INFECTOBESITY: OBESITY OF INFECTIOUS ORIGIN

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Abstract (limited to 350 words)

PURPOSE: To highlight that 1) Inducing a meaningful and sustained weight loss to control obesity at population level has remained challenging; 2) Obesity is a complex disease with multifactorial etiology, and hence requires cause-specific prevention or treatment strategies; 3) A detailed understanding of the varied contributors of obesity is needed to develop such cause-specific approaches; 4) Certain microbial infections may contribute to a subtype of obesity, termed Infectobesity; and 5) This presents the possibility of preventing a subtype of obesity by developing vaccines against adipogenic microbes.

SUMMARY OF PRESENTATION: Certain microbes, including viruses, bacteria, scrapie agents or parasites, increase adiposity in various animal models. Some of these microbes are linked to obesity in humans. Human adenovirus Ad36 is perhaps the most studied adipogenic microbe, which provides a model to describe Infectobesity.

Ad36 increases adiposity in experimentally infected animal models, including chickens, mice, rats and non-human primates. Studies from North America, Europe and Asia report that natural exposure to Ad36 infection is associated with obesity in human adults and children. Mechanistic studies conducted in animal and tissue culture models indicate that Ad36 up-regulates the expression of genes of adipogenic cascade in adipocyte progenitors, resulting in an increase in fat cell number and size. Ad36 reduces the gene expression of leptin, an adiposity sensing hormone, which may further contribute to Ad36-induced adiposity. Furthermore, Ad36 increases the expression of Macrophage Chemoattractant Protein (MCP)-1, an inflammatory cytokine. Ad36 requires MCP1 for promoting obesity.

Recent animal studies provide a proof of concept to prevent Ad36-induced obesity, by using anti-Ad36 vaccine, or anti-inflammatory agents. Additional studies are needed to determine the causative role of Ad36 in human obesity and the efficacy of strategies to prevent such obesity in humans.

CONCLUSION: Ad36 is a non-behavioral contributor of obesity. Such type of Infectobesity underscores the need to carefully understand various contributors of obesity, in order to develop cause-specific and effective prevention and treatment strategies.