

Long space missions and gene therapy

William J. Rowe
University of Ohio at Toledo, USA

With microgravity (M) there is invariable malabsorption necessitating subcutaneous (SC) pharmaceuticals (P). With no replenishable SC silicon device available to administer them a therapeutic dilemma exists. Also SC P are limited in number and several P shown to deteriorate with space flight (SF) even in low earth orbit possibly radiation-induced. Liver, kidney functions deteriorate possibly complicating endothelial dysfunction stemming from invariable serum magnesium (Mg.) deficits despite low sensitivity ($p < 0.0001$) and in turn adrenaline elevations with vicious cycles between the two with in turn inflammation, oxidative stress, mitochondrial injuries.. Other than simulating exactly 1 G. thereby entirely avoiding M complications, there appears to be no alternative except gene therapy (GT) on a limited basis. Suggest beginning with the correction of as many as 4 angiogenesis – related gene deficiencies: (1) atrial natriuretic peptide (ANP) reduced by > 40 % after only 7-12 SF- days stemming partially from Mg. deficits reducing synthesis and release of ANP; (2) nitric oxide (NO); c GMP is a 2nd. messenger of both NO and ANP and is not detectable after 5 months in M (3) vascular endothelial growth factor (VEGF) triggered by SF- thrombocytopenia. Platelets are primary source of VEGF. (4) erythropoietin reduced by about 10 % along with 10 % SF- reductions of plasma volume (PV). Using a PV substitute and a SC device to administer Mg may reduce complexity of GT. If unsuccessful in correcting liver, kidney dysfunctions in order to resume P therapy, additional serial GT will be required.

Biography

William J. Rowe M.D. (Fellow British Interplanetary Society) is a board certified specialist in Internal Medicine. He was in private practice in Toledo, Ohio for 34 years. He was the first to publish that extraordinary, unremitting endurance exercise can injure a normal heart. He studied 3 world class extraordinary endurance athletes and published their exercise –related magnesium deficiencies; this triggered a 20 year pursuit of the cardiovascular complications of Space flight. He published in CIRCULATION a description of only the second Space-related Syndrome. He has been listed in the Marquis Whos Who of the World from 2002-2009

rowerun@aol.com, drowe@femsinspace.com