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SOYBEAN-DERIVED HUMAN EGF ENHANCES WEIGHT GAIN AND LEAN MUSCLE MASS IN MALNOURISHED MICE

James Bao

Mentor: Brad Warner

Chronic undernutrition is a significant contributor to mortality in children and has both short- and long-term effects on growth and development. Poor sanitation often accompanies poor nutrition and has been shown to contribute to repeated exposures to enteric pathogens. The combination of undernutrition and chronic intestinal infection leads to a syndrome of malabsorption and increased intestinal permeability called environmental enteropathic dysfunction (EED). Due to the shown effects of Epidermal Growth Factor (EGF) on enhancement of gut barrier function and growth in weanling models of stress-induced undernutrition, transgenic soybean-EGF was used to mitigate EED. C57BL6 mice were bred and 10 days after birth dams were given either standard chow or a protein deficient isocaloric diet (RBD), until weaning at day 21. Mice were randomized to receive soybean-EGF or vehicle via oral gavage for 21 or 42 days. We assessed weight gain, body composition, intestinal morphology, intestinal permeability, gene expression, food intake and metabolism. Male mice treated with soybean-EGF gained significantly more weight after six weeks and had increased lean mass and decreased fat mass compared to vehicle gavaged controls. Female mice did not demonstrate these findings. We found that neither diet nor soybean-EGF caused significant differences in intestinal morphology or intestinal permeability despite differences in tight junction gene expression in mice on RBD. Soybean-EGF treatment enhances growth and lean mass in male protein deficient malnourished mice. Regional basic diet alone does not alter intestinal morphology or intestinal permeability as measured by dual sugar absorption test.