AGILENT CASE STUDY

BUILDING BETTER UNDERSTANDING
AGILENT BRAVO PLATFORM BOLSTERS BASIC AND TRANSLATIONAL RESEARCH

Dave Weaver, Ph.D.

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Dave Weaver does the kind of research you might see at a pharmaceutical company or a biotech firm, but he does it at a highly regarded American university.

"We screen large libraries of small molecules against molecular targets, but instead of using those compounds as part of a drug-discovery mission, most of our work focuses on the discovery of molecular probes and understanding the properties of those compounds with respect to their molecular targets," Dr. Weaver says. **"We try to decipher how small molecules work when they engage a target, and how small-molecule-based modulation of that target affects signaling systems."**

His own research centers on membrane-delimited signal transduction, looking primarily at ion channels and G-protein coupled receptors.

"Lump them together and they represent probably 40 percent of the pharmaceuticals being marketed today," Weaver says.

His work involves both basic and early translational research, that is taking something he has learned from the natural world, and translating it into something that might make life better.

In the Fullness of Time

Weaver notes that, over the past decade, the university has licensed half a dozen compounds to commercial partners for further development. In the end, however, few compounds live up to their early promise.

"When it comes to taking a new molecular target and treating an unmet medical need, we're simply not very good at that," he says. "Nobody is. Part of that is because we don't have a good enough understanding of human physiology, so that's what we're trying to do in basic research: build a better understanding so hopefully in the fullness of time we can make better decisions."

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The good news is that Weaver and other scientists are able to quickly and efficiently test more compounds than ever, thanks to innovative solutions such as the Agilent Bravo Automated Liquid Handling Platform.

Orders of Magnitude Faster

"Twenty years ago, we could only test a few samples, and that limited the universe of questions we could ask. Now we're able to test hundreds and even thousands of times more compounds than we could before. So, from the standpoint of making advances in basic and early translational research, we don't have to be as limited in the kinds of questions we can ask," he says.

"Many times, if I'm dealing with a new ion channel, something that no one has ever worked with before, I don't have an a priori notion of what the compound that can turn this channel on or off is going to look like. If I don't know what it looks like, how am I going to pick it out of a catalog of a million compounds?"

The answer: test them all.

"The way you can get away with that is having platforms like the Bravo that allow you to transfer, in our case, 384 compounds from one container into another, which then allows us to test 384 compounds at the same time," Weaver says.

"The nice thing about the Bravo is it can pick up all 384 tips at the same time, or a column of tips, a row of tips, or even a single tip. That lets me do things like serial dilutions, because I might want to ask questions about the relationship between the concentration of the compound and the change in activity that I see on my ion channel. By doing it in parallel instead of one dilution at a time, I can do 16 or 24 dilutions at the same time, thereby increasing the speed of the whole process."

"Moving small amounts of liquid from one container into another container may sound mundane, but if we didn't have something to do that quickly and effectively and accurately, the process we use to test tens of thousands of compounds per day would be decreased by one or two orders of magnitude."

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