# Obese through wealth vs. obese through poverty.

**Vincent van Ginneken***

Blue Green Technologies, Ginkelseweg 2, 6866 DZ Heelsum, Netherlands

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In this editorial I want to state that obese people do not have to be the result of conscious overeating but in contrary just is "shaped" by poverty. In one the richest economies of the World, the USA, there exist a Hunger-Obesity Paradox. This was first noticed by William Dietz, in 1995 in his case study, "Does Hunger Cause Obesity" [1,2]. He stated "Both hunger and obesity occurs with an increased frequency among poorer populations in the United States. Because obesity connotes excessive energy intake, and hunger reflects an inadequate food supply, the increased prevalence of obesity and hunger in the same population seems paradoxical" [1,2]. For our ancient ancestors, the Paleolithic hunter-gatherers from an evolutionary perception might the "hunger-obesity paradox" only be placed in the evolutionary concept of the availability of food, as unpredictable evolutionary negative selection effect, driven by nature to human uncontrollable negative selection forces of nature such as the changing of the seasons or the bounty of the kill [3]. From a political perspective, the right to food according to MDG1 is utterly ignored in one of the richest economies in the world. Obesity and hunger exist side by side throughout the United States -which is at the level of economic and political forces within a country- and it is astonishing how biological processes in this way (our microbiotome, see further) can be lifted to macroeconomic and societal level [4]. At national level the hunger-obesity paradox can only be placed in the evolutionary concept of food availability as unpredictable evolutionary negative selection force operating by nature cause quo economics, driven for human uncontrollable negative selection forces of nature driven by cycling of the seasons/economics leading to economic disparity. What is remarkable and counterintuitive is that the contradictory concepts of hunger and obesity are now known to coexist within the same person and within the same household, and here again we come back to our research topics of biology and biomedical sciences [5,2] (Figure 1). This second paradox can be exemplified that a household can be characterized by an (due malnutrition 'silent' hunger) obese adult and a due to lack of kcal starving ('hungry') child stunted in is development and growth. Poverty and unemployment are key drivers that have led to food insecurity in America and due to insufficient money or other resources within a household where there is uncertainty of having enough food to meet the needs of all its members. Malnourishment and lack of essential nutritional elements including a sedentary life-style form the basis of obesity [6]. So, we have to consider that hunger and malnutrition even in the developed world as well as in the richest economy of the World, the U.S. exists. How can we explain and comprehend the "dual burden" within a family with an overweight mother and a stunted and hungry child? It sounds like anti-Darwinian thought where parental investment of modern human beings-of at least the mother in the offspring is considered as a general accepted theory. How can we explain this phenomenon? As a result of these driving forces related to the right to food according to MDG1 individuals often "choose" less expensive, calorie-dense food making them obese. The word "choose" is given with some restriction because in this editorial we summarize increasing, but largely indirect evidence pointing to an effect of commensal gut micro biota on the central nervous system (CNS)-our brains-

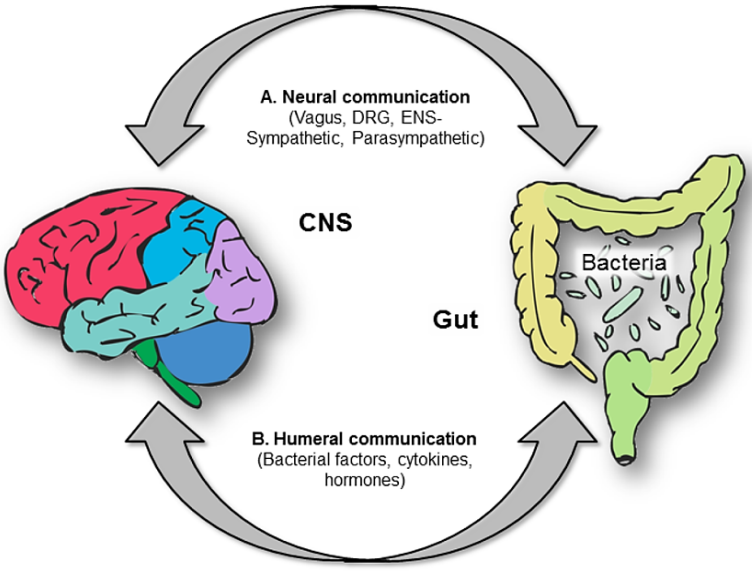


***Figure 1.*** *Neural communication.*

and also related to our daily feeding behavior and appetite. The "dual burden within one household" observations with a mother craving for certain types of food and a starving child [1,2] exemplified the gut has many more important functions and acts a type of "mini-brain", affecting our mood and appetite by all kind of hormones and gut peptides like e.g. the hormone PYY (peptide YY3-36) and ghrelin [7]. Gut hormones can bind and activate receptor targets in the brain directly and a recent emerging number of studies show more and more that massive and excessive food intake are regulated by the huge amount gut flora-an estimated amount of around 100 Trillion Bacteria-in our intestines. So, in case of low quality food as exemplified in [6] "our guts over rules our brains" leading to malnourishment, metabolic syndrome and obesity. For the international scientific community a tremendous task lies ahead following a Systems Biology approach to find appropriate biomarkers-like we earlier performed in a C57BL6 mouse model for biomarkers for obesity in non-adipose tissue [8]-in future studies defining the gut-brain axis, with bacterial genes outnumbering human genes by a factor of 100 to one, is a challenge and a daunting job. According to Platonic philosophy, if we would make a statement that for common people (≈farmers) "our guts overrules our brains" this would also be the case for the soldiers and the philosophers (≈politicians) because we are all from the same species. "Science is Science", stated former US president Obama, and I would reflect "Politics is Politics". But when the United States keeps on denying MDG1 -"the right for food"-, politicians in general should learn from science about the "gut-brain" axis and that not solely the quantity of the food (in empty kcal/caput/day) counts but also the quality. So, coming back to MDG1 "the right for food" should be replaced by "the right for healthy food" for a healthy brain-gut-brain axis [9].

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***Correspondence to:**

Vincent van Ginneken
Blue Green Technologies
Netherlands
E-mail: vvanginneken@hotmail.com