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Melanie Watson, Ph.D.: How a Mother's Love Inspires an Innovative Medical Solution

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Dr. Melanie Watson and her daughter, Claire Juliette Watson-Ray

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by Megan Ward, Biochemistry Sophomore

How far would you drive for blood tests? Five minutes? Fifteen minutes? How about four hours?

During her second trimester, Melanie Watson, Ph.D., found out that her daughter had Trisomy 18, also known as Edward's syndrome. Three copies of the eighteenth chromosome cause this genetic condition and many health complications, including heart problems. Most babies with Trisomy 18 do not live to see their first birthdays. However, Claire Juliette Watson-Ray inherited her mother's fighting spirit. Claire just saw her sixth set of birthday candles.

Unrelated to her genetic condition, Claire was diagnosed with hepatoblastoma, a type of liver cancer, at the age of 14 months. At the time, her mother, Dr. Melanie Watson, worked as an assistant professor of biomedical engineering at LeTourneau University in Longview, Texas. Once a week, Dr. Watson drove four hours from Longview to Houston for Claire's chemotherapy treatments and sometimes just for blood tests.

Standing in a crowded elevator with people cooing over her immunosuppressed baby, Dr. Watson thought there had to be something she could do. "I'm a biomedical engineer. I can do this," Watson said. There had to be a better way for chronic patients to get their blood tested.

Individuals with diabetes can use various glucose monitoring devices to determine their blood glucose levels in real time. Engineers have created devices that work with smartphones to test these glucose levels. However, the devices are not typically available to patients; they are available only to physicians. Additionally, these devices are costly. What stops engineers from creating a similar device to help chronically ill patients test their blood?

Nothing. Dr. Watson, a three-time graduate from Louisiana Tech University, works tirelessly to bring such a product to the market. Dr. Watson's desire to provide the best care possible for her daughter led her to create a device that works with smartphones to provide blood test results in real time.

Currently, she works as an associate professor of biomedical engineering at Trine University, in Angola, Indiana. Both the university and her students invest their resources into the product. Trine provides funding for Dr. Watson's project, and some of her students contribute their time, aiding in the research and development.

The device uses one drop of blood to provide results for simplified complete blood count, blood urea nitrogen (BUN)/ creatinine and potassium levels. A drop of blood is placed on a cartridge that slides into a smartphone case, and the cartridge then takes an image of the drop of blood. The cartridge works in tandem with an application on the smartphone. This application then uses an algorithm to process the images and provide blood test results within minutes.

This device is not meant to replace the need for a physician. Rather, Dr. Watson seeks to have these results sent to the patient's designated physician. Simply, she designed the device to "enhance the patient/ physician relationship." She hopes this device reduces the amount of in-person blood testing from every few days to every two weeks. This less frequent in-person blood testing decreases the patient's exposure to other illnesses and decreases costs.

Depending on partnership agreements, Dr. Watson's device could be out in less than three years, and she seeks to make her product available to everyone.

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