Advanced Module: Fat, Protein and the FreeStyle Libre

Nicola Taylor

Diabetes Specialist Dietitian

University Hospitals of Derby and Burton

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Nicola Taylor

- Diabetes Specialist Dietitian, University Hospitals of Derby and Burton NHS FT
- DAFNE educator
- Derby FreeStyle Libre lead
- Derby Dietetics lead for Insulin pumps & CGM

Disclosures:

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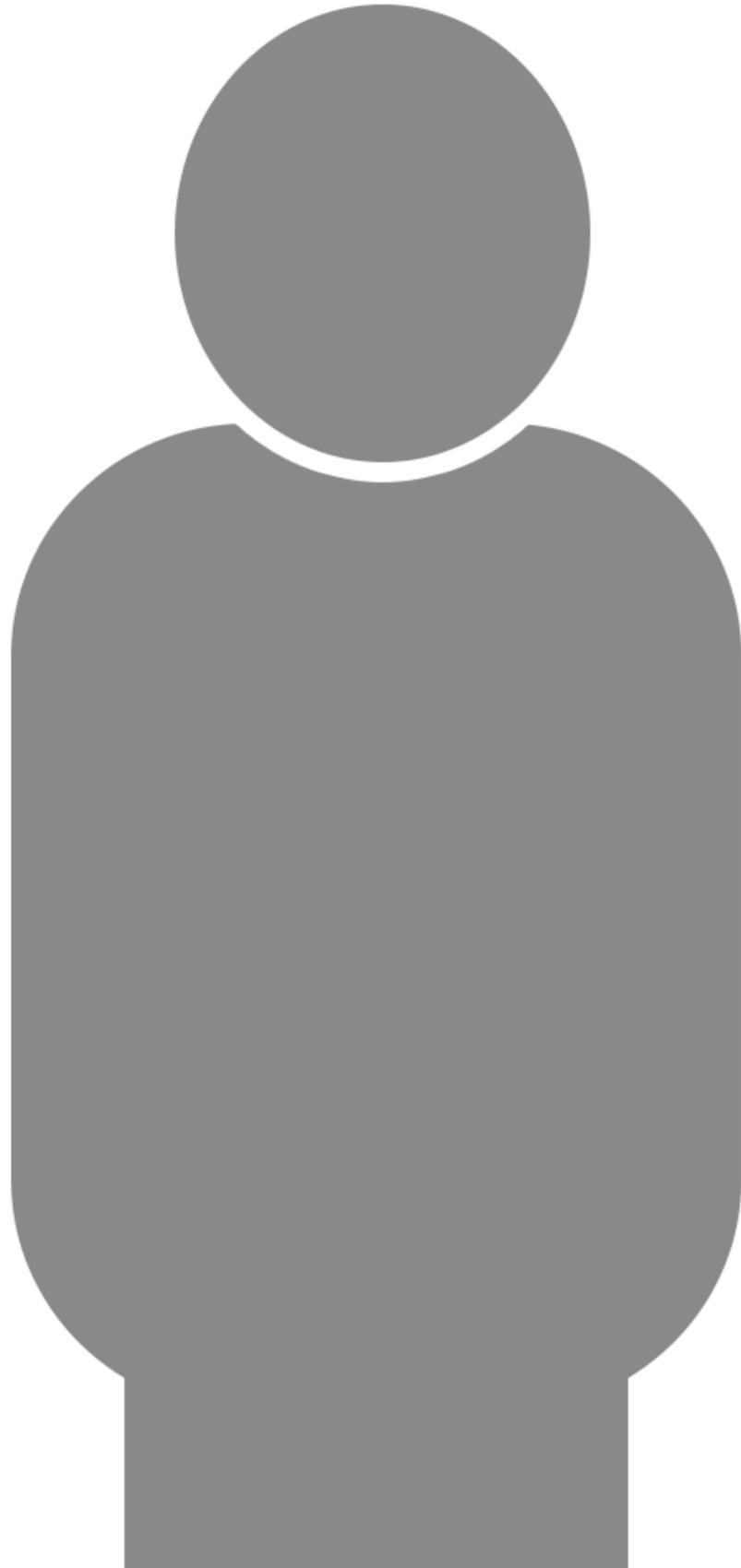
Learning objectives

- Build on the knowledge from Introduction to Carbohydrates and the Freestyle Libre

- Recognise how fat and protein affect glucose levels

- Understand how you can adjust your insulin timing and/or amount of insulin for high fat/protein meals

- Feel more confident using Libre traces to manage high fat/protein meals more effectively

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Carbohydrate foods have the most significant effect on glucose levels...

However they are not the only foods that affect glucose levels

Fat and protein play a part

Impact of fat on glucose levels

When eaten with a source of carbohydrate (mixed meal):

- Fat slows down how quickly your stomach empties. This could lead to a delayed rise in glucose levels that can last for 8 hours or longer

- A high fat meal can also cause insulin resistance and increased glucose production by the liver. This means more insulin may be required to cover the meal

Result: Can lead to low glucose readings shortly after the meal, then high glucose readings for hours after the meal, especially through the night

Fish and Chips

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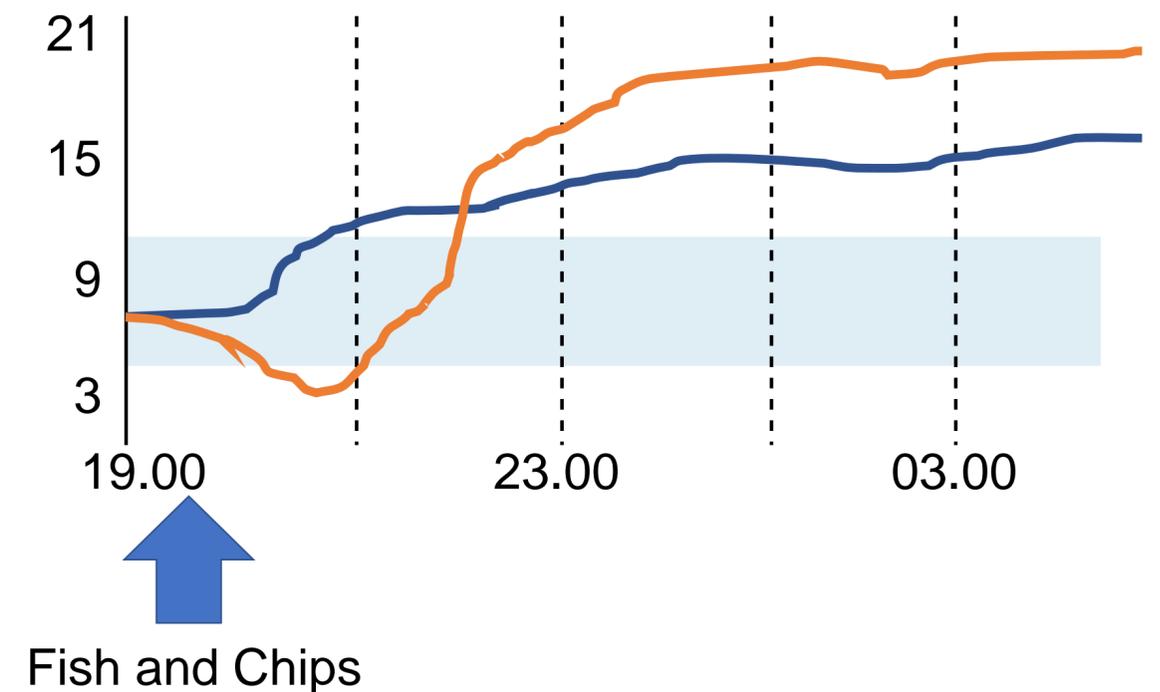
Impact of protein on glucose levels

- Protein also slows down digestion and can cause a delayed rise in glucose levels

- In significant amounts it can increase glucose levels as the protein converts to glucose

- A high protein and high fat meal has an additive effect on glucose levels – a more significant and sustained rise is seen

- Protein can have different effects when eaten with or without carbohydrate

Result: Can lead to low glucose readings shortly after the meal, then high glucose readings for hours after the meal, especially through the night.

Mixed Grill

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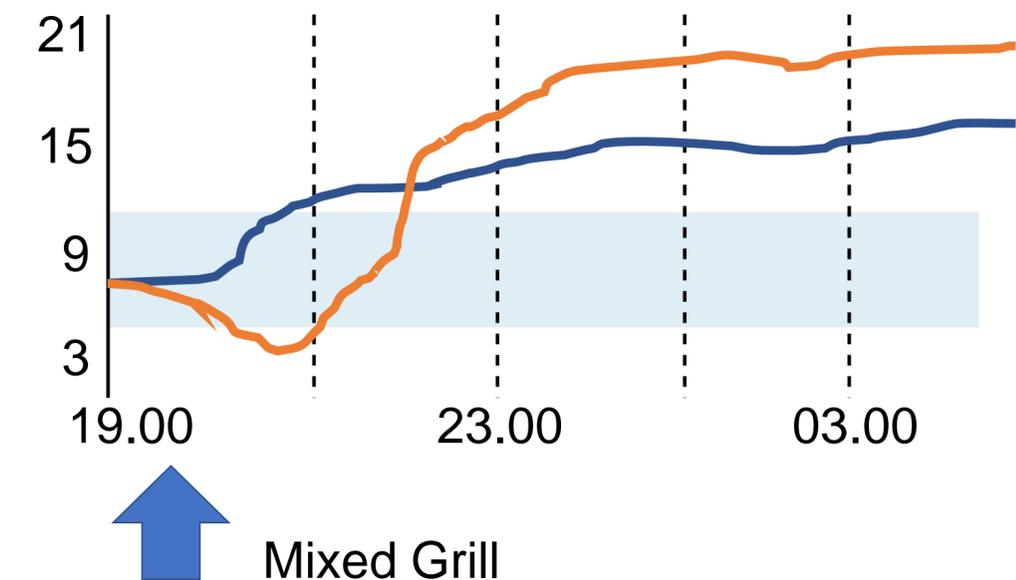
# What do we mean by high fat & protein

- High fat = 40g of fat or more
- High protein with carbohydrate = 40g of protein or more
- High protein without carbohydrate = 75g of protein or more

Look at food labels, Carbs and Cals app/ nutrient tracker apps to work out the fat and protein content of a meal
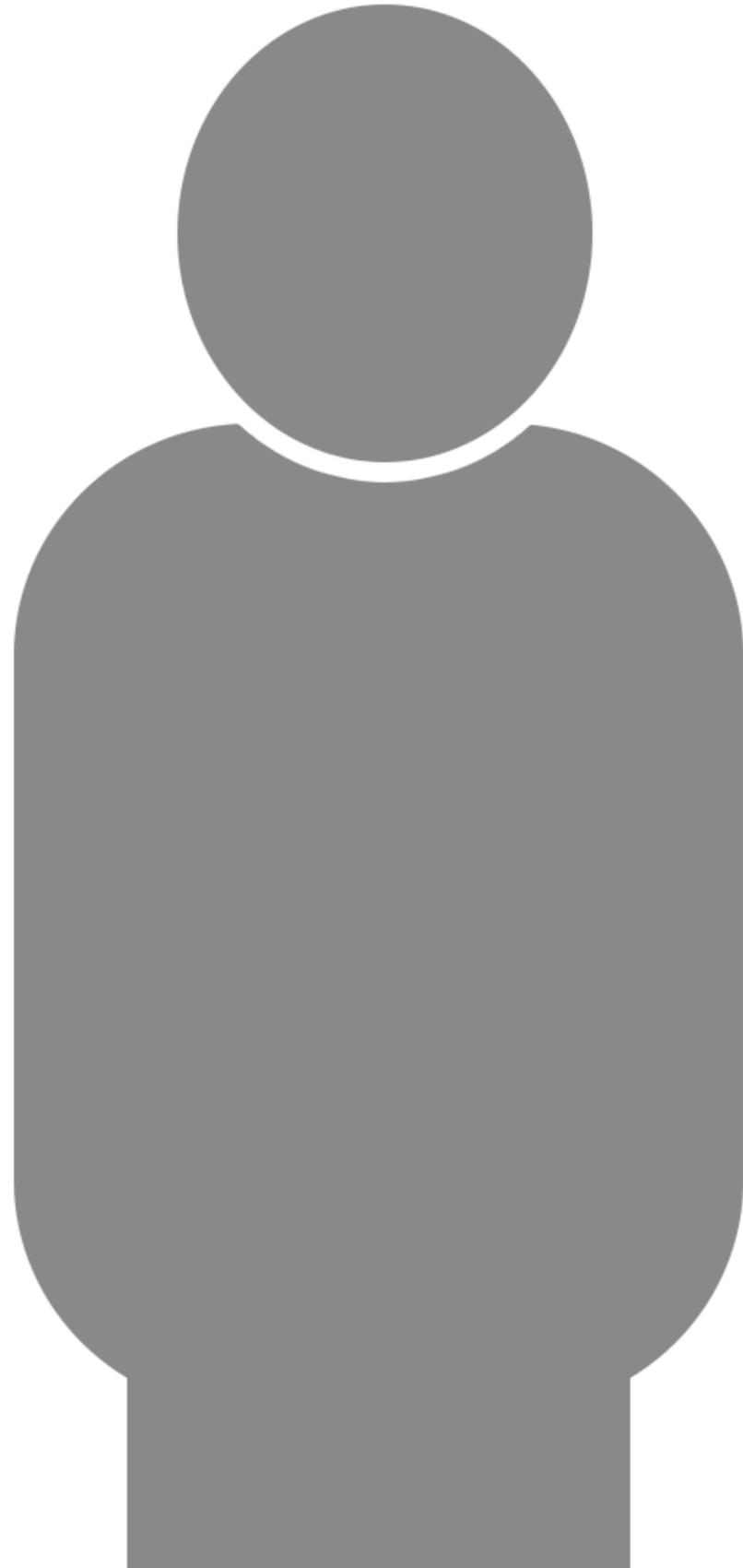
How can the FreeStyle Libre help?

- Can help identify how **individuals respond** to meals high in fat and/or protein **as this varies**

- Allows individuals to consider insulin timing, or if they are on a insulin pump, the type of bolus

- It allows individuals to consider whether additional insulin is required (more than their usual I:C ratio)

How to manage high fat, high protein meals

- There are lots of strategies that can be used

- There is no consensus as to the best method and studies are not conclusive in the benefits vs standard carbohydrate counting

- There are limitations; extra work, higher level of maths required, increase risk of hypoglycaemia

- The following slides provide some suggestions you could consider

- BUT remember the effect of fat and protein on glucose levels varies in individuals. The most important thing to get right remains accurate carbohydrate counting skills

- Healthier food choices will also reduce the need for these sorts of calculations

How to manage high fat/protein meals

If on MDI (Multiple Daily Injections):

Try splitting the injections; take half the usual I:C ratio before the meal and the remaining 1-2 hours later.

e.g. 4 slices of pizza = 120g carbs

Glucose 6.4mmol/l (in target), ICR: 1:10g or 1:1

120 ÷ 10 = 12 units

Take 6 units pre meal, then 6 units 1 hour later

Look at Libre trace and consider if additional insulin is needed

How to manage high fat/protein meals

If on MDI and **additional insulin is needed**:

For high fat meals; consider taking an additional **30-35%** of the pre meal dose 1 hour post meal

e.g. 4 slices of pizza = 120g carbs, 57g fat,
Glucose 6.4mmol/L (in target), ICR 1:10g or 1:1
    120 ÷ 10 = 12 units
    12 x **0.35** = 4.2 units
Take 12 units pre meal + 4 units 1 hour later (16 units in total)

Review the Libre trace, did it work?

How to manage high fat/protein meals

If on CSII (pump therapy)

Try using an **advanced bolus function** e.g. dual wave/ multiwave/ combo bolus; 50/50 or 70/30 over 2-4 hour

e.g. Fish and chips = 140g carbs
Glucose 10mmol/l, target 6mmol/l. I:C ratio 1:5g or 2:1, ISF 1:2mmol/l

For food: 140 ÷ 5 = 28 units
For correction: 10 − 6 = 4 , 4 ÷ 2 = 2 units
Total dose = **30 units;** 15 units as standard bolus, 15 units over 2 hours

The bolus advisor on most pumps will work out the split

Look at Libre trace and consider if additional insulin is needed

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How to manage high fat meals

<mark>If on CSII (pump therapy) and **additional insulin is needed:**</mark>

<mark>For high **fat** meals consider increasing the total dose by **30-35%** and use a combo bolus 50/50 over 2-4 hours</mark>

e.g. 140g carbs, glucose 10mmol/l, target 6mmol/l. I:C ratio 1:5g/2:1, ISF 1:2mmol/l

For food: 140 ÷ 5 = 28 units
For correction: 10 – 6 = 4 , 4 ÷ 2 = 2 units
Total dose = 30 units; 15 units as standard bolus, 15 units over 2 hours

30 units x <mark>**0.35**</mark> = 10.5 units, 30 + 10.5 = **40.5 units**
(override or use health event)
= 20.25 units as standard bolus, 20.25 units over 2 hours

> The bolus advisor on most pumps will work out the split and will often add the correction to the upfront part

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How to manage high protein meals

If on CSII (pump therapy) and **additional insulin needed:**

For high **protein** meals (with carbs) consider increasing the total dose by **15-20%** and use combo bolus 50/50 over 2-4 hours

e.g. 140g carbs, glucose 10mmol/l, target 6mmol/l. I:C ratio 1:5g or 2:1, ISF 1:2mmol/l

For food: 140 ÷ 5 = 28 units

For correction: 10 − 6 = 4 , 4 ÷ 2 = 2 units

Total dose = **30 units;** 15 units as standard bolus, 15 units over 2 hours

30 units x **0.20** = 6 units, 30 + 6 = **36 units**
 (override or use health event)
 = 18 units as standard bolus, 18 units over 2 hours

The bolus advisor on most pumps will work out the split and will often add the correction to the upfront part

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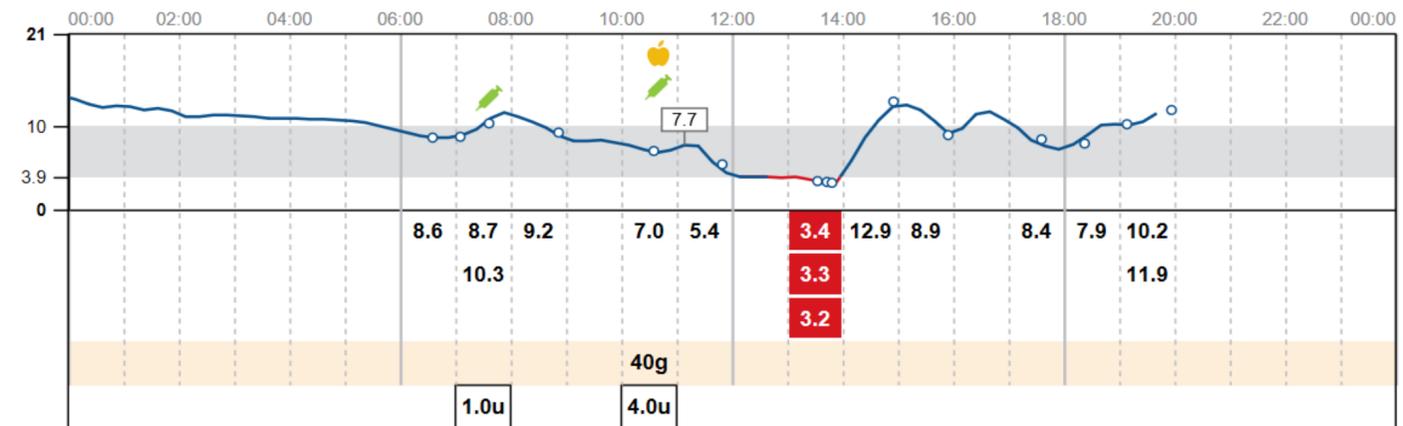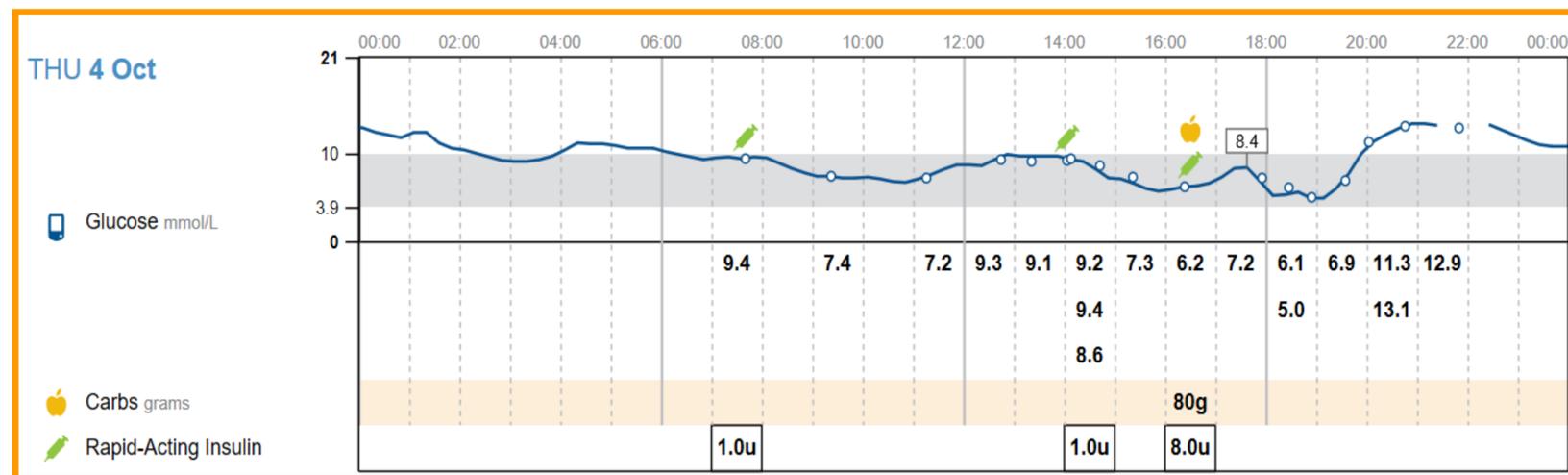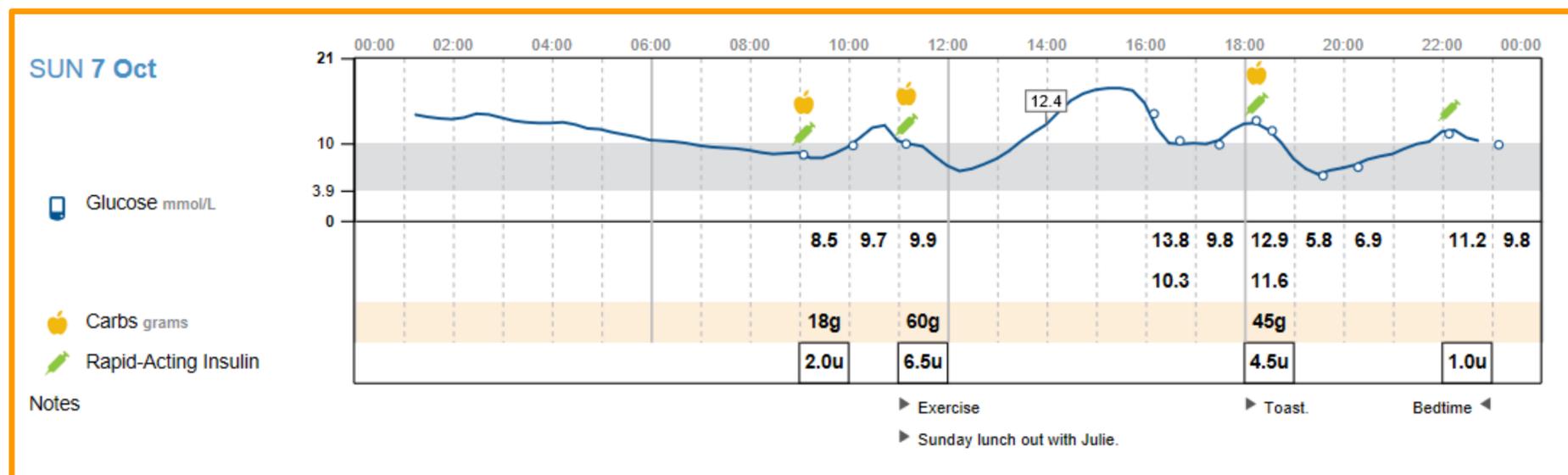
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Using Libre Traces
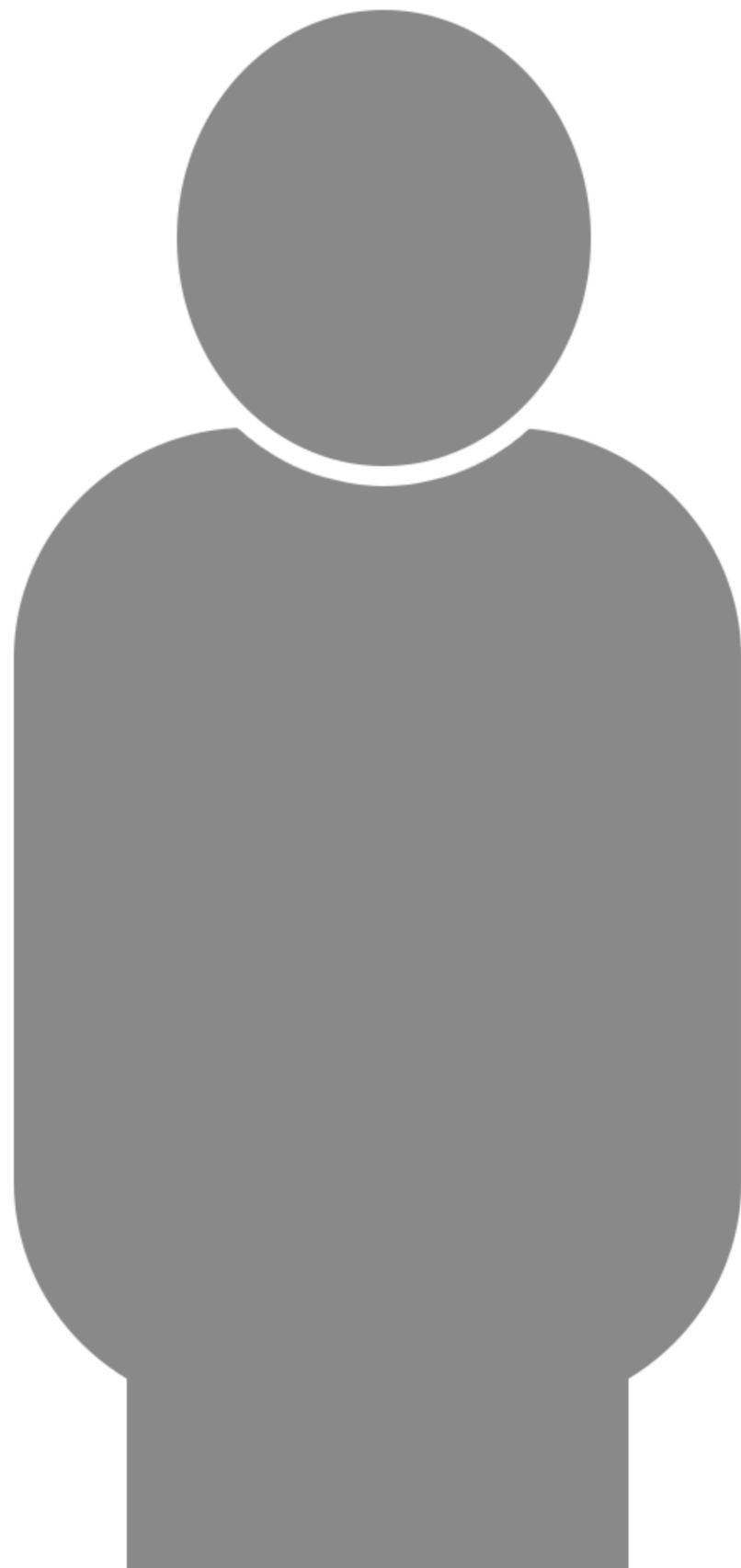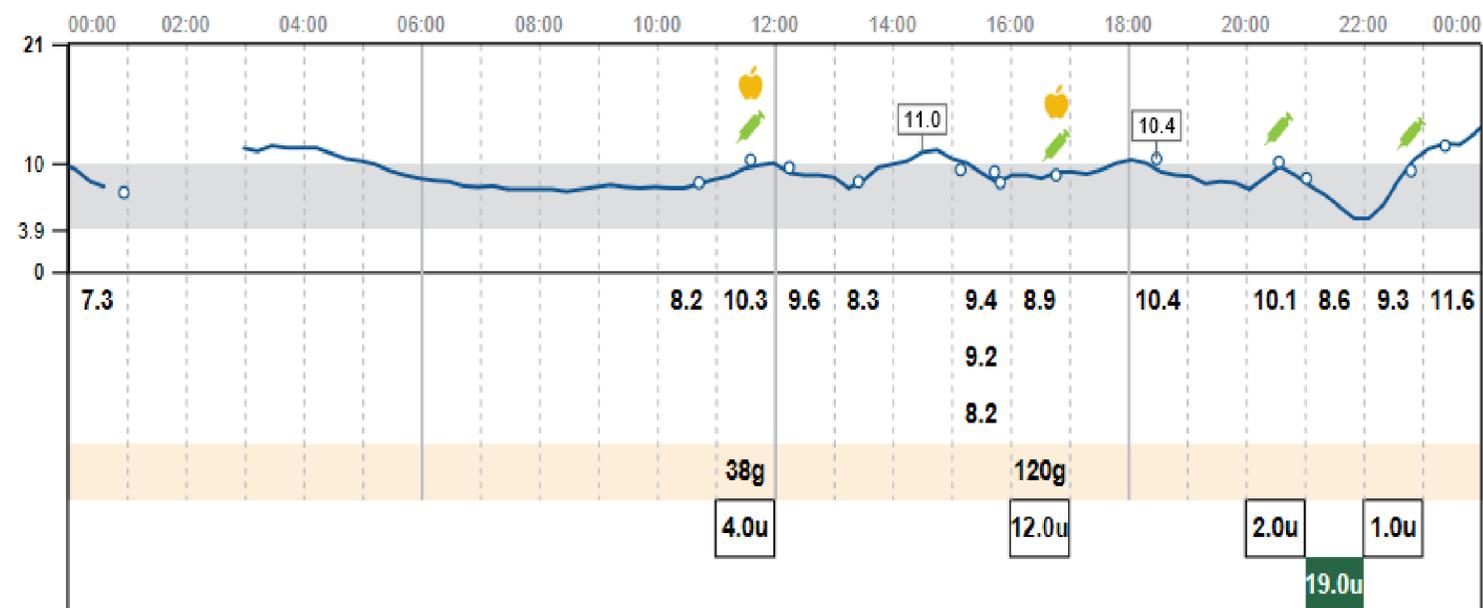
Using Libre Traces

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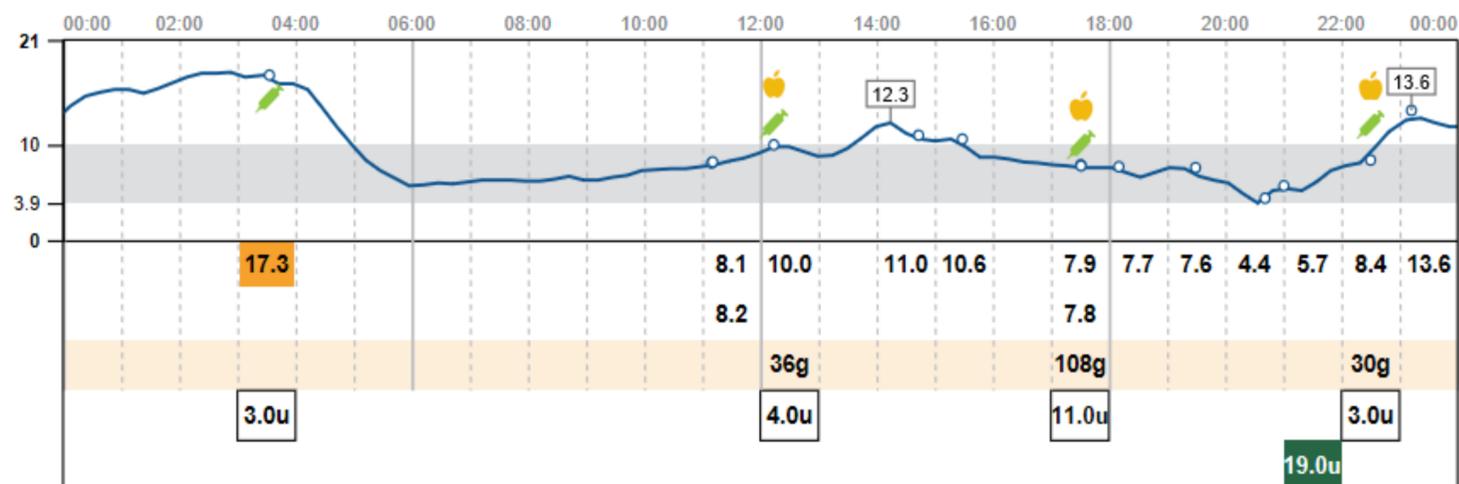
Using Libre Traces

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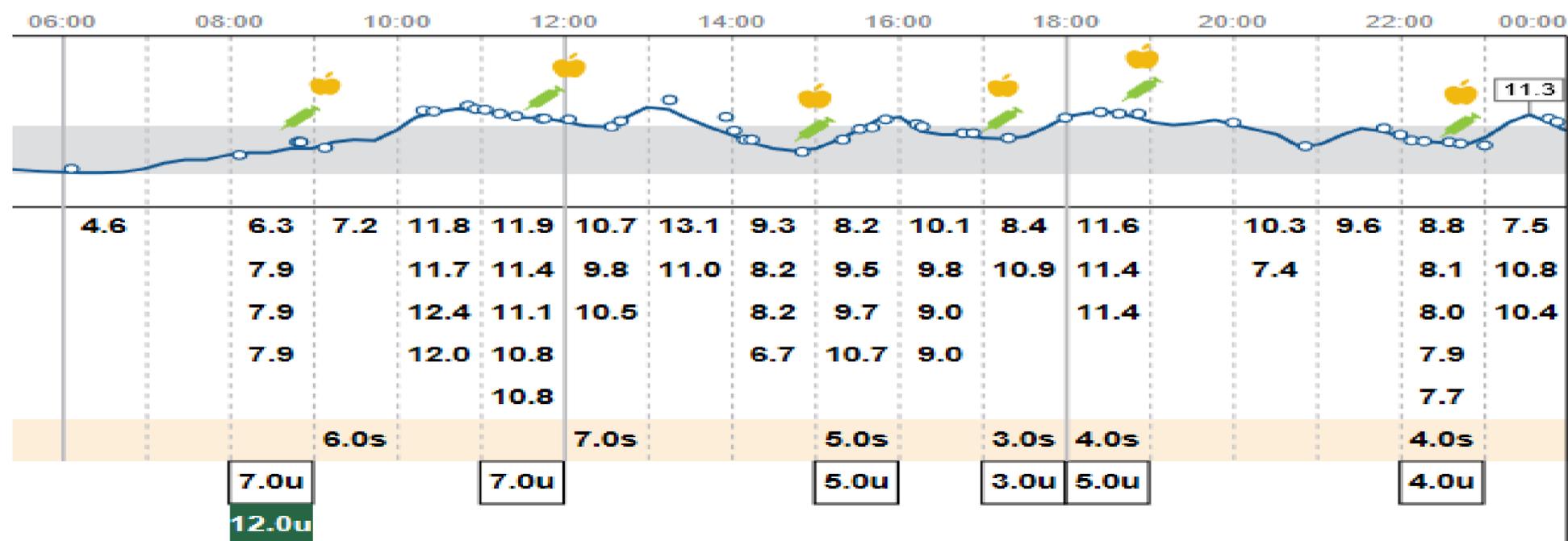
✓ Small, frequent meals
✓ Frequency of scans
✓ Frequency of injections
✓ Injecting 20 mins before meals
✓ Lower GI carbs

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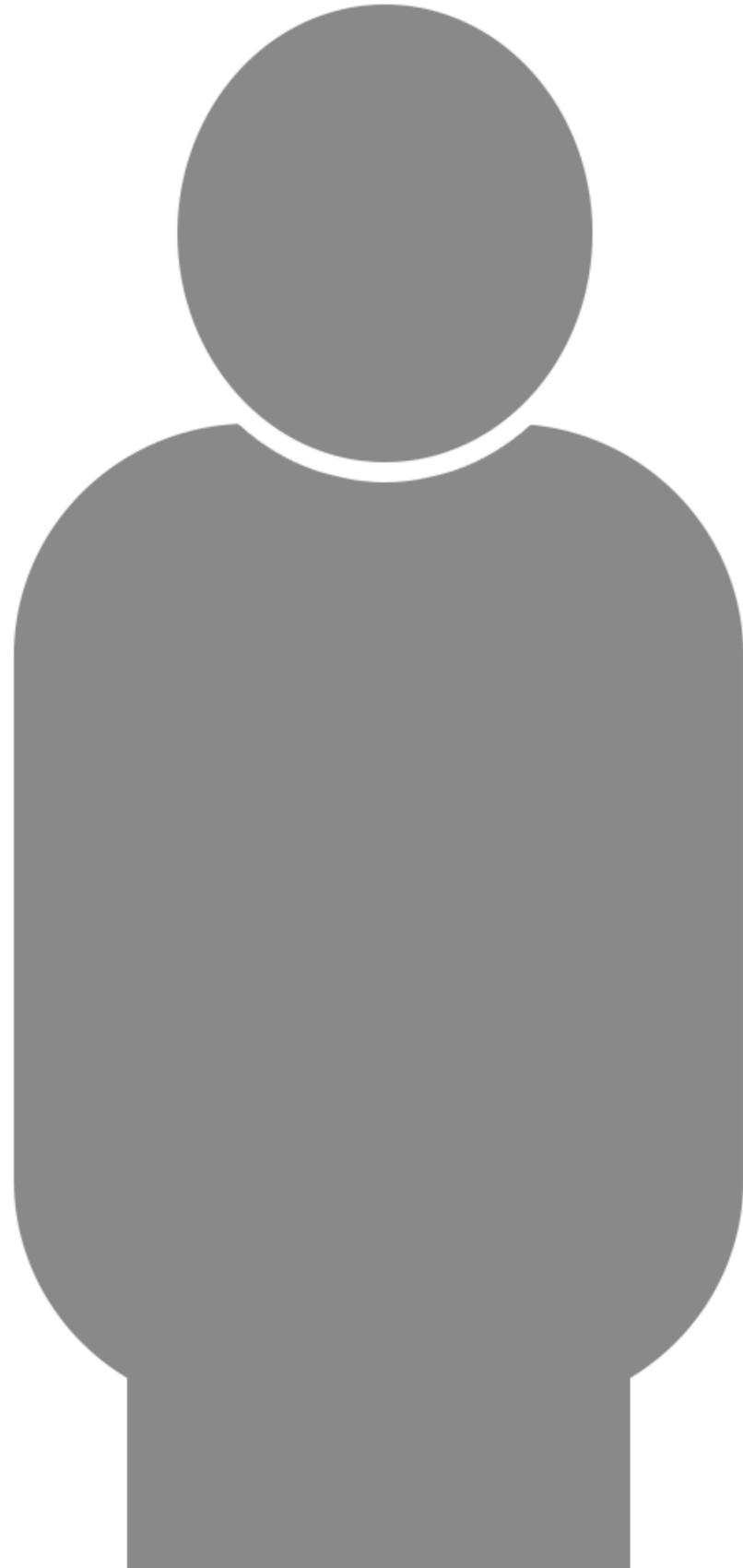
Conclusion

- Carbohydrates remain the main predictor of glucose levels
- Fat and protein in significant amounts do affect glucose levels and can cause variability if not considered
- You can use the Libre traces to adjust how insulin is delivered both with MDI and CSII
- Additional insulin may be required for high fat/ high protein meal
- The response varies between individuals
- Remember to check carbohydrate counting is accurate and I:C ratios are correct before considering taking additional insulin

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