Agilent Case Study: Empowering Researchers

Asking the Right Questions

Agilent Helps Researchers Uncover Key Metabolic Markers

The science of metabolomics can provide critical insights into diabetes, heart disease, and other life-threatening conditions. Indeed, metabolomics has become a hot topic now that scientists have realized that genomics cannot, by itself, provide the solutions they once hoped for.

Just ask Dr. Coral Barbas, the founder and director of the Center for Metabolomics and Bioanalysis in Madrid. Researchers from throughout Spain bring samples to her Agilent-equipped laboratory for metabolic profiling.

Metabolites, like genes and proteins, are critical components of the complex system known as human biology, and they can give us important clues about disease states and potential treatments. In fact, Barbas and her team recently discovered metabolic markers that may change the way we treat atherosclerosis.

To get those kinds of results, however, it's important to start with the right questions.

Barbas and her team do untargeted assays—experiments without a hypothesis—but untargeted doesn't mean unfocused.

"Sometimes people think because we are working without a prior hypothesis we can just analyze samples and results come," she says. "But you need to have a proper question that you want to answer."

Coral Barbas, Ph.D.

Professor of Analytical Chemistry and Vice-Chancellor for Research, Universidad CEU-San Pablo, Madrid
Founder and Director of the Center for Metabolomics and Bioanalysis

Agilent
Trusted Answers

Scientists may bring samples of plasma, for example, from subjects who have asthma and from others who don't.

"They may want to do metabolomics because it is in fashion, but what do they want to find out?" Barbas asks. "There is already a clear way to diagnose asthma, so what is the question you want to answer? Do you want to stratify the subjects according to the degree of the disease? Do you want to stratify according to the response to a treatment?"

That well-defined question determines everything that follows.

"For example, it's very important that the groups you are going to compare are matched in all situations in regard to the question you want to answer," Barbas explains. "If one group is composed of elderly people and the other is composed of young people you will find markers of their age and not of the disease."

"There are a lot of challenges in every step of the workflow, and Agilent is able to help in many, many ways," Barbas says. "We have really good tools with really good sensitivity and accuracy. They are very reliable, too, which is also very important. Then the software for data analysis is one of the strongest points for Agilent. We are using MassHunter Workstation and Mass Profiler Professional. We are very happy with the behavior of these platforms and the findings."

Those findings are having an impact, too.

Take the relationship between diabetes and cardiovascular disease, for example. The connection is well known.

What has not been previously proved, however, is the center's discovery that, even without diabetes, people with atherosclerosis have some kind of underlying insulin resistance.

"Medical groups were very interested," Barbas says, "and our results are being validated in a larger study."

If confirmed, the center's discovery will mean that the treatment of atherosclerosis may be combined with treatment for insulin resistance for better results.

"Once you have the right question and the right samples, you'll need the right equipment, and the Center for Metabolomics and Bioanalysis has it: A diverse suite of instruments from Agilent, including LC/MS, GC/MS, and CE/MS systems."

Coral Barbas, Ph.D.

To learn more about how Agilent is striving to meet the complex needs of scientists and researchers around the world, visit **www.agilent.com/en/academia**

Published in the USA, April 30, 2019
5991-4117EN

Agilent
Trusted Answers