

RefleXion Medical Company and Technology Background

[RefleXion Medical](#) is a privately-held bio-targeting oncology company headquartered in Hayward, California. The company was founded in 2009 by Sam Mazin, Ph.D., and Akshay Nanduri to create a new cancer treatment modality through biological guidance.

The two founders first met in high school in Toronto and maintained contact through college and graduate school. In 2008, Mazin contacted Nanduri with an idea he had about a new approach to seeing and treating cancerous tumors at the same time. The two developed a business plan and submitted it to the Massachusetts Institute of Technology (MIT) business plan competition. Although Mazin and Nanduri didn't win the competition, they were semi-finalists and the work led to the co-founding of RefleXion Medical and a new way to use the established gold standard for cancer diagnostic imaging as a means to deliver cancer treatment to patients.

Specifically, RefleXion is developing a biology-guided radiotherapy (BgRT)* platform that is the first to utilize the unique biology of the cancer itself to guide radiotherapy delivery, even in tumors that are moving. It incorporates a well-established modality for cancer staging and imaging, positron-emission tomography (PET), in a novel way to zap tumors. RefleXion's technology uses the anatomic data from computed tomography (CT) and functional imaging data from PET to guide personalized radiotherapy.

RefleXion's approach offers a significant change in strategy from single tumor therapy to the ability to treat multiple targets in the same treatment session in cancers that have metastasized. This is a difficult target for conventional radiotherapy because of the logistical patient treatment setup barriers and the amount of radiation that would be delivered to healthy cells. RefleXion's platform enables a leap forward in the ongoing goal of conventional radiotherapy to manage motion, reduce tumor margins and diminish radiation toxicity, making it feasible to treat multiple tumors in the same session. The RefleXion system also improves upon the delivery of conventional radiotherapy for single-site cancers.

Novel use of PET

PET makes use of a small amount of a radioactive drug, called a tracer, to highlight the differences between healthy cells and cancer cells. The most commonly used tracer is FDG, a glucose-based compound, which BgRT uses to determine where the tumor is located. Cancer cells rapidly consume the FDG, which breaks down and instantly produces emissions, thereby signaling their location. Real-time response to these detected emissions is the fundamental principle of the BgRT and the RefleXion platform.

Combining PET and Radiotherapy

RefleXion combines PET imaging with stereotactic radiotherapy for superior localization and tracking at the time of treatment delivery. Tumors will continuously signal their location and activity levels during treatment.

Current radiotherapy systems require a margin of healthy tissue around the tumor to account for positional uncertainties such as involuntary patient movements and breathing. In many cases, this extra margin results in a significant amount of additional radiation delivered to the patient's healthy tissue. If too much healthy tissue receives radiation and the patient nears threshold

toxicity levels, less therapeutic radiation is available to ensure efficacy of treatment or to treat additional tumors. By using the tumor's own emissions to guide radiation delivery, treatment margins and the subsequent radiation dose to healthy tissue may be significantly reduced.

Traditionally PET is used to form a complete image that takes up to an hour, during which time the tumor can change location. However, as the FDG is consumed, the emissions generated are instantly available and reveal the cancer's location. The RefleXion platform senses the emissions and rapidly responds by sending a beamlet of radiation down the emissions' pathways toward the originating tumor.

RefleXion's approach represents a significant advance for patients by leveraging a proven modality for visualizing cancer with one of the most effective ways to treat cancer, thereby fundamentally altering the treatment model for cancer care.

Funding, Investors and the Team

RefleXion raised over \$100M in its Series C round of funding and is backed by premier investment firms TPG Growth/The Rise Fund, China-focused healthcare investment firm GT Healthcare Capital Partners, KCK Group, Sofinnova Partners, T. Rowe Price Associates, Inc., Venrock, Pfizer Venture Investments, and Johnson & Johnson Innovation, JJDC Inc. The company has also received grant funding from the National Cancer Institute (NCI) Small Business Innovation Research (SBIR) Program.

Since the company's founding in 2009, Mazin and Nanduri have assembled an impressive internal team and advisory boards made up of KOLs and renowned industry veterans. Todd Powell assumed the roles of president and CEO in 2017 after a successful leadership tenure with Elekta, one of the industry's largest manufacturer of radiotherapy systems. In 2018, Martyn Webster joined the team as CFO bringing specific expertise in medical device startups and fundraising.

The RefleXion System requires 510(k) clearance and is not yet commercially available in the United States.

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