Is obesity a brain disease?

The address reviews brain development in early childhood and the nature of reward, pleasure and associational memory systems including their functional and neurochemical pathways. We demonstrate that the development of obesity in humans can be biologically determined and therefore amenable to therapeutic interventions. Separately, although patterns of obesity are related to environmental changes, the heritability of obesity is significant. Thus, identical twins who are brought up in different families will usually have similar amounts and distribution of body fat in adult life, bearing little resemblance to the families into which they were adopted. We will discuss the early work of Olds in pleasure centers, the pleasure-satiation pathways and the neurochemistry of satiation or the lack thereof. In addition, the genetics of the drive to eat and its influence on the limbic system and hypothalamus will be discussed. Hypothalamic function will be described in the context of the human connectome in an effort to determine how defects in neurocircuitry can lead to excess food consumption beyond metabolic need. In particular, hypothalamic neurons – both in isolation and inside their native neural networks – are assessed to explore how they generate their electrical signals, how these signals are communicated to other brain areas, and how they are altered by physiological and pharmacological stimuli. Therapeutic and interventional strategies including behavioral, physical, and physiological will be discussed.

Biography

Gerry Leisman is Director of the National Institute for Brain and Rehabilitation Sciences in Nazareth, Israel and Professor of Neuro- and Rehabilitation Sciences from the Council of Higher Education of the State of Israel and as Professor of Restorative Neurology at Universidad de Ciencias Médicas Facultad Manuel Fajardo, Havana, Cuba. He has examined self-organizing systems in the nervous system applied to cognitive functions in memory, kinesiology, optimization, consciousness, and autism. He has applied optimization strategies to movement, gait, and cognition. In the 1970’s, he was one of the first to identify functional disconnectivities in the brain. His work in Rehabilitation Sciences, has applied the tools of Industrial Engineering to those with developmental disabilities.

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