in the body, then exit to establish new tumors. Antapodia has identified two proprietary master regulators of invadopodia—MIR-1, which is key to the initiation of invadopodia, and MIR-2, which maintains invadopodia—that the company is targeting with lipid nanoparticles carrying chemically modified small interfering RNA (siRNA).

Antapodia was founded by Patrick Yang—formerly Executive Vice President (EVP) and Global Head of Roche, EVP of Technical Operations at Genentech, and Vice President of Merck and JUNO Therapeutics—and Kelvin Tsai, a Harvard-trained Ph.D. and oncologist who co-discovered MIR-1 and MIR-2. Yang and Tsai are joined by a scientific advisory board with deep expertise in cancer metastasis, invadopodia and nanotherapy, including Robert Kerbel (University of Toronto), Kevin Struhl (Harvard Medical School), Yuval Shaked (Israel Institute of Technology), Avi Shroeder (Israel Institute of Technology) and Hon Leong (University of Toronto).

Antapodia has developed two candidate lipid nanoparticle siRNAs (LNP-siRNAs): AP-01, a first-in-class invadopodia-targeting therapy directed against MIR-1, a cancer-specific protein isoform, and AP-02, which similarly targets MIR-2, which mediates invadopodia signaling. In animal models of triple-negative breast cancer, non-small-cell lung cancer, liver cancer and pancreatic cancer, AP-01 both shrinks primary tumors and dramatically reduces metastasis (by up to more than 90%), and reduces mortality (by up to more than 80%). AP-01 has also been shown to synergize with the targeted agent sorafenib to achieve near complete remission—an effect also seen with high doses of AP-01 alone in liver cancer—without adverse toxicity.

Comparable results have also been found for AP-02, which targets MIR-2. AP-01 is approaching the Investigational New Drug Application-enabling stage, and Antapodia is keen to speak with potential investors and pharmaceutical companies who would like to hear more about joining Antapodia in its mission to bring these novel therapies into clinical trials within the next few years.

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