Repository Spotlight – 2018 in review

Genetic research is revealing new ways for people to take action and prevent disease, as well as new ways to treat disease through personalized medicine. ACP Repository samples have played an instrumental role over the last year in studying the genetics of MS and other demyelinating diseases. In February, ACP entered into collaboration with the Regeneron Genetics Center to sequence the more than 3,200 DNA samples in the ACP Repository. This project will shed light on the inherited gene differences associated with MS. As is the case with all studies using ACP Repository samples, these valuable results will be returned to the ACP Repository database and made available for further research.

Genetic factors are known to influence the risk of developing MS. In the past year, ACP Repository samples were used to study a specific gene that is associated with MS in women. Interestingly, cells in the immune system with this gene are more sensitive to Metformin (a drug commonly used to treat type II Diabetes). This exciting research will shed light on a genetic risk factor for relapsing remitting MS in women, and provide a biomarker for possible treatment with Metformin for female MS patients who have this gene. In 2018, investigators have also used ACP Repository samples and data to study genetic variations and modifiable lifestyle factors (smoking, obesity, low vitamin D levels, exposure to Epstein Barr Virus) and how they relate to the onset of MS and disease progression.

As previously mentioned, researchers using Repository samples must return their research results back to ACP for inclusion in the Repository database and for sharing with other researchers. In 2018, as in the past, returned data sets have been a valued resource for MS research. Much can be learned about how one's genetics

contribute to the MS disease process by studying patterns of gene expression during disease. This year, researchers re-analyzed returned gene expression data and identified several interesting changes that correlate with disease severity. These same researchers also plan to look at patterns of gene expression and how they change during disease progression.

ACP Repository samples can also be used to study other demyelinating diseases. Researchers have analyzed a broad range of different sample types from people with neuromyelitis optica (NMO) in order to better understand the genetic and biological basis of the disease. This groundbreaking work was published in May 2018. Results not only identify genetic risk factors for NMO, but also reveal two specific genes associated with NMO, which are not linked to MS. Furthermore, these data show NMO is more genetically similar to systemic lupus erythematosus (SLE) than MS.

These are just a handful of more than one hundred studies using the ACP Repository as a resource to advance and accelerate cutting edge research. Research on the genetics of autoimmune diseases is key to understanding disease processes, as well as identifying targets for new drugs. The identification of common autoimmune mechanisms holds exciting potential for discovery of drugs that may be useful in different disorders.