

Lipoproteins II--7 Nov. 2002

1) What enzyme acts on TG carried by chylomicrons?

Primarily LPL (lipoprotein lipase).

What activates this enzyme?

LPL is activated by Apo C-II.

Where do chylomicrons acquire this activator?

Primarily from HDL, although a small amount of Apo C-II is secreted with the nascent form and some is present free in the plasma.

What is the fate of the chylomicron remnant?

The chylomicron remnant is taken up by the liver primarily by the ApoE/remnant receptor. Receptor mediated endocytosis of the remnant deposits it eventually in the lysosome where the proteins and lipids are hydrolyzed down to their building blocks.

2) Name three regulatory consequences on a cell of LDL receptor mediated cholesterol uptake.

I can name 5:

decreased HMG-CoA reductase activity primarily because of decreased transcription and and decreased translation

increased ACAT activity

decreased LDL receptor synthesis

increased degradation of the LDL receptor (this one was not mentioned in lecture)

decreased receptor-mediated endocytosis of LDL resulting from fewer plasma membrane receptors

3) What enzyme acts on TG carried by VLDL?

Primarily LPL (lipoprotein lipase).

What activates this enzyme?

LPL is activated by Apo C-II.

Where does VLDL acquire this activator?

Primarily from HDL and some from the plasma. Also small amounts of Apo C-II are present on the secreted form.

What are the two fates of the VLDL remnant, IDL?

A small amount of IDL can be taken up by the ApoE/remnant receptor. Even tinier amounts of IDL may be cleared by the LDL receptor, but this is not generally considered physiologically relevant. The reason why IDL is not taken up by the LDL receptor to any significant extent is because the domain of Apo B-100 that the LDL receptor binds to is buried i.e. hidden in the phospholipid monolayer, and is only exposed to a significant extent when the IDL particle is metabolized down to the smaller diameter LDL particle and this domain gets shoved to the surface.

Most of the IDL is converted into LDL. The exchange of TGs and PC for cholesterol esters of HDL catalyzed by CETP is part of the processing of VLDL to IDL and of IDL to LDL.