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Nutritional contributions to obesity, hyperinsulinemia and brain senescence in aging

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The onset of parameters of cognitive decline often become apparent in aging, but the metabolic and nutritional factors which initiate the process remain largely unclear. Several recent studies have now associated obesity and insulin resistance to brain senescence in aging congenic obese rats. We briefly review several studies that support a link between chronic hyperinsulinemia, epigenetic expression of obesity, brain shrinkage and decreased brain protein and cellular deoxyribose nucleic acid (DNA) content in a congenic rodent model of early onset obesity. Aging congenic obese LA/Ntvl/-cp rats develop obesity and hyperinsulinemia soon after weaning regardless of diet and which pathophysiologic stigmata persist throughout their lifespan, and which becomes further aggravated when fed a high glycemic index diet. Groups of lean and obese rats were fed nutritionally complete is energetic diets continuing cornstarch (ST) or sucrose (SUC) from weaning until 10.5 months of age. Longevity of obese < lean in both sexes. Obese rats were found to exhibit decreased brain mass associated with insulin resistance, and accompanied with proportionate decreases in brain lipid, protein and DNA content in the obese but not the lean phenotype. In addition, the decreases in brain mass, protein and DNA composition were of greater magnitude when fed the SUC vs the ST diets in both phenotypes. These observations are suggestive of an increased potential for a contribution of the metabolic sequelae of insulin resistance as a pathophysiologic factor in the progression of brain shrinkage and cognitive decline in the aging obese, hyperinsulinemia rat, analogous to clinical observations which may occur in dementia and Alzheimer's disease.

Biography

Orien Tulp is an distinguished professor, author, medical researcher, and founder and President of the University of Science, Arts, and Technology. He is a career military veteran and dedicated volunteer who has served on hundreds of medical civic action mission teams in the USA and abroad.