Describe metabolism in the fed state

What three things enter the gut?

What does glucose do and where?

Where does dietary fat go?

What enzyme is activated to take in fat for storage?

What happens to AAs?

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• Glucose, AA and fat are entering via the gut

• Glucose acts on the islets to increase insulin and decrease glucagon

• This causes glucose to be stored in the liver as glycogen

• Excess glucose is converted into fatty acids then triglycerides and goes via vLDLs to adipose tissue

• Glucose also gets into the brain and RBCs whether it is high or low due to transporter mediated uptake which is not insulin dependent

• GLUT-4 transporters upregulated by insulin will appear on muscle and adipocytes which allows glucose to enter stored as glycogen in muscle and in adipose tissue to provide glycerol phosphate for re-esterification of fatty acids

• Dietary fat goes to the periphery

• Lipoprotein lipase is activated and the fat is taken in for storage

• AAs are taken up into the tissue and insulin inhibits protein degradation

Describe metabolism in the fasting state

What happens to glucagon and insulin?

Where is glucose released into?

What happens to the brain and RBCs?

What happens to stored fat? Which enzyme?

What happens to GLUT-4 transporters?

What do muscles use for energy now?

What happens to muscle protein eventually?

What happens to the released fatty acids?

What two things activate gluconeogenesis?

Where will most of the glucose come from?

What is released into circulation to feed the brain?

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• We lived in the fasting state predominantly for thousands of years

• Glucagon high, insulin low

• Glycogen is degraded into glucose

• Glucose will be released into bloodstream

• Brain and RBCs are still able to take it up in low concs

• Stored fat is broken down into fatty acids which are released into the bloodstream. This is done by hormone sensitive lipase.

• GLUT-4 transporters have been downregulated

• Therefore, muscles not take fatty acid and metabolise fatty acid

• As glucose becomes scarce, muscle protein is broken down into glucose

• Fatty acids also go into the liver and are degraded to Acetyl CoA and then form ketone bodies for the brain

• Lactate from RBCs goes into the liver and glucagon activate gluconeogenesis

• However, most of the glucose will come from AAs stored in the muscle