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By Alissa Poh

Subsidized science

Baltimore-based company Champions Biotechnology has a business tale to tell, one reminiscent of Robin Hood. But there's no robbing of the rich in this story. Rather, Champions uses revenue from premium services offered to wealthy clients to subsidize risky—and hard-to-fund—research.

The subsidized science, a twist on standard xenografts, is based on an old concept dating back to the 1970s. Instead of permanent cancer cell lines, scientists transfer fragments of primary tumor tissue directly into mice, creating what David Sidransky, Champions' chairman and director of head and neck cancer research at Johns Hopkins, calls "tumorgrafts."

Tumorgrafts are tedious work and expensive; human tumors need to be freshly implanted and often don't grow in mice. Funds for clinical trials involving tumorgrafts haven't been easy to come by either, due to skepticism that such predictive assays will actually work.

This company uses revenue from premium services offered to the wealthy to fund risky R&D.

Sidransky prefers this model of human cancer, however, because cancer cells grown on plastic adapt to their artificial environment by acquiring genetic changes; soon enough, they're nothing like the original tumor. In contrast, tumorgrafts maintain nearly all of the original cancer's genetic features. "It's not about convenience; it's about relevance," he says. "This allows predictability [of tumor sensitivity or resistance to drugs] not seen in other models."

Champions spent $1.7 million on R&D in fiscal year 2009, and it gathers those funds through a unique business approach: Research is funded with revenue from

premium oncology services, offered to a select clientele. The company creates "personalized tumorgrafts" for cancer-stricken individuals, each to the tune of $100,000; mice carrying a client's unique tumor then get slammed with a cocktail of drugs and characterized through both molecular profiling and computer modeling. It's called "theranostics"—diagnostic, tailored therapy for individual patients. "We get an incredible amount of information from these models; they're hit with up to 60 drug combinations, including experimental and Phase II candidates," says Sidransky. "So while helping themselves, [our wealthy clients] also fund R&D for everyone else."

By R&D, Sidransky is referring to Champions' separate bank of anonymous tumorgrafts, or mice carrying tumors—grafted from spare tissue acquired through collaborations with academic institutions. Champions scientists study these animals, looking for biomarkers to better understand cancer in general. In addition, the bank is used to screen "failed" drug candidates from other pharmaceutical companies, many of which Sidransky suspects might work in combination therapies, an avenue Big Pharma has shied away from due to regulatory concerns. (He declined to reveal any of the preliminary results from this research.)

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To date, Champions has successfully implanted tumors from 15 patients in mice, and completed drug studies on seven. Six of the seven, having already failed standard chemotherapy regimens, nonetheless responded—for time periods ranging from 9 months to over 3 years (three are still living)—to drug combinations their tumorgrafts predicted would be effective. (The company has not compared this data to matched controls, but the historical response rate to any drugs in patients who have failed conventional therapies is 5 percent or less.)

Peter Houghton, director of the Children's Cancer Center in Columbus, Ohio, considers tumorgraft models "very good for identifying active drugs." Houghton is openly skeptical, however, about applying this technology to individuals. He questions the feasibility of doing it in real time, since it takes between 6 and 8 months to grow tumorgrafts, longer than the remaining lifespan of some terminal patients. "This assay is much too tenuous; not up to speed for making strategic decisions on people's therapy," he says. Sidransky, too, admits that this is a potential weakness of the whole strategy, as it "takes a lot of time and investment; it's really not a quick turnaround type of technology." But over time, as more data come in to validate the approach, he hopes skeptics will see that patients treated based on tumorgraft predictions do better than those treated according to their physician's best judgment. "Then it'll no longer be an issue of 'maybe,' but 'my God, if I don't do this I'm out of the game,'" he predicts.

In the meantime, the company is getting kudos for its unique business model. “I don’t think [using premium services to fund R&D] is done in practice today, though I like the idea,” says Stuart Barich, Oppenheimer’s managing director.