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*Turning Today's Discoveries Into Tomorrow's Cures*

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### XMRV: A Human Retrovirus with Unknown Pathogenic Potential, Not a Lab Contaminant

The recent proclamation that “XMRV is not the cause of CFS,” came from an individual who did laboratory experiments to show how PCR experiments can become contaminated. These results have nothing to do with the reality of a disease or the methods used by those who have detected XMRV in the blood and tissue of patients found to be infected. The positive studies, which cannot be explained away by PCR experiments, are those which have used multiple methods to show that XMRV is a live replicating gamma retrovirus in human blood and tissue samples using the gold standard methods of viral isolation and antibody testing, in addition to PCR. Unsupported conclusions, such as the one offered by the Wellcome Trust spokesman, often create sensational headlines but do little to move science forward. Authors of the positive XMRV studies have been extremely careful not to claim causality, realizing that more scientific research is required to make such a statement. However, one fact still remains clear. Not one of the negative studies changes the results of the scientific research done by Lombardi et al., Lo et al., Urisman et al., and Schlaberg et al.

The WPI-led scientific study, which rigorously ruled out contamination, revealed high associations of gamma retroviruses with physician-diagnosed CFS patients, using four different methods of detection. Recent commentary associated with the negative research papers on XMRV, which used only one testing method, claimed that these studies proved that XMRV was not the cause of human disease. On the contrary, what the authors of the “contamination studies” confirmed is something that most experienced scientists already know; there are risks associated with using PCR if one does not properly control for contamination. They cannot conclude that other research groups had the same problems or that “XMRV is not the cause of CFS”.

**Most significantly, the recent *Retrovirology* publications failed to address the most important pieces of scientific evidence of human infection in the previous XMRV studies, including the fact that XMRV positive patients produce human antibodies to gamma retroviruses, XMRV integrates into human tissues, and infectious virus has been cultured from the blood of hundreds of patients with a diagnosis of Chronic Fatigue Syndrome and M.E. Humans do not make antibody responses to mouse DNA sequences from contaminated lab experiments. The *Retrovirology* studies only point out that XMRV research cannot be done in a mouse laboratory without extreme caution and should not rely solely on PCR methods.**

Many researchers realize that the question of gamma retroviruses and human disease cannot and should not be dismissed lightly. Retroviruses integrate into their host's DNA causing life long infection. Human retroviruses, such as HIV and HTLV-1, are causative for immune deficiencies, neurological disease and cancer. Animal studies involving XMRV demonstrate that the virus moves quickly away from the blood to various organs within the body, such as the spleen, lymph nodes, GI tract, and reproductive organs. This helps to explain why the virus is difficult to detect in blood even as it replicates in the tissues of those infected. Other studies using mouse models of Murine Leukemia Virus infection, a close relative of XMRV, have shown significant tissue involvement soon after infection, resulting in many physical symptoms of disease including cognitive deficits and immune deficiencies, symptoms which are well documented in patients with XMRV associated diseases.

Many anxious patients have asked, "Where do we go from here?" and "Is this the end of XMRV research?" The answer to the second question is an unequivocal "no." As to the first question, a quick check of the status of ongoing research in various labs confirms that the research groups who have been working on XMRV over the past year are still hard at work developing better assays to check the world's blood supply for the new retrovirus, finding correlates of immune dysfunction, engaging in animal studies, extending their findings to other groups of patients, and in general, enthusiastically continuing their research. They understand that novel scientific discoveries, which threaten current dogma, will continue to be challenged until the evidence can no longer be denied. For instance, there are still those few who question the fact that HIV is the cause of AIDS. It took Nobel Prize winner, Dr. Barry Marshall, 17 years and three trials in which he infected and then cured himself of H-Pylori associated ulcers, before the medical world would accept the fact that the bacterium causes the disease. Today we are engaged in a new battle to prove that human gamma retroviral infections, such as XMRV, are underlying pathogens in neuro-immune diseases and untold cancers.

It is clear that more research must be done to clarify the role of gamma retroviruses in human disease. However, when a pathogen such as XMRV is found in over 80% of those tested with the same diagnosis, causality is clearly a reasonable hypothesis that begs further scientific and medical research. It is a known fact that important questions of causality can often be answered through well designed clinical trials. For those who have suffered for years from these debilitating diseases, novel drug trials cannot begin soon enough.

WPI's collaborative research projects are revealing the infectious and inflammatory nature of neuro-immune diseases, providing strong evidence against the use of CBT and exercise therapy as rational "treatments" for those who are ill. Such knowledge underscores the urgent need for much more private and federal funding of biological research to provide diagnostic tests and effective drug therapies for the millions who are ill, stop the spread of infectious retrovirus(es), and end the devastating cycle of disease.

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