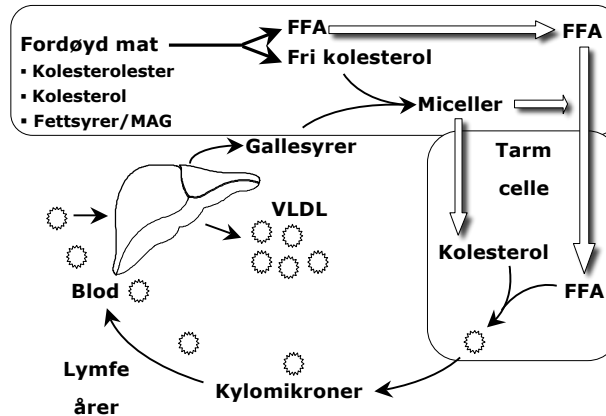


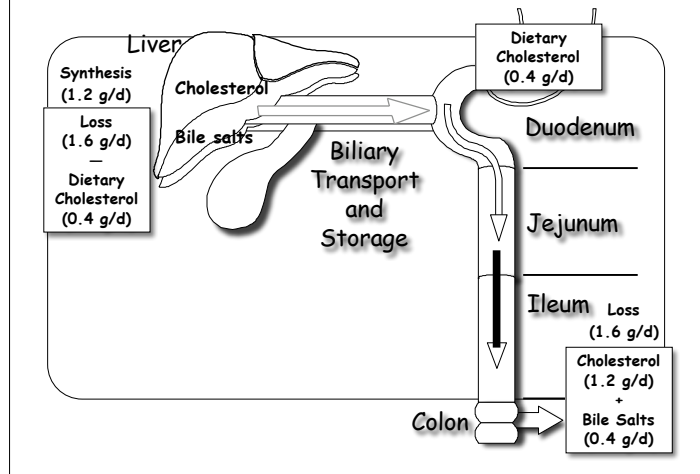
Lipidmetabolisme og lipoproteiner

FRM3020 A.C.Rustan

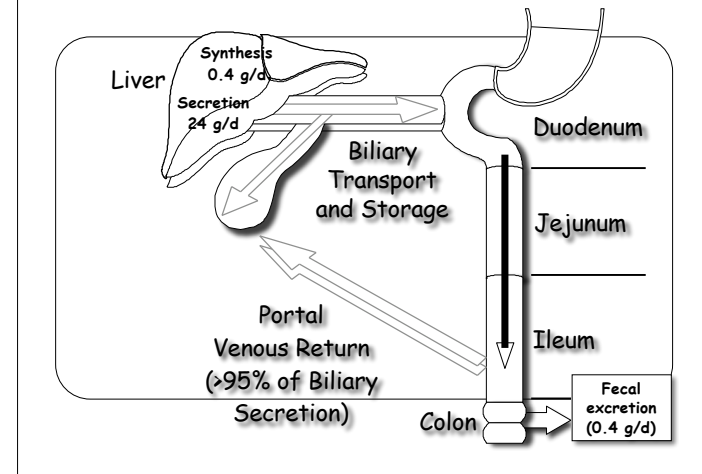
Hvordan absorberes kolesterol og TAG?



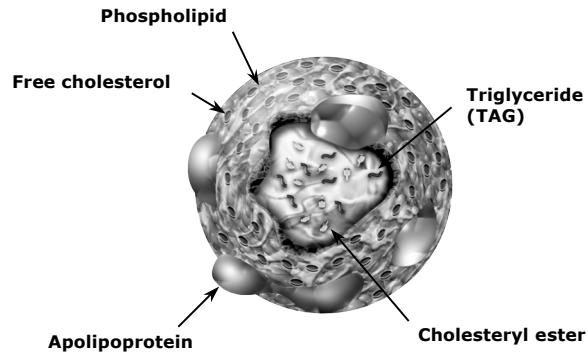
Kolesterolbalanse



Enterohepatic Circulation of Bile Salts



Lipoproteiner - struktur



Klassifisering av lipoproteiner

Basert på tetthet (density):

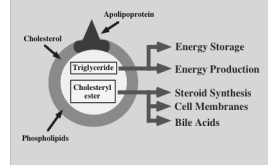
- Kylomikroner (CM) (størst og lettest)
- Very low-density lipoprotein (VLDL)
- Intermediate-density lipoprotein (IDL)
- Low-density lipoprotein (LDL)
- High-density lipoprotein (HDL).

Lipoproteiner - funksjoner

Triglyseridrike lipoproteiner

- .. Kylomikroner
- .. VLDL

Energitransport (fettsyrer)



Kolesterolrike lipoproteiner

- .. LDL
- .. HDL

Kolesteroltransport

Lipoproteiner

Lipoprotein klasse	Tetthet (g/ml)	Diameter (nm)	Type apoprotein*	Apoprotein innhold (%)	Kolesterolester innhold (%)	Triglyserid innhold (%)
Chylomikroner	< 0,95	500	C-III	2	3	85
Very low density lipoprotein (VLDL)	< 1,006	43	B-100	10	13	50
Intermediate density lipoprotein (IDL)	1,006-1,019	27	B-100	18	22	26
Low density lipoprotein (LDL)	1,02-1,06	26-27	B-100	25	37	10
High density lipoprotein (HDL)	1,063-1,21	6,5-9,5	A-1	55	15	4

* Chylomikroner, VLDL, IDL og HDL inneholder ulike typer apoproteiner, bare den vanligste er angitt her.

LDL cholesterol

- Remains the cornerstone of dyslipidemia therapy
- Strongly associated with atherosclerosis and CHD events
- 10% increase results in a 20% increase in CHD risk¹
- Most patients with elevated LDL untreated
 - Only 5.5 million out of 22 million treated²

Referanseverdi generelt: < 3 mmol/l

1. Wood D, et al. *Atherosclerosis*. 1998;140:199-270.
2. National Centre for Health Statistics. National Health and Nutrition Examination Survey (III) 1994.

HDL cholesterol

- Elevated HDL cholesterol has a protective effect for risk of atherosclerosis and CHD¹
- The lower the HDL cholesterol level the higher the risk for atherosclerosis and CHD¹
- HDL cholesterol tends to be low when triglycerides are high²

Referanseverdi: > 1.1 mmol/l for menn
> 1.3 mmol/l for kvinner

1. NCEP, Adult Treatment Panel II. *JAMA*. 1993;269:3015-3023.
2. Wood D, et al. *Atherosclerosis*. 1998;140:199-270.

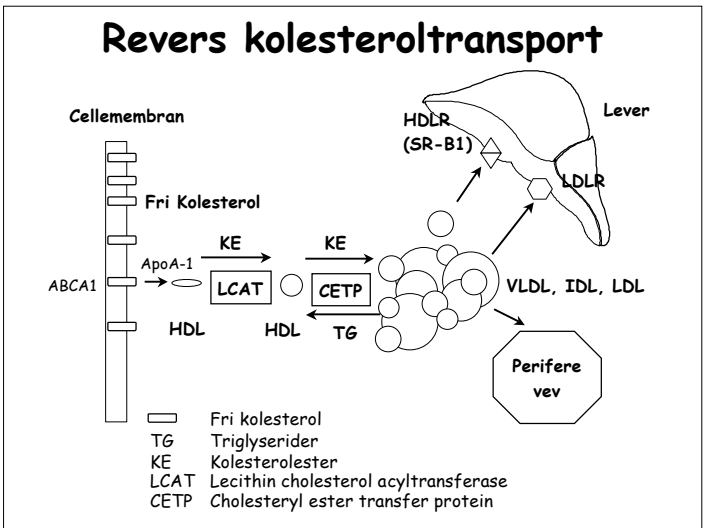
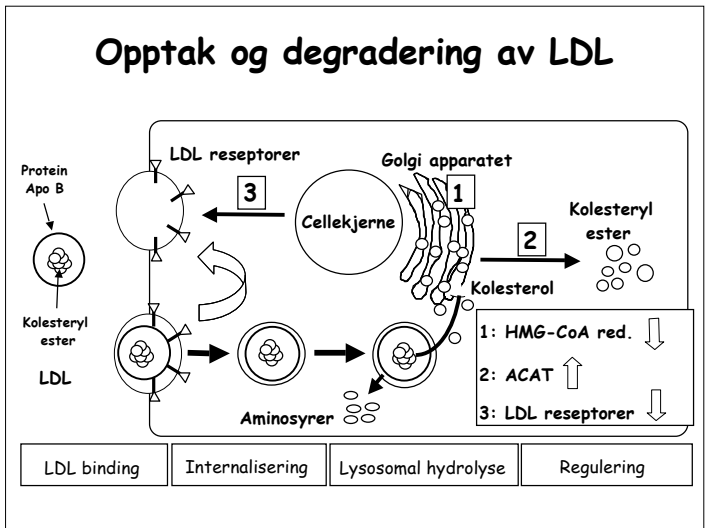
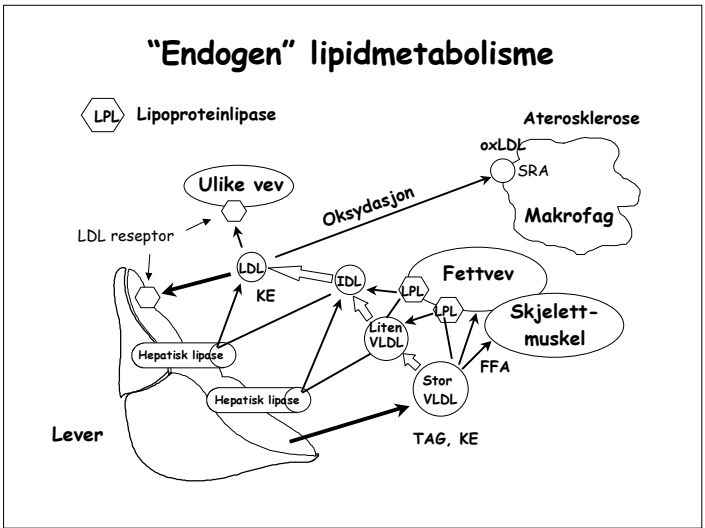
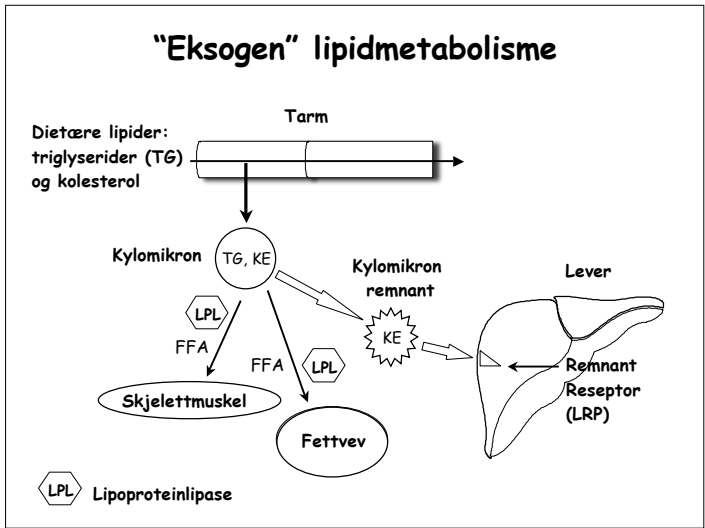
Triglycerides

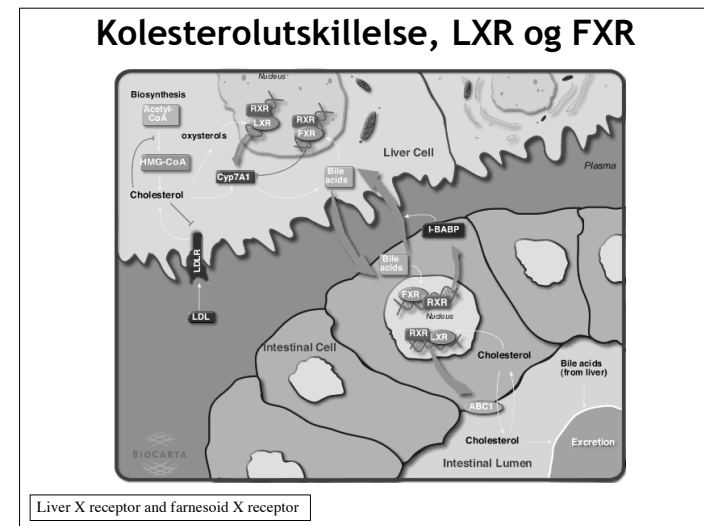
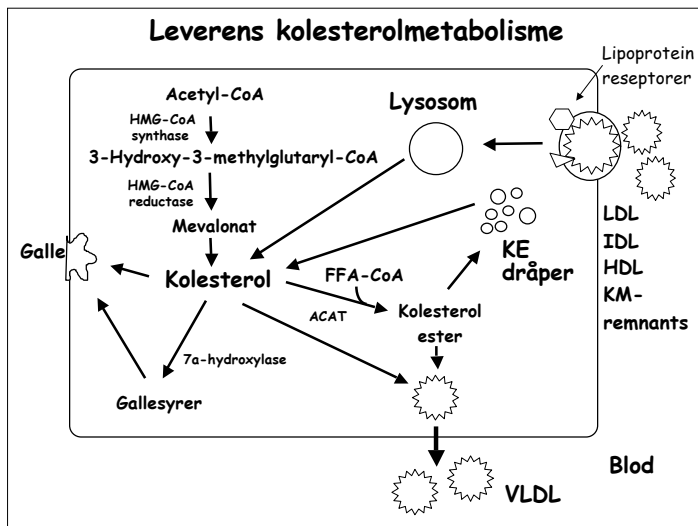
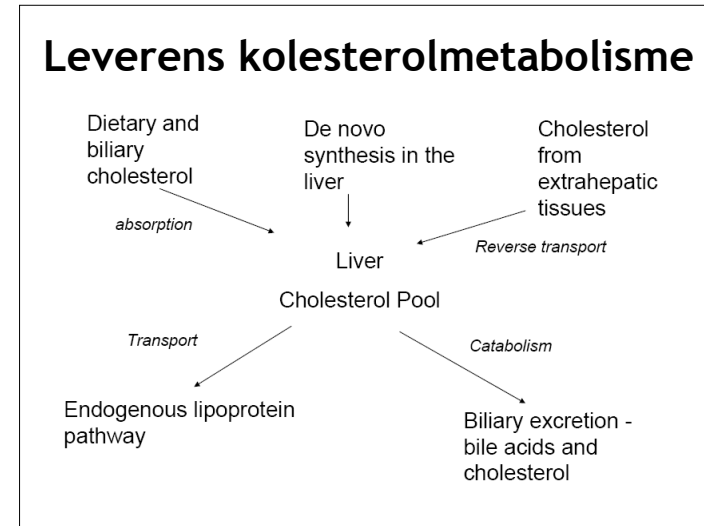
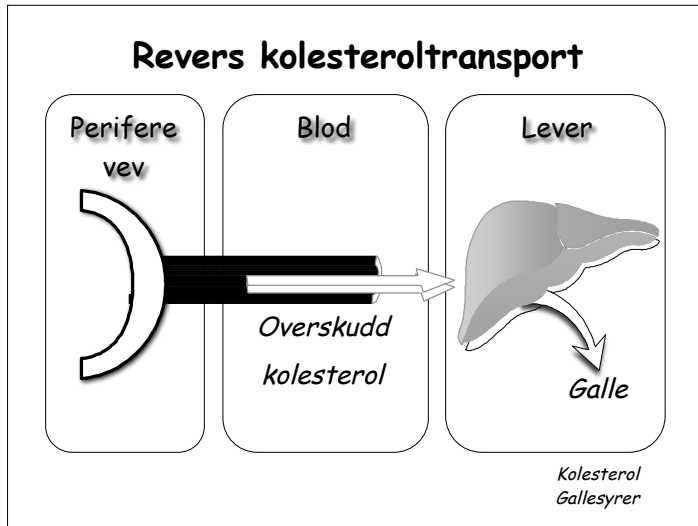
- Associated with increased risk of CHD events
- Link with increased CHD risk is complex
 - May be related to low HDL levels and highly atherogenic forms of LDL cholesterol
- Normal triglyceride levels < 2 mmol/l
- Very high triglycerides >10-12 mmol/l increase pancreatitis risk

NCEP, Adult Treatment Panel II. *JAMA*. 1993;269:3015-3023.

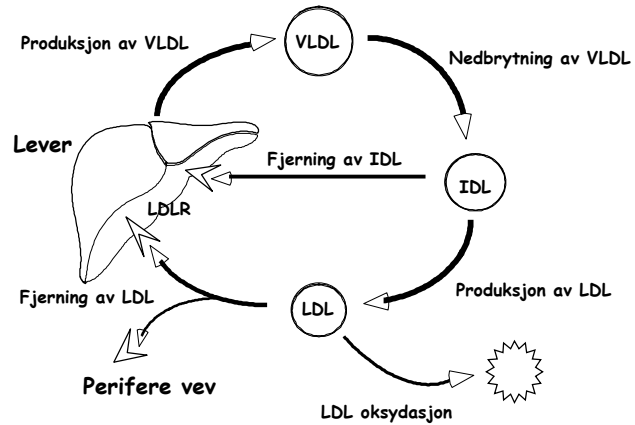
Apolipoproteins

- Main protein content of lipoproteins
- Functions include
 - Facilitation of lipid transport
 - Activation of 3 enzymes in lipid metabolism
 - Lecithin-cholesterol acyltransferase (LCAT)
 - Lipoprotein lipase (LPL)
 - Hepatic triglyceride lipase (HTGL)
 - Binding to cell surface receptors





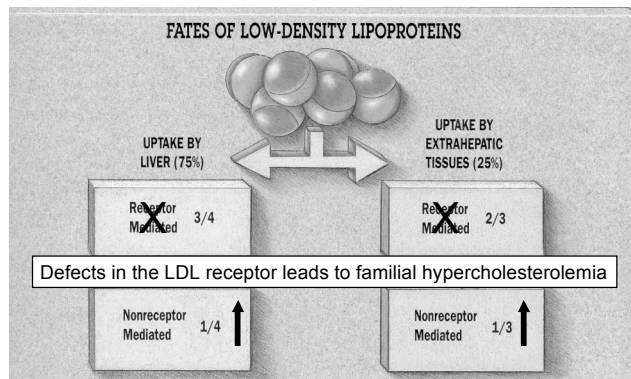
Hovedprinsippene for regulering av LDL



Effects of dietary fatty acids on lipoprotein metabolism

	Saturated (14:0 & 16:0)	Monoenes (18:1 n-9, cis)	Omega-6 (18:2 n-6)	Omega-3 EPA & DHA
Chylomicron				
VLDL production	↑	→	? ↓	↓↓
LDL production	↑	→	↓	? ↓
LDL clearance	↓	↑	↑	→
LDL-receptor activity	↓	↑	↑	→
HDL	↑	? →	→	? ↑
Hepatic cholesterol excretion	↓	↑	↑	↑

LDL Uptake by Tissues



Cholesterol and Atherosclerosis, Grundy

Tendon xanthoma



Hovedprinsippene for regulering av triglyserider (VLDL) og kolesterol (LDL)

