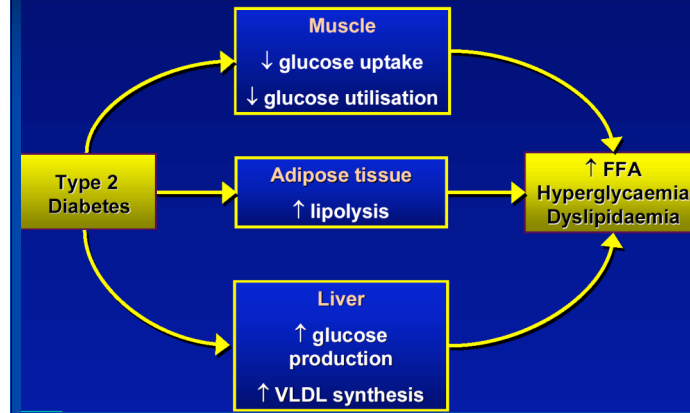


Lipider og diabetes

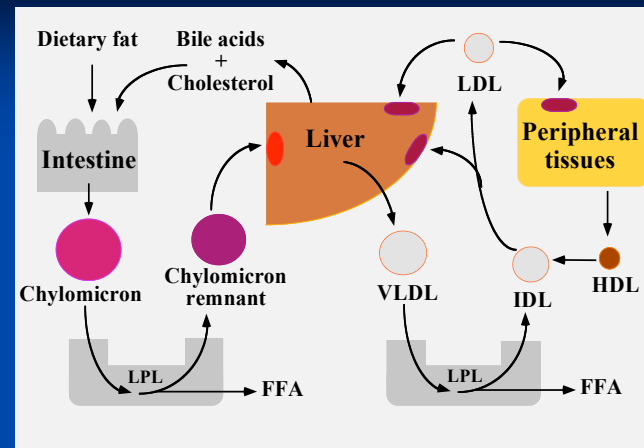
Type 2 Diabetes: Metabolic Imbalance



Lipidendringer hos pasienter med diabetes

	Type 1		Type 2	
	Dårlig kontroll	God kontroll	Dårlig kontroll	God kontroll
Total kolesterol	↑	Normal	↑	Normal
LDL kolesterol	Normal	Normal	↑	Normal
Triglyserider	↑	Normal	↑↑	↑
HDL kolesterol	↓	↑ Normal	↓	↓

Lipoproteinomsetning



Lipider og type 2 diabetes

- **Insulinresistens: konsekvenser for lipidmetabolismen**
- **Lipidtriaden: Total- og LDL-kolesterol, HDL-kolesterol, triglyserider**

Type 2 Diabetes and Dyslipidaemia

- Diabetic (atherogenic) dyslipidaemia is characterised by multiple lipoprotein abnormalities
 - elevated triglyceride (TG) levels
 - decreased HDL-C levels
 - shift to small dense LDL particles (pattern B LDL phenotype)
 - elevated free fatty acids
 - increased apolipoprotein B, decreased apolipoprotein A

Dyslipidaemia in Diabetes

Increased

- Triglycerides
- VLDL
- LDL and Small Dense LDL
- Free Fatty Acids
- Apo B
- Lp(a)

Decreased

- HDL
- Apo A-I

Lipidforstyrrelser ved insulinresistens og type 2 diabetes, blodplasmanivåer

- Hypertriglyceridemi (>1.7 mmol/l)
- Lavt HDL-kolesterol
< 0.9 mmol/l (m), < 1.0 mmol/l (k)
- Ikke spesielt høyt LDL-nivå, men flere små, tette LDL-partikler
- Forlenget postprandial lipemi

Insulinresistens, FFA og triglyserider

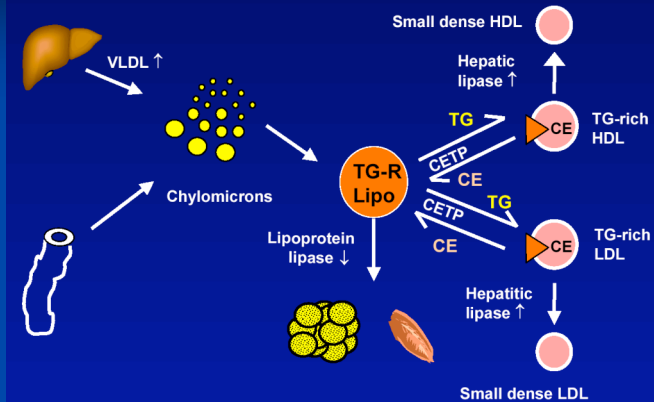
- Decreased insulin action on lipoprotein lipase leads to decreased uptake of TG-rich lipoproteins



- Decreased insulin action on hormone sensitive lipase enhanced lipolysis leading to \uparrow FFA. In the presence of hyperinsulinaemia, FFA is used for VLDL synthesis by liver



Insulin Resistance and Dyslipidaemia



Potential Atherogenicity of Hypertriglyceridaemia

Direct:

Chylomicron remnants and VLDL remnants

- Enter the arterial wall
- Stimulate PAI-1 synthesis and secretion from endothelial cells
- Stimulate Factor VII activity

Indirect:

- Increase in small dense LDL particles
- Decrease in HDL cholesterol

Small Dense LDL and CAD: Potential Atherogenic Mechanisms

- Increased susceptibility to oxidation
- Increased vascular permeability
- Conformational change in Apo B
- Decreased affinity for LDL receptor
- Greater arterial endothelial uptake
- Increased uptake by macrophages

Behandlingsmål = ønsket nivå (generelt og ved diabetes)

- Total kolesterol < 5.0 mmol/L
- Total/HDL ratio < 4.0
- LDL-kolesterol < 3.0 mmol/L (*lavere hos diabetikere < 2.6 mmol/L*)
- Triglyserider < 2.0 mmol/L (< 2.4)
- HDL-kolesterol > 1.0 mmol/L (> 1.15)

Hvem skal ha profylakse?

Type 2 diabetiker under 75 år, har forventet levetid på 5 år og som:

- har kjent aterosklerotisk hjertesykdom og totalkolesterol/HDL > 4
- *ikke* har kjent aterosklerotisk hjertesykdom, men har én risikofaktor i tillegg til sin diabetes og totalkolesterol/HDL > 5 mmol/l

Aktuelle medikamenter

- Statiner
- Fibrater
- Omega-3 fettsyrer