“To control how cancer grows” says Colin Sanctuary, “you must be able to control the microenvironment of the cancer.”

Sanctuary is the founder and chief executive of QGel, a Swiss biotech company that uses Agilent technology to create microenvironments tailored to the needs of researchers. Want to study brain cancer? Bone cancer? Stomach cancer? Skin cancer? QGel will create the environment you need to grow the cancer as closely as possible to how it would in a person’s brain, bones, stomach, or skin.

QGel’s customers, which include some of the world’s largest pharmaceutical companies, then use its custom-made assays to test potential treatments.

“What we’ve developed, thanks to Agilent precision, is a broad, miniaturized, cost-effective way of growing cells in a physiologically relevant manner,” Sanctuary says.

Pharma companies know that the cost of clinical studies can run into the billions—and four out of five clinical studies end in failure.

“Our mission is to improve R&D productivity in the pharmaceutical industry, so that innovative medicines make it to market faster and at less cost,” Sanctuary says. “We’re able to help our customers reduce the failure rate because we offer better screening in the early stages of drug discovery. So, not only will we be helping to accelerate the process of getting treatments to patients suffering from disease, we’ll also be saving the industry billions of dollars.”

How it works

“Every cell in the body will grow, but only if it’s in the right environment. We can adjust the stiffness of the environment to induce the formation of bone, brain, or gut tissue. But it’s not only about stiffness. It’s also about all the biomolecules we need to put in. For example, we can make a skin-favoring mixture—proteins, growth factors, and so on—so that skin will grow properly in that environment. Likewise you can take skin cancer, put it in that microenvironment, and it will grow and express key physiological features similar to an animal or a human,” Sanctuary explains.
“Why is this useful? Using Agilent’s Bravo robots, we can dispense thousands of different mixtures into assay plates and create thousands of different types of tumors that behave in a way that is meaningful to predict the outcome of a clinical study.”

**The best part**

“Growing cells in vitro is relatively easy. You can grow them on 2-D plates, clump them or force them into 3-D structures, and a number of other ways. But no other in vitro technology can induce specific targets or physiological disease features the way we can, because we take into account the microenvironment. With QGel, our customers are empowered to study mechanisms of action like never before, which truly revolutionizes how they approach drug discovery. That’s our unique selling point,” Sanctuary says.

“Think of cancer as an organ that has mutated within the body. It sends signals out to its environment, saying, ‘Hey, I need blood vessels.’ The body is tricked and feeds the cancer. But what happens if we’re able to block that signal from being sent? The cancer will starve.”

The trick is being able to see when you’ve blocked the signal.

“As you grow the cancer, you need to add biomolecules to its microenvironment that will, to use a simple analogy, turn on a light. When the light comes on, it means that the cancer cell is sending a message, saying, for example, ‘Give me blood vessels.’ If the goal of the drug is to block that message, you have to be able to see it happen. Most technologies that grow cells just grow cells. They don’t turn on that light and let you see whether your drug or pipeline compound turns it off,” Sanctuary says.

“What we do with customers is, we grow the cells and we guarantee that the light is going to be turned on so they can test thousands of library compounds to see which actually turn off the light. You can imagine what that looks like on the heat map from the Agilent robots. You have a 384-well plate, times a thousand, and you have black dots and green dots. That gives you an indication of whether your drug is working or not.”

**Why Agilent?**

Sanctuary notes that QGel chose Agilent’s Bravo Liquid Handling Platform for its precision, compact design, and flexible features such as the system’s interchangeable heads.

Because of its compact design, the Bravo can be placed in a standard safety cabinet without disturbing air flow. This guarantees sterility for the assay and safety for the user. The Bravo also provides deep and flexible control of pipetting parameters, which enables good pipetting or multi-dispensing for any liquid, including viscous sauce.

“Agilent’s engineers were a big help to us in validating our protocols, so there was a service element to our decision as well,” he says. “To this day, the engineers from Agilent have been extremely supportive in helping us develop stuff.”