

National CFIDS Foundation – Rapid Communication:

Could a Chernobyl therapy (Stimol/citrulline malate) for radiation exposure find merit in the medical management of CFIDS/ME?

By National CFIDS Foundation Medical Committee

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The National CFIDS Foundation's core CFIDS/ME cohort consists of patients with internal radiation exposure to alpha-radionuclides (uranium, thorium, polonium etc.); chromosome damage (translocations, aneuploidy, karyotype abnormalities, defective mitotic figures, chromosome fragmentation, chromosome condensation, genome chaos etc.); and eNOX2 protein generation (ecto-NOX disulfide-thiol exchanger 2, tNOX) as identified in cancer cells. These patients were also positive for Mab-CTX (Monoclonal antibody to ciguatera toxin, Hokama) reactivity. In addition, many patients were found to have STAT1 protein defects and were kappa-lambda light chain positive (MGUS). Neurodegenerative tauopathy has been identified which may result from chronic radiation sickness. Furthermore, bone marrow suppression has been seen and may manifest as a myelodysplastic syndrome or a pre-leukemia/lymphoma condition.

Recently, the National CFIDS Foundation announced its Radiation Model based on cell anomalies produced as a direct result of radiation exposure. These aberrations have been identified as cardiolipin hydroperoxide(s) and phosphatidylserine hydroperoxide(s) and have been confirmed by other research groups. These compounds act as cell toxicants to alter cell function because hydroperoxides induce DNA damage and mutations. Interestingly, hypometabolism that has been previously identified in CFIDS/ME patients, has been found to mitigate radiation induced lethality in animal models.

Currently, treatment options for CFIDS/ME patients are very limited due to the disease complexity and because there appears to be numerous multi-organ system targets. It is well established that radiation exposure produces a pathophysiology that combines hematopoietic, gastrointestinal, and neurovascular changes. Ingestion or inhalation of alpha-radionuclides adds to this complexity because many alpha-particles have long half-lives thereby acting as a chronic stimulus associated with aberrant cell functionality. However, when alpha-particle emitting isotopes are ingested, they are far more dangerous than their half-life or decay rate would suggest due to the high relative biological effectiveness of alpha-radiation to cause biological damage. Alpha-radiation is an average of about 20 times more dangerous, and in experiments with inhaled alpha-emitters, up to 1000 times more dangerous than an equivalent activity of beta emitting or gamma emitting radioisotopes.

More recently, the National CFIDS Foundation found a U.S. Patent that had identified the use of Stimol (citrulline malate) in the treatment of Chernobyl radiation-exposed workers. According to this patent, "Citrulline malate (Stimol) has been shown to be a successful therapeutic in humans and animal models... Citrulline malate stimulates hepatic ureogenesis and the renal reabsorption of bicarbonates. These metabolic actions had a protective effect against acidosis and ammonia poisoning and might explain the anti-fatigue properties of citrulline malate in man. Successful therapeutic effects have also been demonstrated using citrulline malate (Stimol) as an anti-fatigue compound in treatment of fatigue syndrome in cleanup workers of the sequelae of the Chernobyl Nuclear Power accident."

The NCF's funded researchers will be testing Stimol/citrulline malate and other potential therapies in its radiation/mitochondrial test system as these may be of therapeutic value in our patient cohort. Could any of these possible therapies help to improve the quality of life in our patients long-term? The National CFIDS Foundation is committed to find out!

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