

Research findings

Insulin requirements to maintain normal glucose levels after eating a high protein, high fat meal

Age Range: 12 to 21 years

▶ WHAT WAS THE AIM?

Carbohydrates are recognised as a major determinant of post meal blood glucose responses, which is why carb counting is used to calculate insulin doses for meals. However, recent clinical guidelines suggest that people with type 1 diabetes (T1D) make adjustments to their mealtime insulin doses to compensate for delayed post meal blood glucose rises, for meals with more protein and fat than usual. The amount and pattern of insulin delivery for high protein high fat meals is not well understood.

The aim of this study was to determine the amount and delivery pattern of insulin needed to maintain optimal glucose levels after eating a high protein, high fat meal compared to a low protein, low fat meal.

▶ HOW DID WE DO IT?

Young people with T1D attended two testing sessions at least one week apart. At each session, participant arrived at 8am after fasting overnight and had a drip inserted so that their blood glucose levels could be controlled using insulin. Once their blood glucose levels were stable, participants were given either a low protein low fat meal of pasta with tomato sauce, or a high protein high fat meal of pasta with tomato sauce and mince in a random order. Participants stayed for 5 hours after the meal so that the team could monitor and adjust the insulin to maintain blood glucose levels at 5mmol/l.

▶ WHAT DID WE FIND?

We found a lot of variation between people in both the dose and pattern of insulin delivery for the high protein high fat meal.

A higher dose of insulin was needed for the high protein high fat meal. Some participants needed more of the additional insulin for the high protein high fat meal in the first two hours after the meal and others required most of the additional insulin from two to five hours after the meal. Our full results are published here:

<https://pubmed.ncbi.nlm.nih.gov/33954780/>

▶ WHAT DOES THIS MEAN IN PRACTICE?

For adolescents and young adults with type 1 diabetes, a high protein high fat meal will require more insulin than a low protein low fat meal to maintain optimal glucose levels after the meal. Due to the wide variation in amount and pattern of insulin delivery, it is hard to provide general recommendations, and instead suggests personalised dosing regimens are likely to be needed to achieve optimal post meal glucose control.