Glucose Level Research

Artem Markin
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How food I consume **affect** my body?

Can I **improve** by diet?

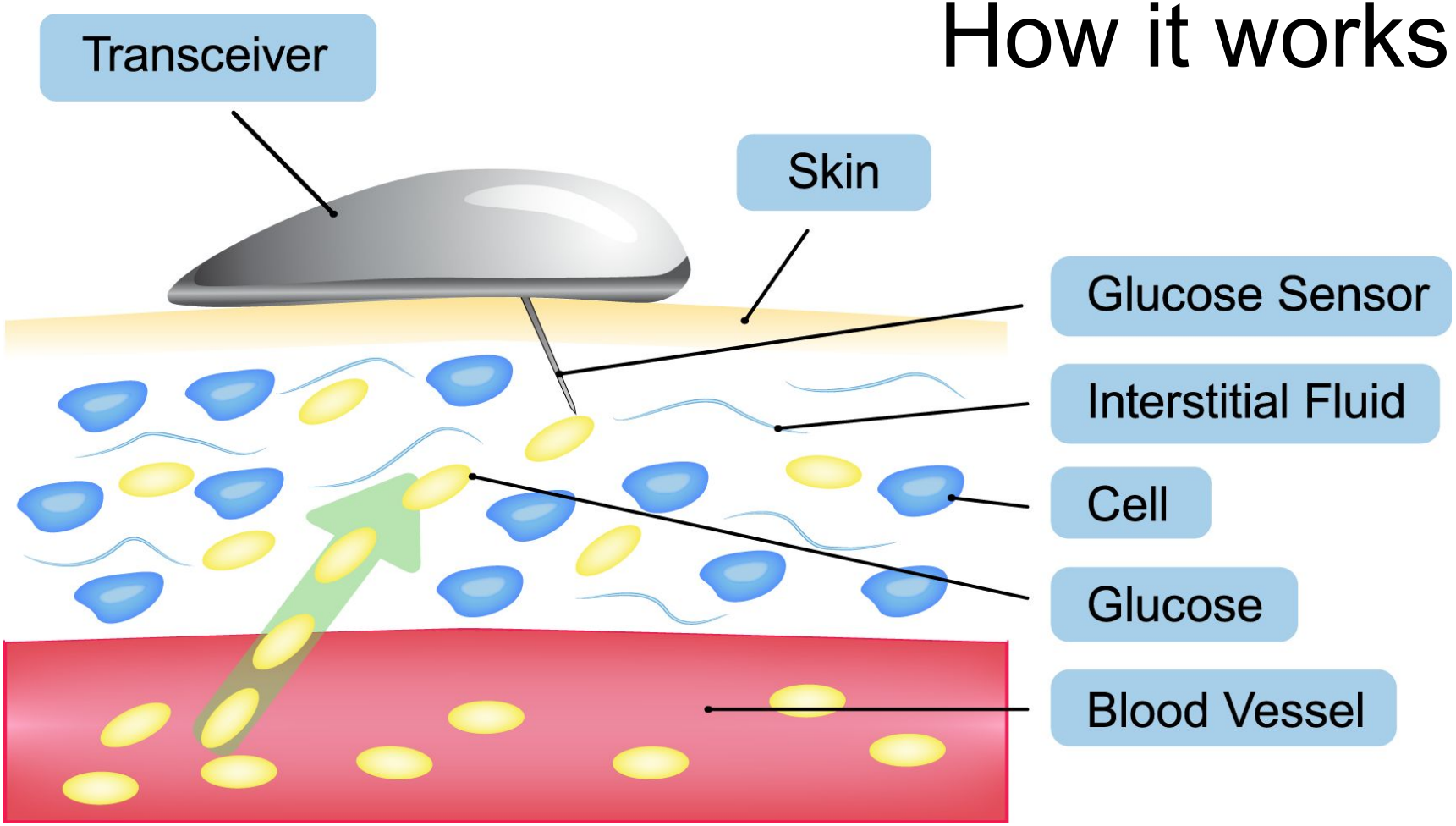
Which products are **better** for me? What should I avoid?

To answer on this questions I did an experiment **tracking** and **analysing** the glucose level in my blood.

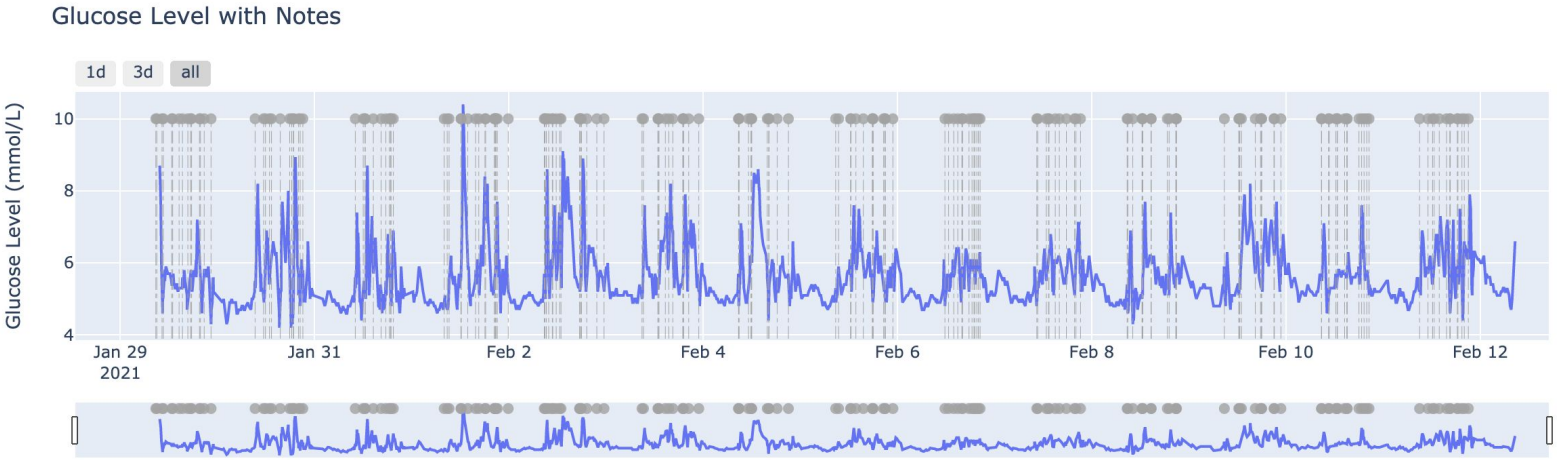
Important Remark: **I’m not a doctor** and all these experiments I did for fun. Keep it in mind if you will decide to apply any findings I’ve got!

I inserted the sensor (**Freestyle Libre**) into my arm for **two weeks**. The sensor tracked the glucose level each **15** minutes automatically. I also could trigger measurement manually to increase accuracy. **Everyday** during this experiment I left notes with all food and drinks I consumed as well as with some activities.

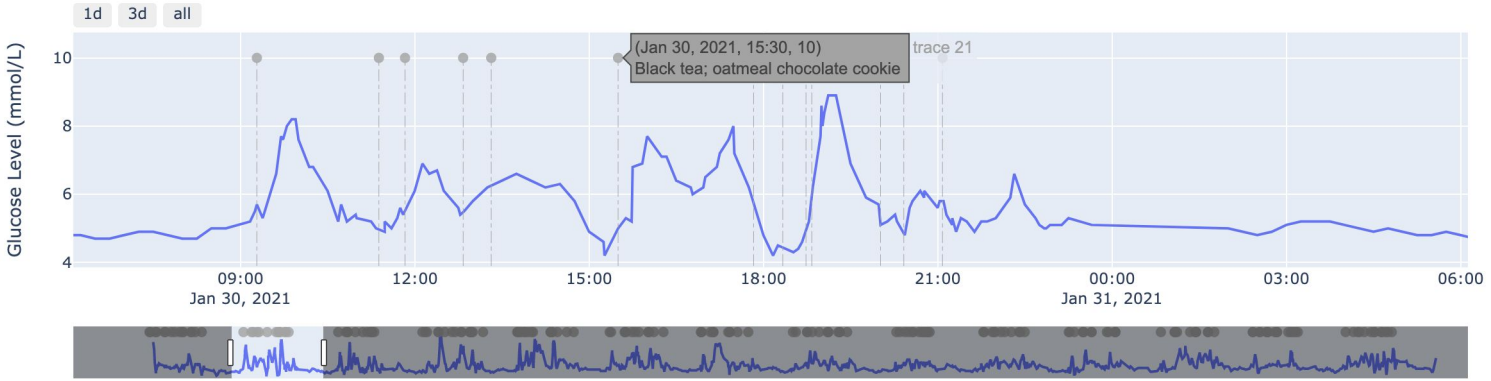
How it works...

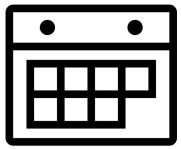

Transceiver
Skin
Glucose Sensor
Interstitial Fluid
Cell
Glucose
Blood Vessel

Data



Zoom-in one day





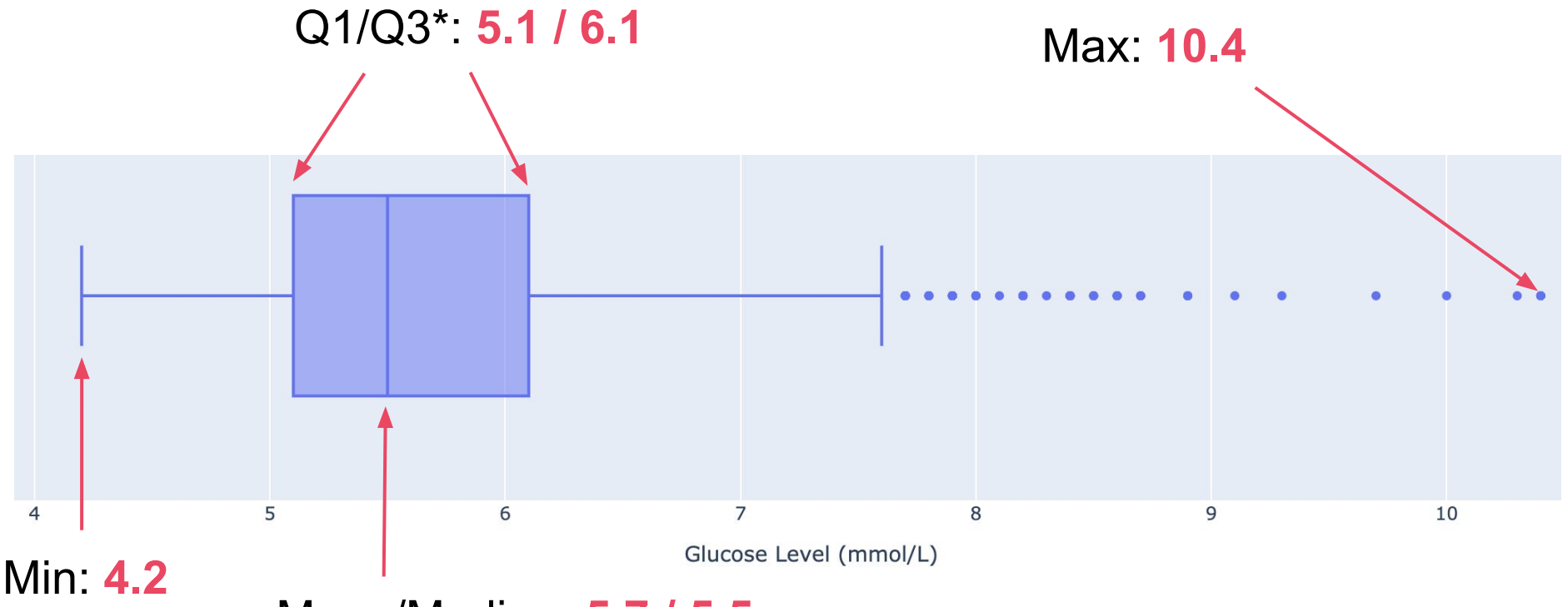
The data is within **29-Jan-2021** and **12-Feb-2021**

Total number of glucose measurements: **2 031**

Total Number of Notes: **187***

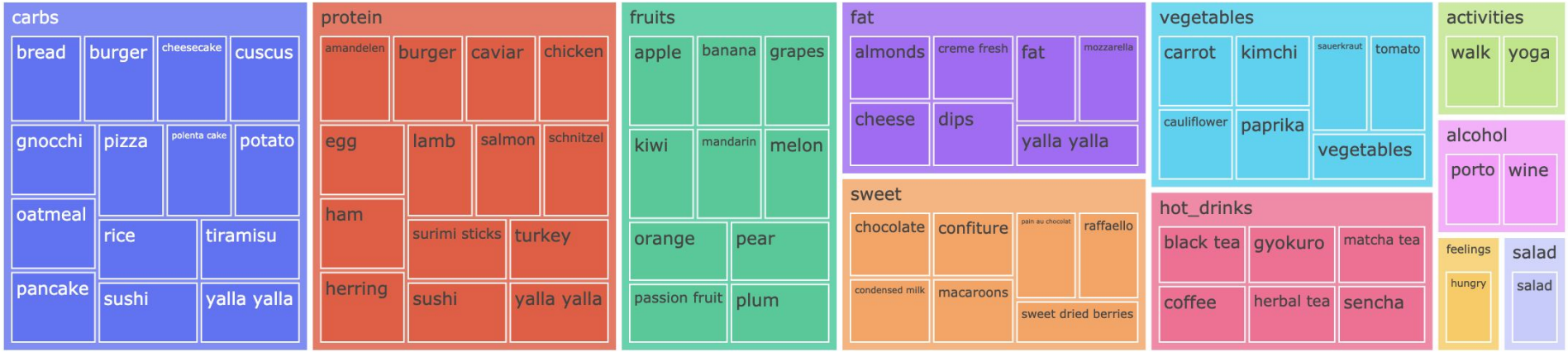
* Please keep in mind that one note can contain several products or different activities, e.g. ‘walk’.

Glucose Level Distribution



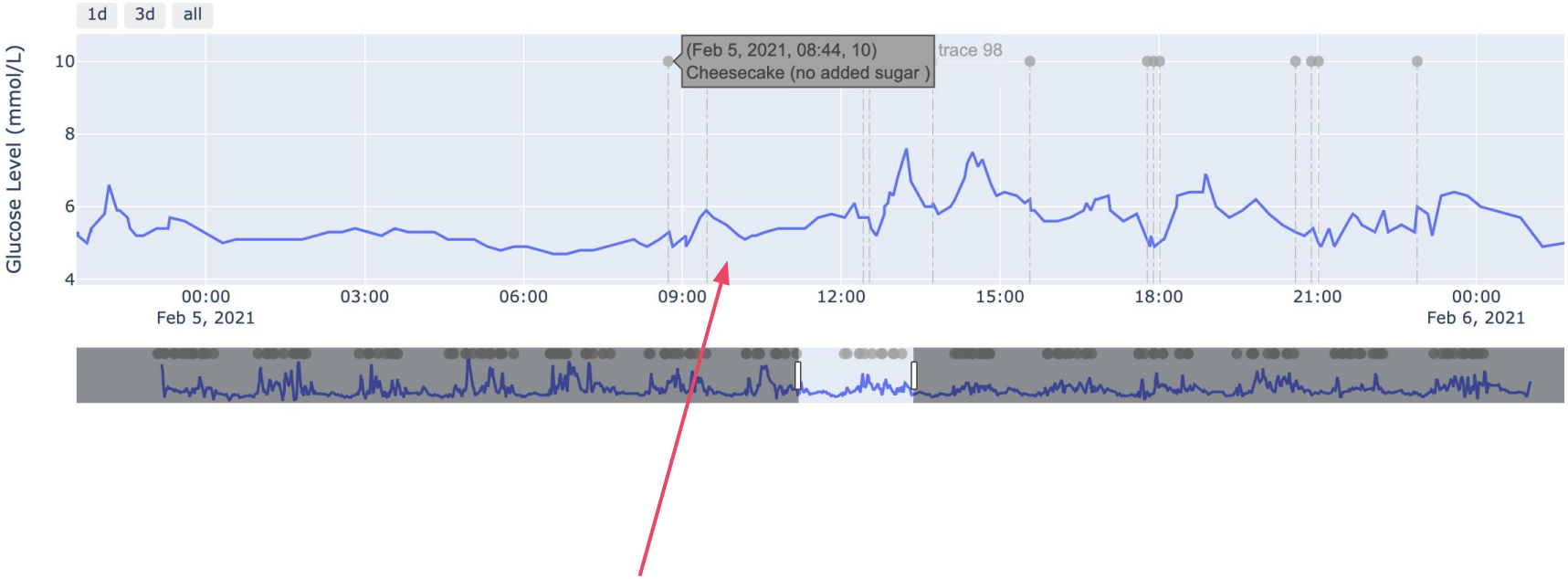
* 25th and 75th percentiles

Products and activities mapping



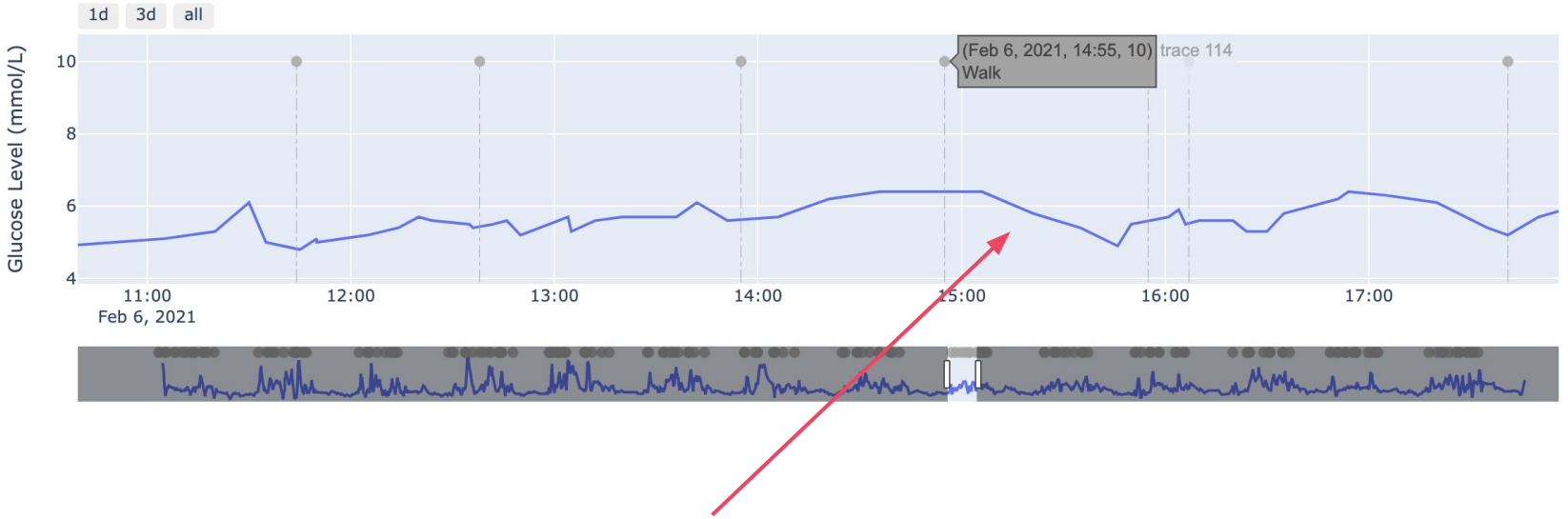
I’ve grouped products on several categories to simplify analysis.

Facts I’ve **noticed** during the usage of the sensor



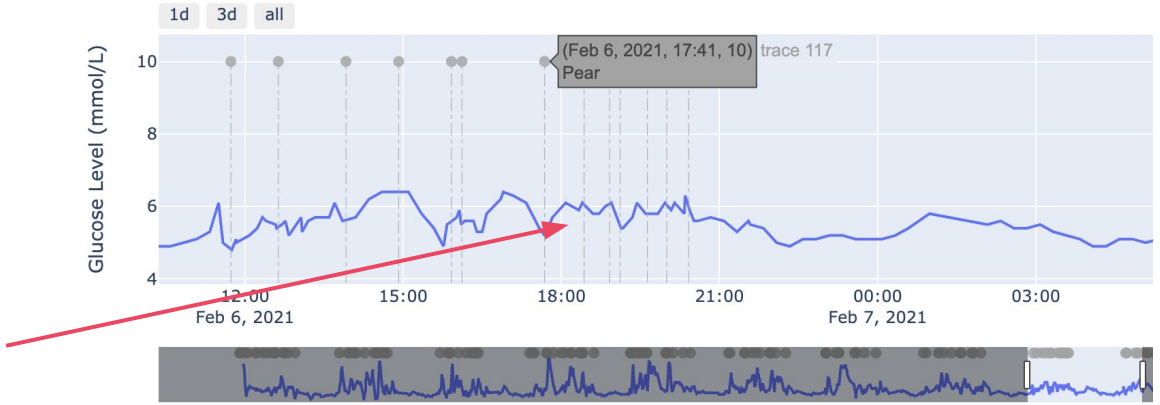
Homemade desserts **do not highly affect** my glucose level.
Ask my wife for recipe :)

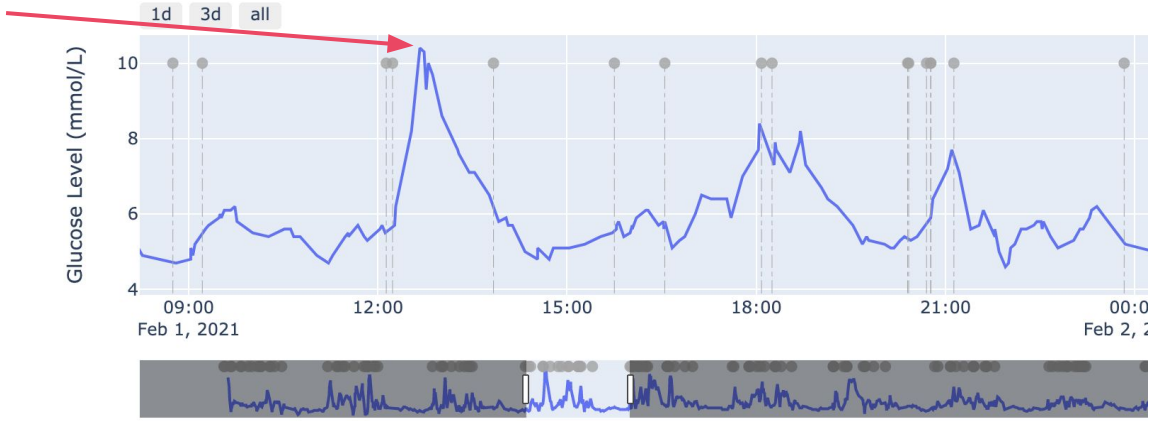
I **didn't notice** increase of the glucose level after alcohol. The sugar level even increased much slower after a glass of wine during diner. I've found an explanation of this effect - alcohol prevents liver to process sugar. That is one of the reason why you are hungry after alcohol consumption.

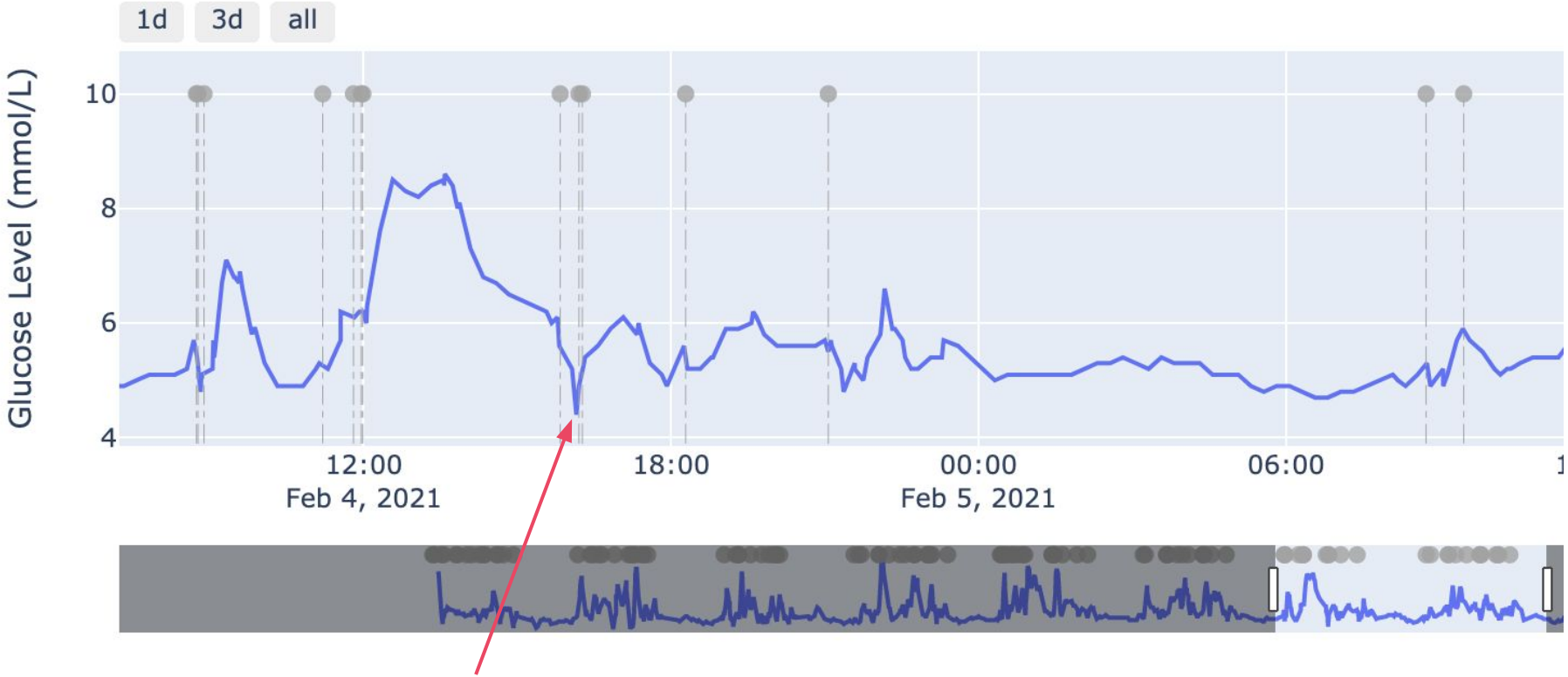


Even low physical activities have positive effect on glucose level.

I **didn't notice any significant effect** of fruits on my glucose level in general. However the biggest sugar peak appeared after I ate quite big and very sweet banana.



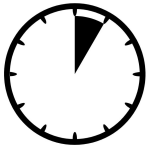




After **significant increase** of the glucose level your body will try to compensate producing more insulin. In such case your glucose level can go very low. What means that you will be hungry again in quite short period of time. You should avoid such glucose "**roller coaster**".

Findings based on the data I’ve got

In average I did **12** food related notes per day.



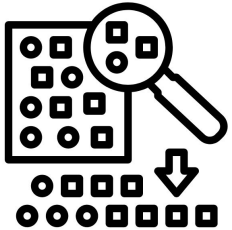
In more than **50%** of cases I consume another portion just within **one hour**.

In more than half of the cases it takes **20 minutes** to achieve sugar level of **6** or higher. Increase up to **8** takes **~25 minutes**.

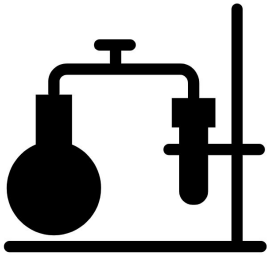
- I tried to fit a linear model to check what kind of food affects my **glucose level increase**.
- I've looked into the products' groups I consumed within one hour before **> 7 mmol/L** increase and built OLS model.
- Statistically only **sweet** products lead to **significant glucose increase**.
- My initial assumption that **fruits** **are much better for glucose level** wasn't rejected.
- The reason that **carbs** **do not lead to significant increase** can be related to the fact that I consume healthier carbs in general, e.g. homemade desserts.
- Please keep in mind that the **data is very limited**. With more data collected the results could change.

	coef	std err	t	P>|t|	[0.025	0.975]
Intercept	7.0466	0.071	98.994	0.000	6.902	7.191
fruits	-0.0172	0.065	-0.264	0.793	-0.149	0.115
hot_drinks	0.0400	0.099	0.405	0.688	-0.161	0.241
salad	-0.0617	0.301	-0.205	0.839	-0.673	0.550
vegetables	-0.1145	0.110	-1.045	0.304	-0.337	0.108
fat	0.0121	0.129	0.094	0.926	-0.251	0.275
sweet	0.2315	0.113	2.047	0.049	0.001	0.462
protein	-0.0240	0.124	-0.195	0.847	-0.275	0.227
carbs	0.0563	0.105	0.535	0.596	-0.158	0.270
alcohol	-0.0412	0.104	-0.396	0.695	-0.253	0.171

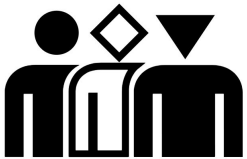
Future Steps



The data I've collected **was very limited** and based only on two weeks. The most logical step is to buy another sensor and **do additional experiments** for at least two more weeks or even couple of months.



Do **design of experiments** (DOE). Currently I found only statistically significant effect of the "sweet" products. In the new iteration I can try to do cleaner measurements without mixing different product types.



It would be interesting to collect data from **different people** to see the difference of the glucose level behaviour based on the age, gender, weight and diet preferences.