

JOHN There are many different treatments for diabetes. I'll just use myself as a case study. One of the things I did to myself is I measure my blood sugar at different times during the day, and my blood sugar this morning was 116. And my blood sugar at about five o'clock this afternoon will probably be in the high 80s or 90.

ESSIGMANN:

My blood sugar after I have a meal might go up to 160, 170, and it shouldn't go that high. And some mornings, like a couple of days ago, my blood sugar was 146, which is too high. And that reflects two things, what I ate the night before, but the second thing is the one that's my problem, which is gluconeogenesis.

Gluconeogenesis technically means new synthesis of glucose from non-carbohydrate precursors. For example, I could take the amino acid aspartate, and I could find a path by which I could convert that into glucose. I could take lactate, and I could convert it into glucose.

OK, so during the day, I use my glucose, and I stay active, and I walk around. I ride my bike and so on. So my glucose level, it's pretty reasonable by the time I go to bed. But then at night, when I stop moving around a lot, this gluconeogenesis process continues in me, and that's what causes my blood sugar to go up. The medicine I take is called Metformin. It has a number of targets, but one of them is one of the enzymes, called PEPCK, Pyruvate Carboxykinase, that's in the gluconeogenic pathway.

Let me say a word about gluconeogenesis, another word actually. So we all have dinner, like say six to nine o'clock at night. We go to bed, and there are certain organs in the body, the brain, our red blood cells, that require glucose. They can't work with anything else. So gluconeogenesis, by principally the liver, provides a constant stream of glucose to these organs that absolutely require it, like our brain.

Now, when we go to sleep at night, as time gets longer and longer and longer, after the meal, our glucose level, our natural glucose level, is going to start to fall off. And the liver then compensates by increasing the amount of gluconeogenesis in order to keep our blood glucose at about 100 while we're not eating. What I do, during the night, is to take this drug that will prevent the switch to produce more and more sugar by gluconeogenesis.