

Intro Biochemistry

Test 4 Review

11/18/05

Chapter 17

- Meaning of oxidation and reduction
- Source of reducing equivalents
- Flow of electrons through electron transport chain
- Know the two paths -- starting with either Complex I or Complex II
- Understand how the electron transport chain is coupled to oxidative phosphorylation
- Know how proton gradient is used to generate ATP via chemiosmotic model (the accepted model)
- Know how cytoplasmic NADH sends electrons to mitochondria

Lipids Ch 8

- Lipid structure and properties
- Triacylglycerol function
- Triacylglycerol breakdown
- Adipocyte function
- Glycerophospholipid function and properties
- Sphingophospholipid function and properties
- Cholesterol structure and function
- Cholesterol precursors

Lipids Ch 9

- Micelle vs. Lipid bilayer
- Lipid bilayer function
- Lipid bilayer composition - general
- Fluid mosaic model
- Membrane proteins
- Membrane transport - passive, active

Lipid Metabolism Ch 18

- Dietary Triacylglycerols
 - breakdown
 - emulsification
 - absorption
 - Transport in blood
 - Storage and utilization

Lipid Metabolism Chapter 18

- Hormonal regulation of triacylglycerol breakdown
 - Triggered by blood glucose
 - Release pancreatic hormones
 - Binds to cell receptors
 - Triggers cAMP production
 - Activates enzyme
 - Releases FA and transport into blood

Lipid Metabolism Chapter 18

- Fatty Acid Catabolism
 - Activation
 - Transport
 - Steps in breakdown
 - Energy yield (itemized)
- Odd Chain Fatty Acid Catabolism
 - Products
 - Propionyl CoA changed to Succinyl CoA

Lipid Metabolism Chapter 18

- Fatty Acid biosynthesis
 - Shuttle for Acetyl CoA
 - Rate-determining step and modulators
 - Importance of malonyl CoA
 - Unique cofactors - ACP
 - Steps of biosynthesis
 - Product
- Be able to compare FA breakdown and synthesis and know how they are regulated

Lipid Metabolism Chapter 18

- Cholesterol
 - Importance
 - Function and Properties
 - Transport of
 - Steroid precursor
 - Excretion of (as bile salts)

Lipid Metabolism Chapter 18

- Cholesterol biosynthesis
 - Precursors
 - Rate-determining step and regulation
- Lipoprotein complexes and Chl
 - VLDL: liver to tissue
 - LDL: major Chl carrier
 - HDL: tissue to liver
 - Chylomicrons: for exogenous lipids and exogenous Chl
- Cholesterol acquisition by cells
 - Receptors
 - Chl ester breakdown and Chl release

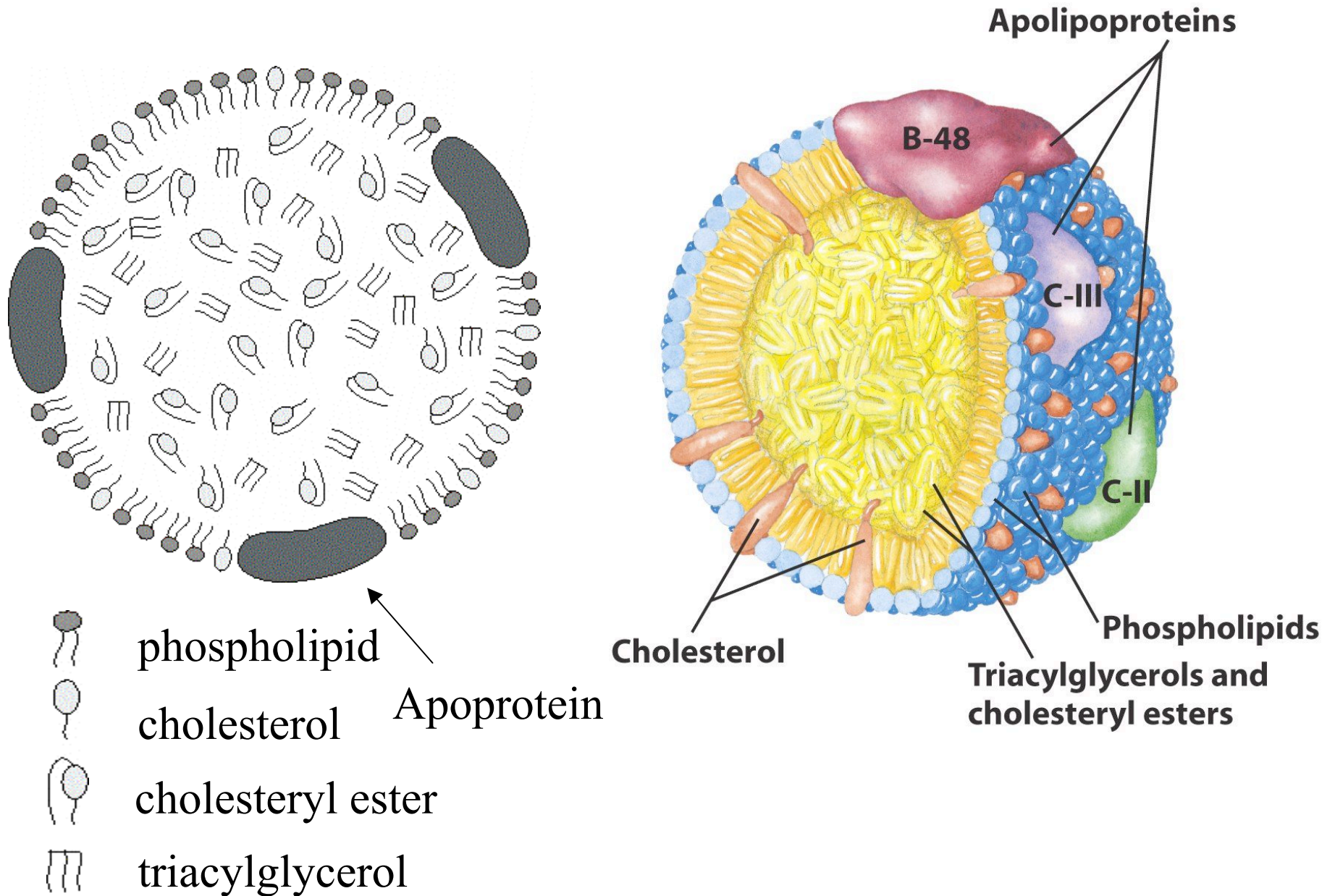
Nitrogen Metabolism Chapter 19

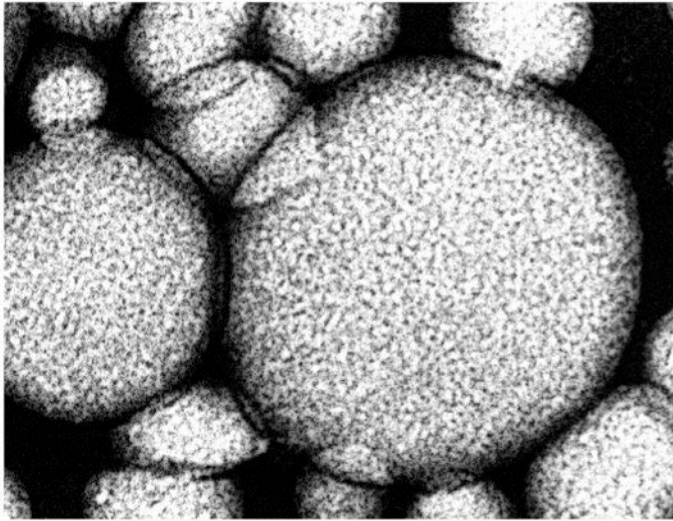
- Nitrogen processing in animals
 - Glutamate formation
 - Glutamine formation
 - Aspartate formation
 - Alanine formation
 - Know reactions for all the above

Nitrogen Metabolism Chapter 19

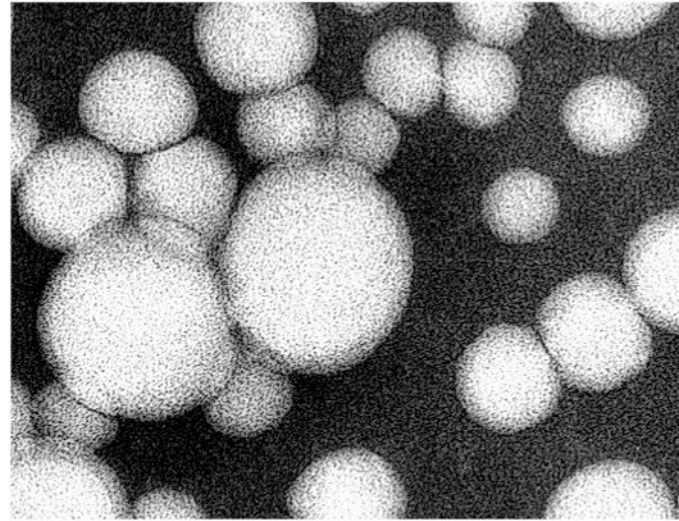
- Essential vs. Non-essential amino acids
- Amino acid breakdown
 - Deamination
 - Degradation of α -keto acid
 - Glucogenic and/or ketogenic products (on final exam)
 - Tie in to Citric acid cycle

Structure of Human Plasma Lipoproteins

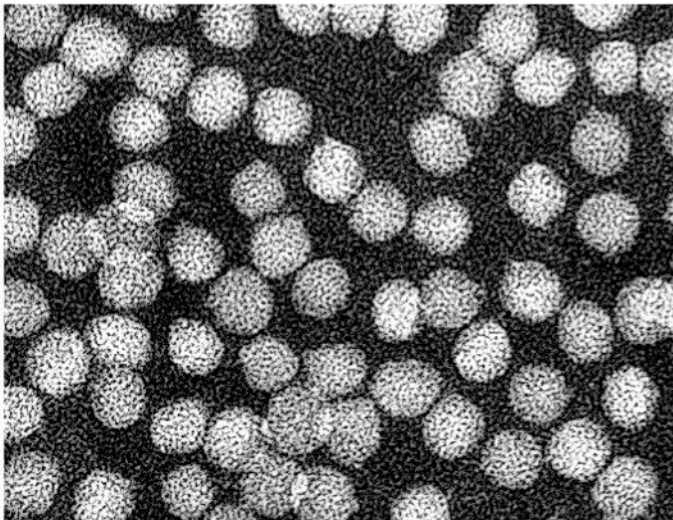




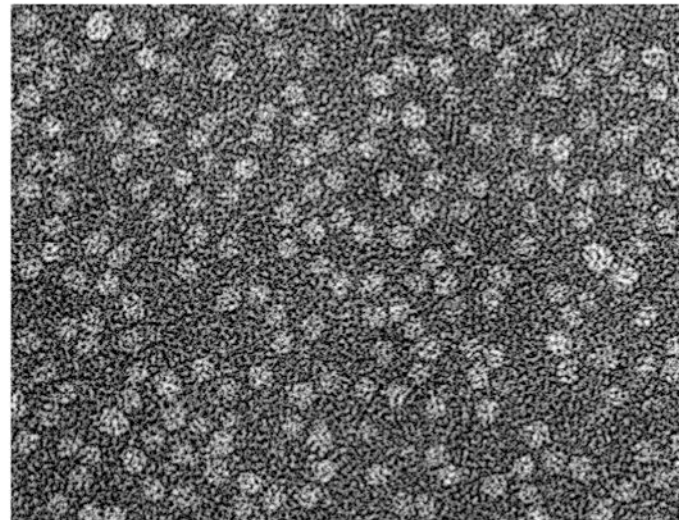
Chylomicrons ($\times 60,000$)



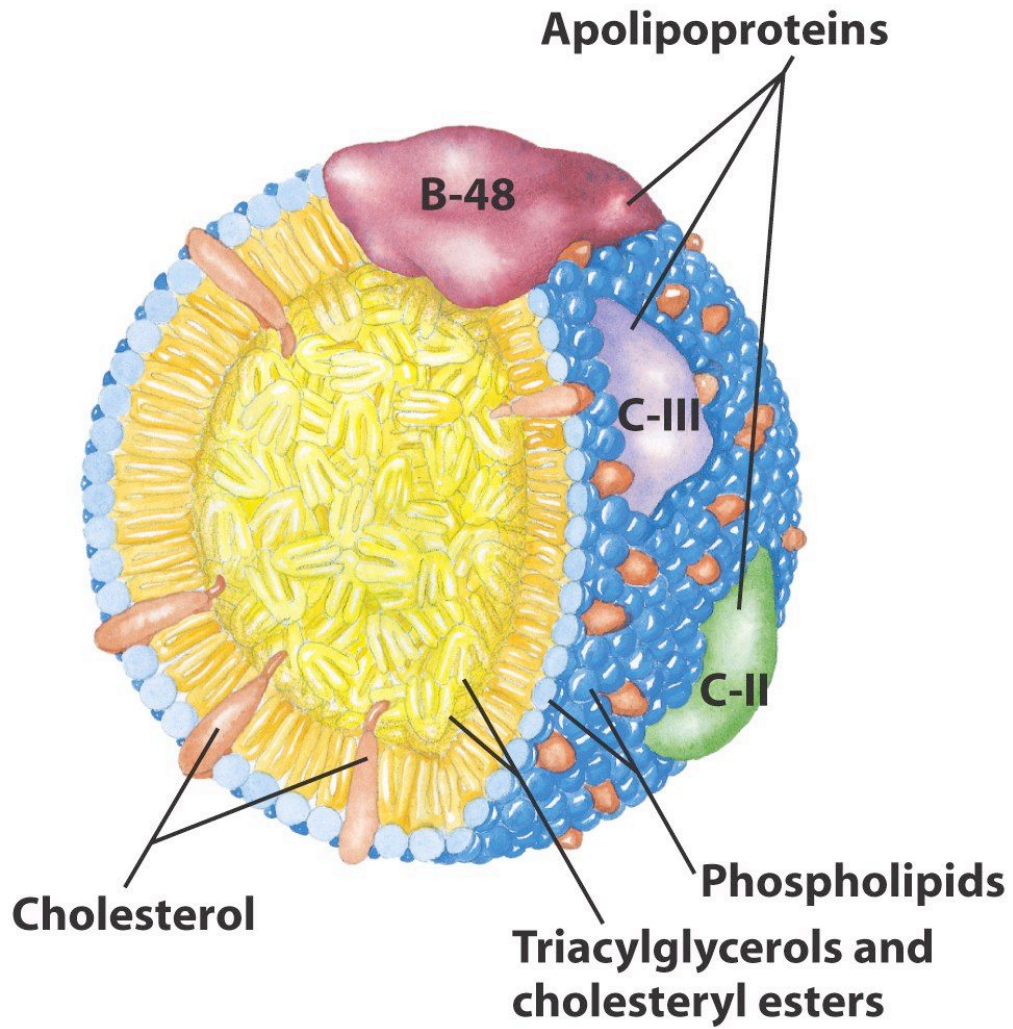
VLDL ($\times 180,000$)



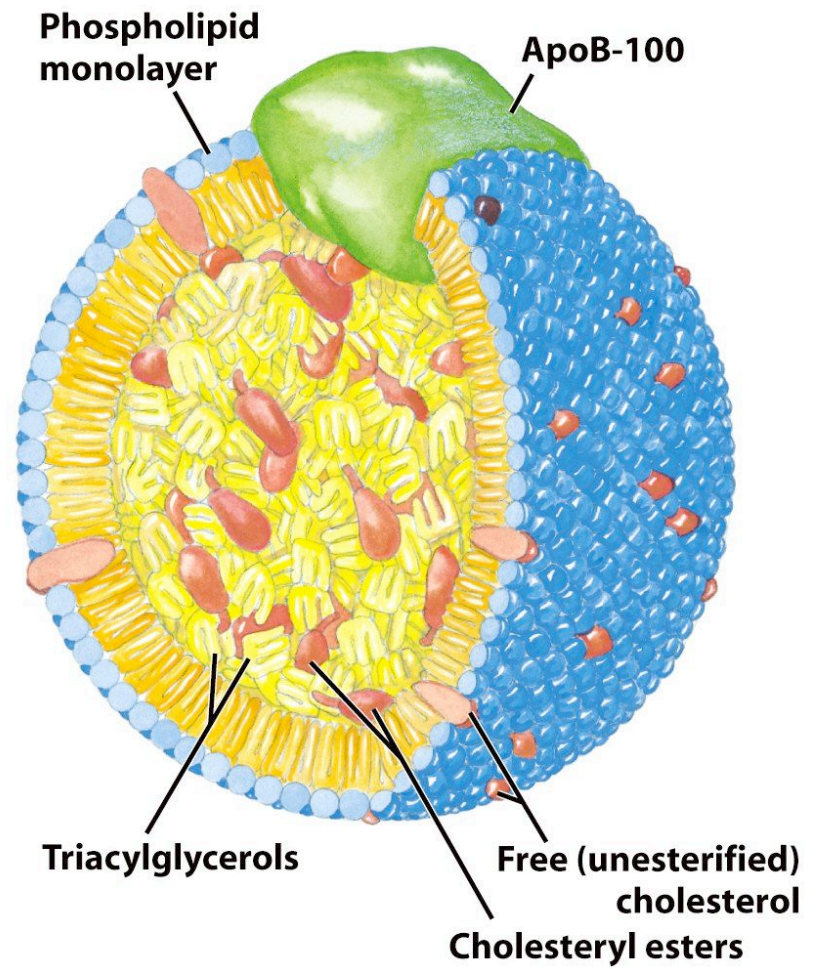
LDL ($\times 180,000$)



HDL ($\times 180,000$)



Chylomicron



LDL

Properties of Apoproteins

TABLE 21-3 Apolipoproteins of the Human Plasma Lipoproteins

<i>Apolipoprotein</i>	<i>Molecular weight</i>	<i>Lipoprotein association</i>	<i>Function (if known)</i>
ApoA-I	28,331	HDL	Activates LCAT; interacts with ABC transporter
ApoA-II	17,380	HDL	
ApoA-IV	44,000	Chylomicrons, HDL	
ApoB-48	240,000	Chylomicrons	
ApoB-100	513,000	VLDL, LDL	Binds to LDL receptor
ApoC-I	7,000	VLDL, HDL	
ApoC-II	8,837	Chylomicrons, VLDL, HDL	Activates lipoprotein lipase
ApoC-III	8,751	Chylomicrons, VLDL, HDL	Inhibits lipoprotein lipase
ApoD	32,500	HDL	
ApoE	34,145	Chylomicrons, VLDL, HDL	Triggers clearance of VLDL and chylomicron remnants

Source: Modified from Vance, D.E. & Vance, J.E. (eds) (1985) *Biochemistry of Lipids and Membranes*. The Benjamin/Cummings Publishing Company, Menlo Park, CA.

LCAT = lecithin:cholesterol acyl transferase

LPL = lipoprotein lipase

- Apoproteins are amphipathic helices. Charged amino acids on one side of α -helix and neutral amino acids on the other. (Neutral side interacts with lipid)