Research

Research Update: Biomarkers and Persistent Viruses

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Post-Polio Health International's deadline for Phase 1 of proposals for the 2011 $25,000 research award is Friday, March 5, 2010. Details are available at www.post-polio.org/res/rfcall.html.

The unresolved issue of whether or not post-polio syndrome (PPS) can be detected by a test was explored by PHI's last two awards. The work (2007) of the team from the University of Arkansas for Medical Sciences (UAMS), Little Rock, to identify a biomarker has not yet been published. ("Biomarker" is the name given to the results of a laboratory test that can distinguish the presence of and/or amount of activity of a specific disease.)

The Italian team, led by Antonio Toniolo, MD, University of Insubria, Varese, and recipient of PHI's 2009 award, reports the development of a highly sensitive test to detect and characterize poliovirus (PV) strains and other enteroviruses. Their recent work in patients 50-76 years of age confirms that fragments can persist for decades in polio survivors. However, the data do not provide a link between virus persistence and development of PPS. Failure to detect PV fragments in 12 family members of the 47 patients with PPS who were tested indicates that these mutated agents are not transmittable.

The team received additional funding from the Italian government to continue the research, which is good news because these preliminary studies need to be confirmed in a larger cohort of subjects that includes patients, their families and age-matched controls. Also, an abstract of their work was recently accepted by the American Society for Microbiology (San Diego, May 23-27, 2010).

Related Published Work

Other researchers continue to search for a reliable biomarker of PPS.

In a 2008 study by Fordyce, et al., (Ref 1) three non-specific blood markers of inflammation were elevated among 51 PPS patients compared to non-polio controls. Only one of these biomarkers (TNF-alpha) showed a significant correlation with any symptom (muscle pain).

In a 2008 study by Gonzalez, et al., (Ref 2) cerebrospinal fluid was analyzed for protein expression profiles among 15 PPS patients and 51 individuals with other diseases. A disease-specific and highly predictive (previous polio) differential expression of five distinct proteins was found and these proteins suggest active neuroinflammation.

These published studies continue to suggest an active inflammatory component to PPS. Unfortunately, neither study included polio survivors not having PPS. It remains unclear if these potential biomarkers have a significant correlation with the development of, progression of or severity of PPS symptoms. Only when a correlation is made and confirmed will biomarkers become useful to follow the progression of PPS or its response to treatments, such as antiviral agents. ▲

Ref 1 ...
Fordyce, C.B., Gagne, D., Jalili, F., Alta, S., Arnold D.L., Da Costa, D., Sawoszczuk, S., Bodner, C., Shapiro, S., Collet, J., Robinson, A., Le Cruguel, J.P., Lapierre, Y., Bar-Or, A., Trojan, D.A. (2008). Elevated serum inflammatory markers in post-poliomyelitis syndrome. *Journal of Neurological Sciences*, 271(1-2), 80-6.

Ref 2 ...
Gonzalez, H., Ottervald, J., Nilsson, K.C., Sjögren, N., Miliotis, T., Von Bahr, H., Khademi, M., Eriksson, B., Kjellström, S., Vegvari, A., Harris, R., Marko-Varga, G., Borg, K., Nilsson, J. Laurell, T., Olsson, T., Franzén, B. (2008). Identification of novel candidate protein biomarkers for the post-polio syndrome—implications for diagnosis, neurodegeneration and neuroinflammation. *Journal of Proteomics* (January), 71(6), 670-81.