From August 1990 through February 1991, nearly 700,000 U.S. troops and civilian personnel participated in Operation Desert Storm; the military campaign initiated in response to the invasion of Kuwait by the Iraqi armed forces. Approximately one third reported a wide range of physical and psychological impairments that could not be explained through clinical observations or medical anamnesis [1]. **Those afflicted with what is now commonly referred to as Gulf War illness (GWI) typically report a spectrum of physical symptoms including post-exertional fatigue, musculoskeletal pain, gastrointestinal dysfunction, and cognitive difficulties[2]**. Multiple factors have been evaluated as potential triggers for GWI including environmental exposures, toxins, vaccines, and unknown infectious agents[3] [4]; however, neither a definitive cause nor a unique biological marker that can unambiguously delineate the disease has been identified. Although over 20 years have passed since the end of the Gulf War, approximately **25% to 30% of those initially afflicted with GWI continue to experience symptoms[5].**

One of the most promising **breakthroughs in GWI research** was the observation that **mitochondrial dysfunction** can differentiate cases and controls, as observed through 31P Magnetic Resonance Spectroscopy[6]. This report offers exciting new insight into the pathophysiology of GWI; however, many of the biological components of mitochondrial pathways are also common to pathways of the immune system and, therefore, may give rise to the **immunological disturbances identified in** those who suffer with **GWI.** It is for this reason that the focus of our research effort is to identify differentially expressed genes that are common to these pathways and ultimately identify the causes of these differences, characterize these differences at the molecular level, and identify potential treatment strategies.

Although this work is preliminary and ongoing, **WPI researchers** have made some exciting observations during our work to characterize the kinetics of inflammatory responses in subjects with GWI. We have identified **clear differences** in how those with **GWI respond to inflammatory stimuli,** and we have also identified **differences in key genes important to mitochondrial pathways** as well as **antigen presentation pathways.** Over the course of the next year, we will expand upon these observations in an effort to more fully understand the causes of these differences.

In addition, we recently published a study involving the comparison of a large group of **cytokines** found in those with **GWI and ME, identifying differences between these two illnesses.**

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[5] United States. Congress. House. Committee on Veterans' Affairs. Subcommittee on Oversight and Investigations. Gulf War illness research : is enough being done? : hearing before the Subcommittee on Oversight and Investigations of the Committee on Veterans' Affairs, U.S. House of Representatives, One Hundred Eleventh Congress, first session, May 19, 2009. Washington: U.S. G.P.O. : For sale by the Supt. of Docs., U.S. G.P.O., 2009.

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