Bionaut™: A breakthrough robotic microdevice to treat non-communicating hydrocephalus in both adult and pediatric patients

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Bionaut Labs, LLC is developing a minimally invasive robotic microdevice designed to treat non-communicating hydrocephalus in both adult and pediatric patients. The device utilizes biocompatible microsurgical particles (Bionaut™) specifically designed to safely and reliably perform accurate fenestration(s) in the 3rd ventricle, *aqueduct* of *Sylvius*, and/or trapped intraventricular cysts of the brain in order to re-establish normal CSF flow and thereby balance intra/intercompartmental pressure The Bionaut™ is navigated to the target *via* CSF or brain tissue in a minimally invasive fashion with precise control using real time imaging. Upon reaching the pre-defined anatomical target, the external driver allows for directing the specific microsurgical action. Notable features of the proposed protocol are: i) Bionaut™ access to the intraventricular target follows a clinically validated endoscopy trajectory which may not be feasible via 'traditional' rigid endoscopy: ii) the treatment is microsurgical, there are no foreign materials left behind post procedure; iii) Bionaut™ is an untethered device navigated through the subarachnoid and intraventricular compartments of the brain, following pre-designated *non-linear trajectories* as determined by the safest anatomical path; iv) Overall protocol involves minimally invasive delivery and post operational retrieval of the surgical Bionaut™. The approach is expected to be suitable to treat pediatric patients 0-12 months old as well as adult patients with obstructive hydrocephalus who fail traditional shunts or are eligible for endoscopy. Current progress including platform optimization, Bionaut™ control, imaging and *in vivo* safety studies of the Bionauts™ in large animals, specifically the spine and the brain of ovine models will be discussed.

Biography

Alex Kiselyov is an accomplished Biotech R&D expert, with over 20 years of Pharma/Biotech and Foundation experience in drug discovery and preclinical development. He completed his Doctorate in Chemistry at Georgia State University in Atlanta followed by postgraduate studies at the Ben May Institute for Cancer Research (University of Chicago) and Columbia University (New York). He has directly contributed to over 10 clinical programs across multiple therapeutic areas including oncology, CV, dementias and cognitive disorders. He held senior R&D positions with Amgen, CHDI Foundation , ImClone/Lilly, deCODE, ChemDiv and Genea Biocells.