STARTUP CITY
BIOTECH STARTUPS EDITION OCTOBER - 21, 2019 STARTUPCITY.COM

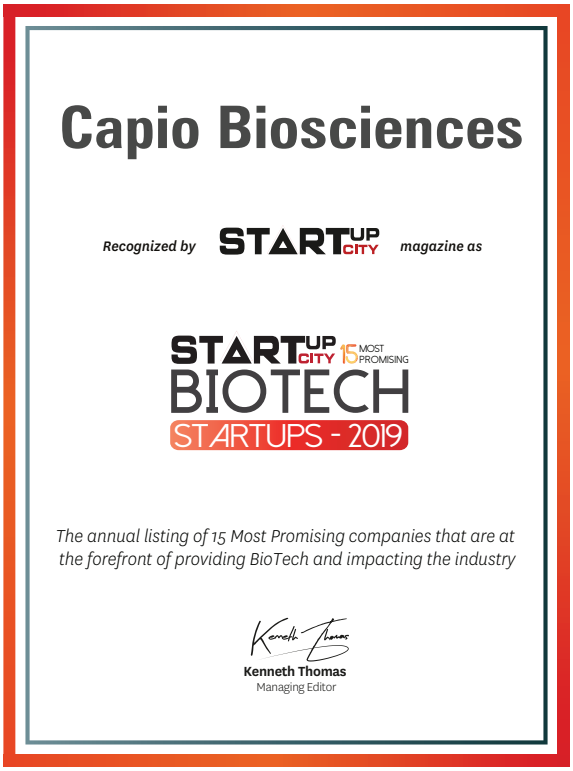
15 MOST PROMISING BIOTECH STARTUPS - 2019

At a time when the news about lab-grown organs or designer babies is no more an awe factor, we must admit that the biotech industry has moved much ahead, creating an opportunity for startups to launch themselves in this competitive and ever-evolving market. With the startups specializing in developing cancer immunotherapy, digital therapeutics, cell and gene therapy, and more, the biotech industry is piquing the interest of the venture capital firms.

Amid this evolving market scenario, we are glad to feature New Jersey-based Anima Biotech that is pioneering the discovery of small molecule drugs with its Translation Control Therapeutics platform. On the other hand, we have also featured Wisconsin-based Capio Biosciences, a biotechnology startup focused on developing biopsy-free and cost-effective diagnostic tests for cancer surveillance, monitoring, and diagnosis. While significant challenges in manufacturing and analytical technologies persist in the cell and gene therapy market space, an Ireland-based BioTech startup Avectas is addressing those by developing unique technology for ex vivo delivery of advanced molecules such as mRNA, proteins, and gene editing payloads for cell engineering applications. We also bring to you the story of San Francisco-based Synthego—a startup on a mission to broaden the access of CRISPR, to accelerate the basic scientific discovery of cures and develop novel synthetic biological applications. The list also includes innovative biotech companies like inRegen, which is developing advanced cellular therapies for treating CKD.

We hope this issue of StartUp City provides you with a bigger picture of the evolving biotech industry so that you can build the partnership you and your organization need for leveraging these advancements to enhance your business.

We present to you StartUp City's "15 Most Promising BioTech Startups - 2019".



COMPANY:
Capio Biosciences

KEY PERSON:
Seungpyo Hong
Co-Founder &
President
Andrew Wang
Co-Founder & CEO
Steve Miller
CBO

DESCRIPTION:
Capio Biosciences is a biotech start-up focused on delivering high-value oncology diagnostics to aid patient care decisions and improve outcomes

WEBSITE:
capiobiosciences.com

Capio Biosciences

Improving Cancer Management through Liquid Biopsies


Seungpyo Hong

When a patient is diagnosed with cancer they may face a challenging journey depending on the type and stage of the cancer they have. They are often required to have numerous follow-up tests, including invasive biopsies so that doctors can select the right treatment options. Once treatment has started, it can be even more challenging for doctors to effectively monitor treatment efficacy and to make adjustments. Today, patients often require multiple radiology visits (CT-Scan, MRI, PET-Scan, etc.) as well as invasive repeat biopsies.

While working at the MIT Langer lab, Seungpyo Hong PhD and Andrew Wang MD came up with the idea of finding new and effective biomarkers to mitigate the physical trauma and complications associated with conventional biopsies and radiology visits. Hong and Wang strongly believed that CTCs could represent a powerful biomarker to aid physicians with patient management decisions. Their ideations, followed by 10 years of academic collaborations, led to the establishment of Capio Biosciences: a biotechnology startup that focuses on creating biopsy-free and cost-effective diagnostic tests for cancer surveillance, monitoring, and potentially, diagnosis. Hong expresses that "we only wish to simplify oncology diagnostics." It was this very desire that affixed the cornerstone of Capio Biosciences in 2015. Since then, Hong and his team have been studying how to more effectively capture CTCs from patient blood samples for enumeration and downstream analysis. In order to achieve this goal, the team looked at how to re-create the conditions in the blood stream whereby CTCs actually "slow down" by "rolling" along blood vessel walls, which directly led to the development of "biomimetic" capture technologies.

"However, while making strong headway in understanding the behavior of CTCs in blood, the challenge we started to face revolved around how to capture CTCs once they transition from one phenotype to another," explains Hong. To overcome this obstacle, the company is currently developing their flagship product, CapioCyte™: a platform where blood samples are first centrifuged to isolate the buffey coat (white cells and CTCs). The sample is then passed through its in-house engineered flow chamber system where the sample travels across the surface of Capio Biosciences' proprietary chips. The surfaces of these chips are engineered to induce biomimetic cell rolling, which enhances the capture efficiency of CTCs. "The aim is to detect CTCs with the utmost sensitivity and specificity in a clinically-significant manner," adds Hong. With CapioCyte™, the company seeks to increase the sensitivity and specificity of CTC detection as well as to establish CTCs as a powerful biomarker. Additionally, results can be obtained much more quickly by utilizing CapioCyte™ than with conventional biopsy, and may also reduce unnecessary radiology vists. In his laboratory at the University of Wisconsin-Madison, Hong and his team utilized CapioCyte™ technology to mimic how CTCs roll in the blood stream. This led directly to the creation of nanoparticle mediated multivalent cell capture techniques. "This research helped us increase the capture efficiency of CTCs obtained from the blood by using nanoparticles conjugated with antibodies that specifically target CTCs," says Hong.

With an eye toward future commercialization, Capio Biosciences hopes to deliver significantly improved capture efficiency, while enhancing various down-stream analysis like the identification of specific genes or mutations. To further strengthen their proof of concept, Capio Biosciences has been conducting a series of clinical research studies that have shown highly promising data. With over 300 patients participating in the company's clinical research studies,

Capio Biosciences has been successful in collecting over 1000 clinical data points with CapioCyte™. One notable data point is that Capio Biosciences were able to detect CTCs in 100 percent of 49 head and neck cancer patients. “We also published our first clinical paper in a premier cancer journal called Clinical Cancer Research.” adds Hong.

With the help of these test results, physicians can identify what treatments—radiation therapy, chemotherapy, immunotherapy, and others—reflect the best healthcare outcomes by understanding the CTC count via CapioCyte™, as well as downstream molecular analysis. The company, fueled by the promise of offering better cancer patient care with its technology, intends to drive innovation in the liquid biopsy landscape for the years to come. Looking ahead, Hong seeks to delve deeper into the possibilities of leveraging CTCs, along with other blood-circulating biomarkers, such as exosomes and circulating free DNA (cfDNA), as predictive biomarkers to further improve patient treatment and outcomes.

> **“Hong and his team have been studying various biomimetic technologies for the capture of CTCs in a patient's blood sample and to potentially augment outcomes via simple blood tests”**