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University of Florida Psychiatry Grand Rounds *Sugar, Hormones and Addiction*

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1. What is the difference between over eating and an addiction to food?

Answer: The difference between over eating and addiction to food is- problematic. Kent Berridge from University of Michigan put this in the form of liking versus wanting versus needing, obviously we all need food to survive. Some people say how can you possibly have an addiction when you need something. The question is what is need to me? Certainly from the survival stand point, food is essential. So could you be addicted because you need food in other words may be we all are addicted to food. So here is a paradigm– Sex addicts. So do sex addicts need sex? Well if you are an addict to do, do the rest of us need it? All the species need it because otherwise the species die out but probably an individual only wants it and when we go from wanting it to needing then becomes an addict .

So the question is if you go from wanting something to needing something, that could be addictive and the answer is- yes, it can. And that’s the part of the issue. So can food be addictive? Yes. Is it automatically addictive, are all foods addictive? And that’s when things get a little more complicated. It appears when you actually look at the clinical and the empirical data, fat, salt are not addictive. Caffeine, highly addictive but not toxic unless you mix it with alcohol. Is sugar addictive? Data are not totally in yet, but they are certainly pointing to that direction. In humans there are some problems with trying to do these studies, there’s no control group because no ones naïve. There’s sugar in virtually everything so its almost impossible to clear out to assess the concept, tolerance and lastly most people who are not addicted to sugar are mainlining it to other standard sugar delivery vehicle called soda which is also high in caffeine. So you have the overlay of caffeine. The question of whether sugar is truly addictive or not is till not answered but there are lots of reasons for the concern.

2. You say obesity and addiction affect different parts of the brain, will you elaborate on that point?

Answer: The area of the brain that is the reward center is called the Nucleus Accumbens and the nucleus accumbens is where the dopamine signal is transduced to create the feeling of the reward and the sad part is that dopamine down regulates its own receptor.

And that's on purpose because what that does is it protects those neurons from over stimulation. The problem is that the more dopamine, the fewer receptors. So everytime you get a hit that is a substance of abuse you down regulate those receptors and you end up needing more and more to get less and less and that's the phenomena of tolerance. Does sugar do that? Absolutely. That we have hard invest data on. Then the question is with withdrawal. Final question is do you need withdrawal to classify something as addictive and there are some five criterion that you do need withdrawal, you need other phenomena that go along with it demonstrating psychological and chemical dependency but not necessarily withdrawal. So the definitions are changing , this is very complex question and I don't think we have an answer to it.

3. Some people have a lot of sugar in their daily diet, so does that automatically lead to obesity?

Answer: No, not at all. There are lot of people who consume large amounts of sugar and who are not obese. If you look at the role of sugar in obesity, it adds about 0.8 BMI points when you look at the meta analysis of sugar, adding it or subtracting it from the diet . We have a 7 to 8 BMI point problem so unbalanced sugar accounts for about 10% of the total weight gain. Sugar is "a" cause of obesity and its not "the" cause of obesity, there are many causes of obesity, pretty much anything that raises your insulin will drive weight gain and there are other things other than dietary sugar that do that. So its not all surprising that sugar is not the called the big hoona in terms of driving weight gain and obesity per say. I don't care. That's not the issue.

The issue is not obesity. Metabolic syndrome is the issue because that's where the money goes. 75% of all heath care costs for chronic metabolic disease and 75% of those costs are potentially recoupable if we could actually fix this problem. We wouldn't need health care reform if we could fix metabolic syndrome. Well that's where sugar comes in. Sugar is uniquely pathogenic for the different diseases of metabolic syndrome, irrespective of the obesity and it occurs in normal weight people as well. 20% of the obese population is metabolically normal. They have a completely normal lifestyle, completely normal age not because they are fat paradigm, they are just fat. Conversely upto 40% of the normal weight population have the same metabolic disease as the obese, they get type 2 diabetes, they get hypertension, they get heart disease, they get cancer, they get dementia they get all the chronic metabolic disease and they have normal weight because those diseases are not dependable on weight. Obesity is the marker for the metabolic dysfunction not the cause. This is one of the things that has to change in terms of medical education and one of the things that I am trying to express .

4. So for a person who has a sugar addiction, is obese, and has tried everything to lose the weight but has not been successful. In your opinion, what is the best method to overcome this issue?

Answer: Obesity is leptin resistance, they are synonymous. If your leptin works right, you would not be obese. Leptin tells your brain that you have had enough. Leptin tells your brain that you can burn energy to your normal weight. If your brain cannot see its leptin, you are going to be hungrier because your brain is starving and you are going to eat more and you are going to exercise less because your brain is telling your body to conserve. The only way to fix obesity is to make that leptin work again that is absolutely paramount and unfortunately eating less doesn't do it because what that does is it adds leptin deficiency on top of leptin resistance and that's why everyone is recidivist and that's why diet and drugs don't work because its not fixing the primary problem which is leptin resistance.



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So the question is what causes leptin resistance and the answer to that based on our work and work of many other basic science investigator show that insulin specifically blocks leptin signaling. Insulin blocks leptin from telling the brain to eat more and insulin also blocks the sympathetic outflow that comes from normal leptin signaling which will normally tell you can release energy to burn. So gluttony of the sloth are all being driven by the insulin which inhibits leptin signaling so you got to get the insulin down. When your insulin is down then your leptin works and when your leptin works you can eat less and burn more, feel better and the process reverses and this what we do our clinic everyday. We do not run an obesity clinic, we run an insulin reduction clinic and we will get the insulin down any way we can and there are lifestyle methods of doing it, most important of which is to get rid of the sugar. There are pharmacological agents that we use and finally if necessary surgery. We do all of these things but we don't do them casting a wide net, we do this by targeted therapy specifically to what the problem is. Why is the insulin high, what making that happen and we go after that we have a good success.

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