



## **This Little Sample . . . or How Repository Samples Help Accelerate Research**

In November, 2007, a 23-year old woman who was diagnosed with MS went to an appointment at her neurologist's clinic. After seeing the doctor she left, but not before making an important contribution to research. In ways that she probably did not foresee at the time, the contribution this woman –known to us as Patient 220 –made would enable scientists across the globe to advance the understanding and treatment of MS in ways that are still unfolding today.

Patient 220 is one of several thousand people with MS who have contributed to science through their participation in the Biorepository created and managed by Accelerated Cure Project (ACP). Formally launched in 2006, the Repository is a rare source of high-quality materials for the MS research community. Because of it, scientists from different disciplines (genetics, virologists, etc.) are able to analyze the same samples and then combine their data to gain a deeper understanding of the causes and mechanisms of the disease.

To build the Repository and enroll study participants, ACP partnered with a network of leading neurology centers around the country. Maybe you donated to the Repository, or maybe you know someone who else who did. Perhaps you've wondered whatever happened with your samples and data. We think you'll be gratified to learn that they have enabled close to 100 studies, and the data that these studies have returned to ACP has been available for the benefit of all researchers.

As with Patient 220, whenever a Repository participant donated blood samples at their local MS clinic or collection site, these samples were processed into useful components for research, such as plasma, serum and white blood cells. Some of the white blood cells were further separated into DNA (genetic material inherited from our parents) and RNA, molecules created from



DNA whenever the cell needs to produce new proteins, such as immune proteins needed to fight an infection. These samples are made available to scientists, via a formal sample request process in which a project proposal is evaluated by internal and external reviewers. Following approval, specific samples are selected based on a detailed discussion of the scientist's requirements and objectives and shipped to the scientist's lab, in America or somewhere else around the globe.

To illustrate the impact that can be made by a single blood donation, we decided to trace the path of Patient 220's samples. Hers is an excellent example of how valuable these samples are to investigators; material derived from her blood has been used in multiple studies, and the data generated by the studies has been returned to ACP. In each of the studies, her samples were analyzed alongside samples from other Repository participants, and the extensive clinical and epidemiological data that they each provided helped the study investigators better understand the significance of their results.

Here are just a few of the studies performed on Patient 220's sample:

- A genome-wide study of DNA by Dr. Philip De Jager at Brigham and Women's Hospital in Boston in conjunction with the International MS Genetics Consortium. The purpose of this study was to analyze gene variations in thousands of people with MS and healthy individuals to determine correlations between specific variants and MS.
- A second, more targeted, DNA study that focused on the genetics of vitamin D metabolism was performed by Dr. Alberto Ascherio's team at the Harvard School of Public Health. This study is significant because vitamin D insufficiency may play a role in MS susceptibility.
- A third study that used Patient 220's DNA, was performed by Dr. Michael Demetriou's group at the University of California, Irvine. This study probed the association with MS of certain genes that are involved in modifying proteins by adding sugar molecules, a process called glycosylation.
- A research project using Patient 220's serum was conducted by Dr. Gilles Guillemin (University of New South Wales, Australia) and examined the differences in the metabolism of tryptophan, an amino acid, for a potential role in MS.
- Another study by scientists at a company called Glycominds, in Israel, used Patient 220's serum to develop and commercialize an MS diagnostic test based on antibodies in the blood.
- A study by Dr. Thomas Aune at Vanderbilt University using Patient 220's RNA, aimed to identify changes in gene expression that correlate with the stages and subtypes of MS (such as relapsing remitting or progressive forms of MS). Its eventual objective was to develop a diagnostic/prognostic test to monitor and predict the course of the disease.

These studies are a sampling of the many that have produced valuable data and new knowledge from the ACP repository samples. Subsequently much of the returned research data and the patient's clinical information has been accessed and analyzed further by other scientists, often in conjunction with additional experiments on patient samples. In one current example, an investigator is using the genetic information provided by Dr. De Jager's work (described above) to help him in the selection of patient samples that will allow further insight into the possible effect of smoking on MS.

The data generated by research on the ACP repository samples has yielded at least 27 scientific publications and conference abstracts and has provided valuable information used in the development of diagnostic tests and the identification of drug targets. If you have contributed samples and data to the Repository, your donation has helped to make all this possible. Meanwhile, ACP continues working to identify additional uses for the Repository resources.

While ACP is not currently accepting new samples into the Repository, we look forward to expanding our inventory of samples and associated data with the planned OPT-UP clinical study and we have just begun to pilot the collection of samples within the iConquerMS™ patient-powered research network. The OPT-UP study will acquire "longitudinal" samples, where a series of samples will be collected from patients, along with detailed clinical data, over several years. We hope that it will also be possible to collect longitudinal samples from the iConquerMS™ network participants. Collecting longitudinal samples and associated data is a powerful approach that will allow investigators to monitor biochemical changes in patients that can be correlated with response to drug therapy and progression of disease. In the meantime, if you have questions about ACP's Repository or if you are a researcher in need of samples or data, feel free to contact David Gwynne, at (978) 219-4117 or [dgwynne@acceleratedcure.org](mailto:dgwynne@acceleratedcure.org).