**Beta-glucan study Plain English summary**

There are approximately 30,000 adults in the United Kingdom receiving dialysis (blood cleaning) treatment for advanced kidney disease. Advanced kidney disease is associated with reduced quality of life and increased risk of hospital admission and death. For certain people with kidney disease treated with dialysis, receiving a kidney transplant is not possible. For other people treated with dialysis remaining healthy and well is crucial prior to receiving a transplant. It is therefore important to try and investigate the reasons behind poor outcomes in order to improve treatment strategies for people receiving dialysis.

A significant proportion of people (approximately 25%) receiving haemodialysis (a treatment where blood is removed from a person’s body and then ‘cleaned’ by a machine before being returned to the patient) have elevated measurements of inflammation on blood testing that cannot be easily explained by other medical conditions. One possible source of inflammation in this group of patients is increased leakage of gut contents into the bloodstream. There is evidence that the accumulation of toxins in the body as a result of significant kidney impairment can cause increased gut leakage. During haemodialysis treatment, people also commonly have fluid removed from their body as this commonly accumulates as a result of their kidneys not working properly. Fluid removal performed during dialysis may also lead to increased gut leakage as a result of reduced blood supply to the gut.

This study will compare healthy individuals with people who have high blood markers of inflammation and kidney impairment who are receiving dialysis. It will aim to establish if there are differences in gut leakage and gut inflammation between these two groups. If there is evidence of increased gut leakage identified in people with kidney impairment this may help to explain the source of inflammation in this group.

Both groups will be given a drink consisting of oats, banana, raw dates and 150ml of almond milk that contains a large amount of a substance called beta-glucan. Beta-glucan is commonly found in plant-based foods and has been shown to have health benefits such as lowering cholesterol by stopping its absorption from the gut. It is also found in bacteria and fungi. When plant-based foods containing beta-glucan are eaten the beta-glucan part of the food is not usually absorbed from the gut into the bloodstream and its detection in the blood after a meal may represent increased gut leakiness. Previous studies have shown that beta-glucan has been found at high levels in the blood of people who are undergoing dialysis treatment however it is not clear if these levels are high due to increased levels of gut leakage or another source.

People receiving dialysis treatment may have questions about the amount of potassium and phosphate contained in the drink. This drink contains approximately 1/6th of the recommended daily intake of potassium and 1/7th of the recommended daily intake of phosphate for a person receiving dialysis treatment. People with kidney impairment who have persistently high levels of potassium on blood tests will not be included in this study.

Routine blood tests will be taken on dialysis as part of usual care along with a baseline measurement of beta-glucan in the blood prior to taking the beta-glucan drink. After taking the drink, participants will undergo 8 separate blood tests over a period of 48 hours in order to measure the levels of beta-glucan in the bloodstream. Study participants will be asked to follow a low fibre diet for 48 hours before and after taking the beta-glucan drink. Participants will also be asked to fast for 12 hours before taking part in the study. This is in order to minimise beta-glucan intake from other dietary sources.

Participants will be asked to provide a stool sample which will be studied for evidence of gut inflammation and leakiness. In addition, participants will also be asked 2 questions about their mood and will also undergo examinations to assess the level of fluid in the body both before and after dialysis treatment. These investigations are being performed to assess if there is any evidence of a relationship between mood, amount of fluid in the body and gut leakiness.

Following completion of the above investigations, there will be no further follow up for participants who are enrolled in this study.

This study aims to help to establish if there is evidence of increased gut leakage in people with kidney impairment treated with dialysis and to better understand if gut leakage explains the increased levels of inflammation seen in this group of patients. This study may, in turn, help to inform future treatment strategies to reduce gut leakage and inflammation in people with kidney impairment.