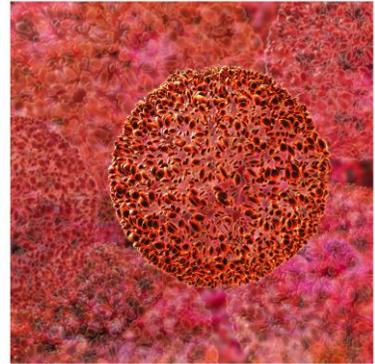


Whatever Happened to that Blood I Donated . . . or How the ACP Repository Was Built

By Katina Leodas

About a month ago, we had lunch with a man we were recruiting to join the ACP Board. He mentioned that soon after he was diagnosed with MS in 2006, he donated blood to the ACP Repository. He asked how his blood donation was “converted” into usable biosamples and how many samples were created from the multiple tubes of blood he gave that day. The answer, provided by our CEO Robert McBurney, was detailed and interesting (particularly to those of us not familiar with research laboratory procedures) so we decided to capture the conversation and share it with you.



In telling the story of how the Repository was built, Robert highlighted the important role played by the Study Coordinators, a group of skilled professionals employed in the clinics where samples were collected. This information led us to Jan Weaver, Study Coordinator at UMass Medical Center in Worcester, Massachusetts, a “soldier” on the front lines during those exciting years of building the Repository. We have woven our separate conversation with Jan into this account as well.

Leodas: When and how was the Repository created?

McBurney: In 2006, after running an initial 6-month pilot, ACP sought and received IRB approval¹ and contracted with 10 leading MS clinics around the United States to gather blood samples from people with MS. Key to the success of this effort was ACP’s decision to fund a Study Coordinator – a paid professional -- at each site, whose role was to spread the word about the opportunity to participate in MS research and to recruit people to donate blood and assist them in filling out a lengthy questionnaire. The answers to the questionnaires constituted an enormous trove of data that, like the biosamples, is still being used today. For example, at UMass Medical Center in Worcester, Massachusetts, Jan Weaver worked with the clinic’s doctors to enroll over 700 people as Repository participants!

Leodas: How did the enrollment process actually work?

¹ An institutional review board (IRB) is a type of committee used in research in the United States that has been formally designated to approve, monitor, and review biomedical and behavioral research involving humans. The purpose of the IRB is to assure that appropriate steps are taken to protect the rights and welfare of humans participating as subjects in a research study.

McBurney: When a person with MS came into the clinic to see their neurologist, either the doctor or the Study Coordinator told them about the opportunity to participate in the creation of a Repository.

Jan Weaver: I am a scientist who started out working in laboratories and then developed an interest in clinical work because it combined my love of science with my interest in people. I had been employed as a Research Coordinator in the Neurology Department at UMass Medical Center for about a year when ACP approached us about working together to build a new Repository. I loved the idea and so set about making it as easy as possible for people to donate blood.

Each week I looked ahead in the schedule of appointments to see which patients were coming in to see their neurologists in 2 or 3 weeks. I then called those individuals, told them about the opportunity to participate and, if they were interested, I sent them the 38-page questionnaire. That way, they had plenty of time to complete it. Sending the document in advance dramatically increased the likelihood that patients arrived with the form completed and, in instances where they didn't, I sat down with them on the day of their visit and helped them finish it. In addition to the patient provided information, there is also a critical section of the Case Report that is filled out by the neurologist, so I would corral their doctor while the patient was in the clinic to ensure that the clinical information section was fully filled in. In this way, I ensured that the people who provided blood samples to the Repository also completed 100% of the questions on the Case Report Form.

Leodas: What motivated you to do the work in this way?

Weaver: Well, in the process of helping people with MS fill out these lengthy forms, I wound up making friends and learning a lot about them. I was humbled by the people I met at that clinic; inspired by their resilience, courage and great spirit. The work became much more than a job but rather a mission to help people with MS. I miss them!

McBurney: While the clinics were integrally involved in building the Repository, the resource that was created – a collection of samples and data that was unprecedented at the time – has been stewarded by ACP. By agreeing that the Repository would be managed by a centralized, independent entity (ACP), clinicians and participants ensured that the samples and data would remain open and accessible to anyone. In this way, the creators of the Repository provided for its contents to be broadly distributed. (In recognition of the enormous role they played in creating the resource, the 10 participating clinics were granted priority access to the samples and data for later MS research).

Leodas: Why did ACP choose to build a Repository, rather than selecting promising neuroscientists and investing in their work?

McBurney: The reasons go to the heart of ACP's understanding of MS. The organization's founder believed, as we still do today, that MS is a complex multi-factorial disease. It is not likely to be fully understood or cured by researchers in a single discipline. (For example, a geneticist working in isolation is not likely to cure MS.) Instead, ACP believes the greatest value is created by encouraging researchers from different institutions, different disciplines, and with different disease foci, to work together towards better treatments and a cure. In the 10 years since building the Repository, ACP fostered dozens of *virtual* collaborations among scientists and researchers around the globe, whose individual use of our samples and data overlap with one another.

Leodas: So what happened to the blood and data once they were collected at the clinics?

McBurney: Typically, researchers need a number of "products" derived from blood, including plasma, white blood cells, which are the cells of the immune system, DNA, RNA and serum. Different processes yield different blood products. Blood plasma is the pale yellow liquid component of blood that normally holds the blood cells in suspension and makes up about 55% of the body's total blood volume. It is prepared by spinning a tube of fresh blood containing an anticoagulant in a centrifuge until the blood cells are forced to the bottom of the tube. The plasma is then drawn off leaving a thin layer of white blood cells on top of the red blood cells. The white blood cells are carefully drawn off. In the laboratory, the white blood cell fraction is treated in different ways to extract DNA and RNA. Serum is prepared by causing blood to clot, and removing the clear pale yellow fluid that remains. It is similar to plasma but does not include certain components that are removed when is allowed to clot.

ACP contracted with Precision Bioservices, a Maryland-based company that houses a number of leading biobanks, to help collect, transport, prepare, organize, store and distribute the blood samples and the blood products that make up the ACP Repository. Blood is collected in different types of tubes depending upon the product to be harvested, for example, some tubes promote clotting, some *prevent* clotting and some preserve RNA. Precision Bioservices sent to the MS clinics kits that included the necessary tubes and packaging for safe transport of the samples. The tubes were then collected and sent overnight to Precision, where the various products were extracted from the samples.

Meanwhile, data gleaned from the Case Report Forms was entered into a database that is housed at Document Solutions Group, a leading provider of clinical data management services based in Malvern, Pennsylvania.

Leodas: Most donors gave about 67 milliliters of blood, or about 9 test tubes. How many actual samples are produced from that size donation?

McBurney: The blood and the products derived from the collected tubes is divided into much smaller portions, referred to as “aliquots.” Typically, a samples collected from an individual yielded 20 aliquots of serum; 4 aliquots of white blood cells; 3 aliquots of RNA; 10 aliquots of DNA; and 4 aliquots of plasma. So in all, somewhere around 40 different samples were created from each donation. More than 3,200 people with MS and related demyelinating diseases, and some healthy control subjects participated, and about 700 of them returned to provide new samples and update data at a second time point.

In all, approximately a quarter of a million usable samples were created. As we’ve reported in previous issues of this newsletter, they have been used in about 90 studies on MS conducted by scientists from different disciplines and institutions around the globe, thus far. Some of the scientists work in academia while others are employed by private companies, both large and small. They include small, scrappy biotech start-ups, established industry giants like Biogen and Pfizer, and top research institutions like Brigham and Women’s Hospital, the Broad Institute and Mayo Clinic.

Continue reading this issue to know how pioneering scientists learn about the ACP Repository and make use of this important resource.