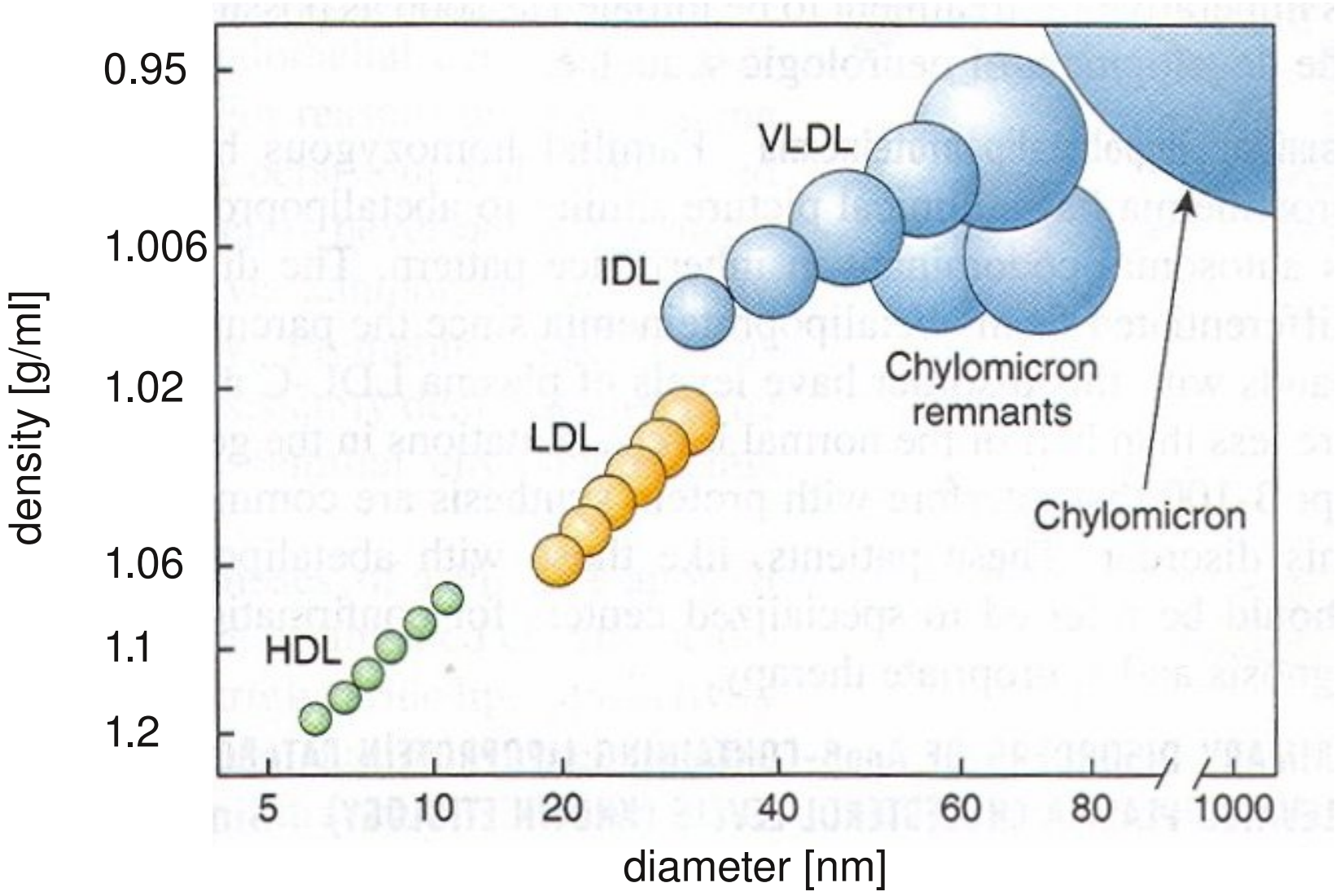
Laboratory diagnosis of lipid metabolism, risk factors of atherosclerosis

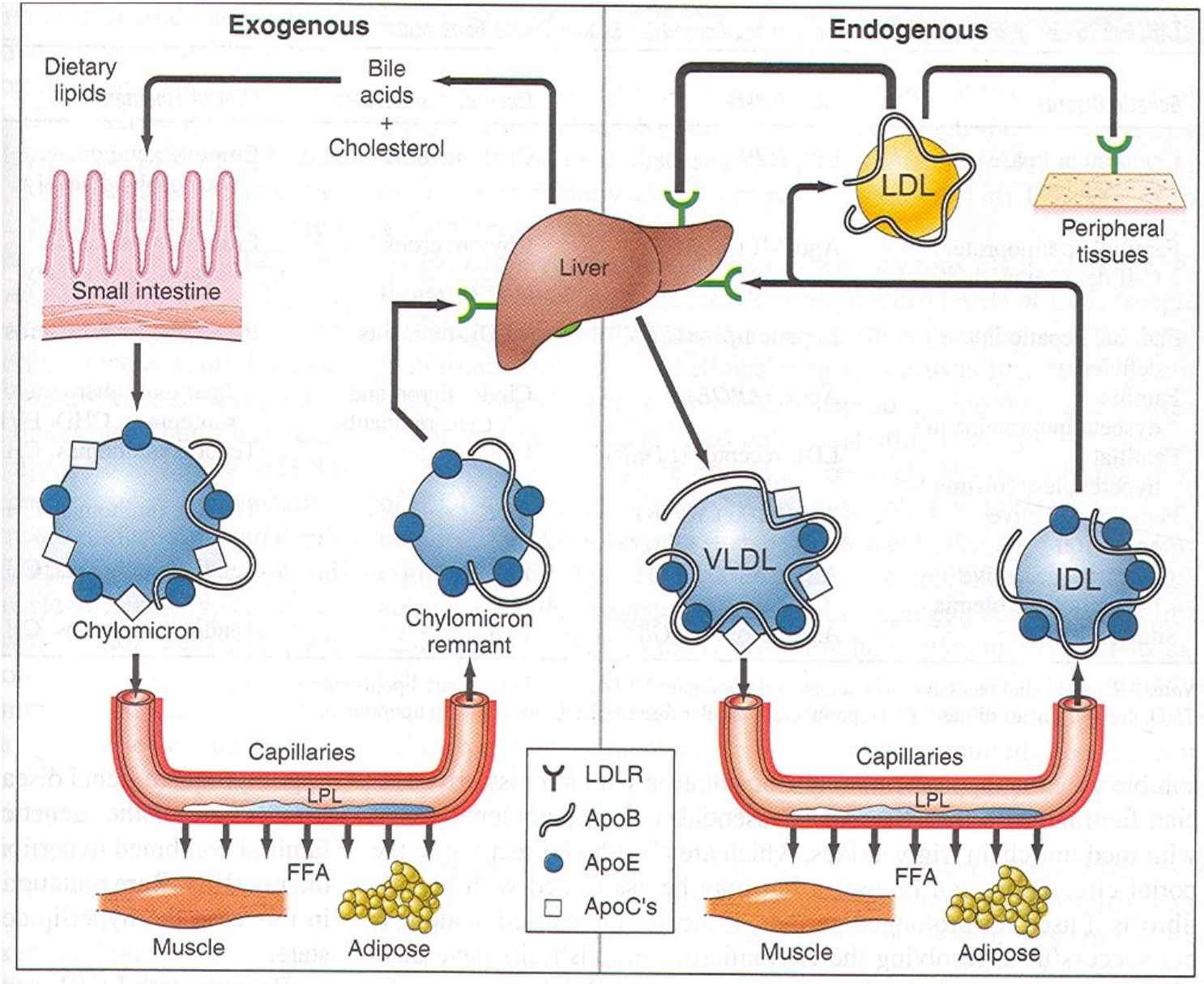
Density and diameter of lipoprotein particles



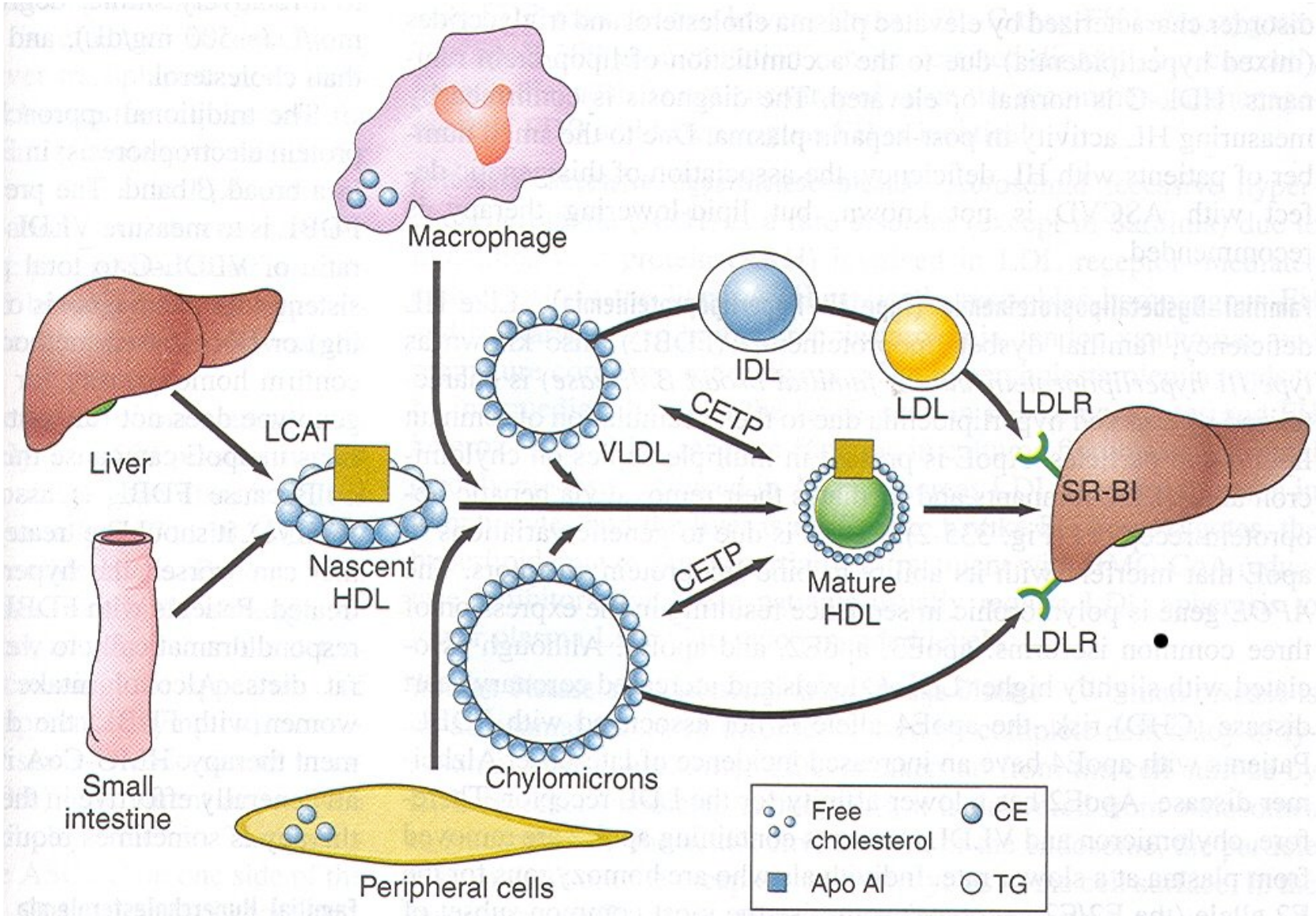
Characteristics of lipoprotein classes

	Density [g/ml]	Size [nm]	Elfo mobility	Apolipoproteins
Chy	0.93	75–1200	start	B-48, A, C
Chy-remnant	0.93–1.006	30–80	slow pre-beta	B-48, E, A, C
VLDL	0.93–1.006	30–80	pre-beta	B-100, E, A, C
IDL	1.006–1.019	25–35	slow pre-beta	B-100, E, C
LDL	1.019–1.063	18–25	beta	B-100
HDL	1.063–1.21	5–12	alpha	A, E, C

Metabolism of chylomicron and VLDL particles



Metabolism of HDL particles, reverse cholesterol transport



Frederickson classification of hyperlipoproteinemias

Type	I	IIa	IIb	III	IV	V
Increases	Chy	LDL	LDL+VLDL	Chy+IDL	VLDL	Chy+VLDL
TG	↑↑↑		↑↑	↑↑	↑↑	↑↑↑
Ch	↑	↑↑↑	↑↑	↑↑	↑	↑↑

Most frequent causes of secondary hyperlipoproteinemias

- obesity
- diabetes mellitus
- hypothyreosis
- renal diseases (nephrosis, ESRD)
- cholestasis
- alcoholism
- estrogen treatment
- glycogen storage diseases

Classic and new risk factors

- male sex
- high total Ch
- high LDL-C
- low HDL-C
- high TG
- hypertension
- IGT, DM

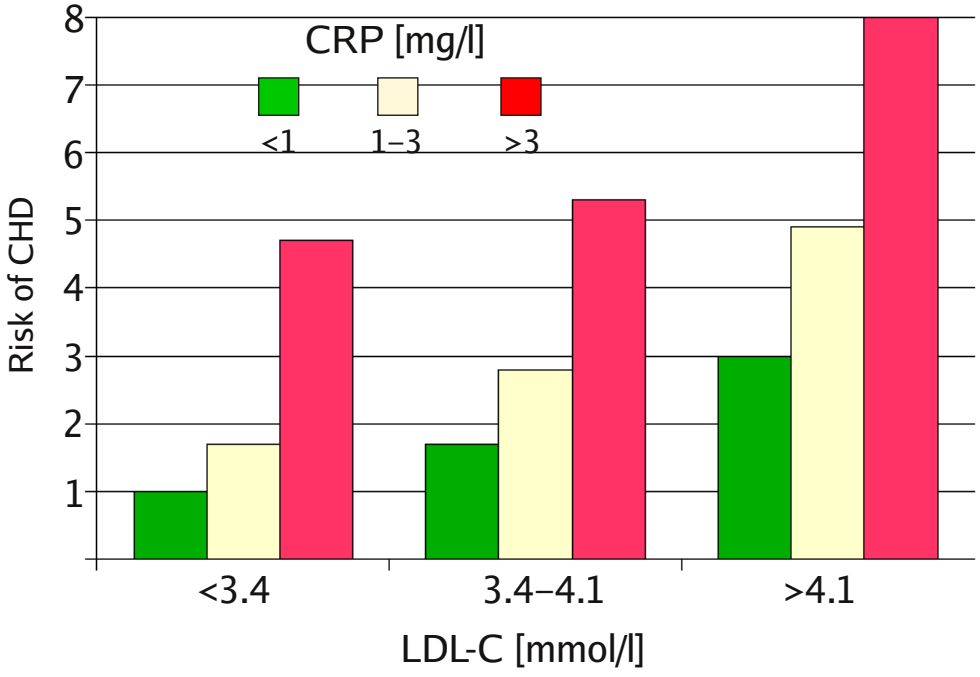
- LP(a)
- homocysteine
- CRP
- fibrinogen
- tissue plasminogen act. (t-PA)

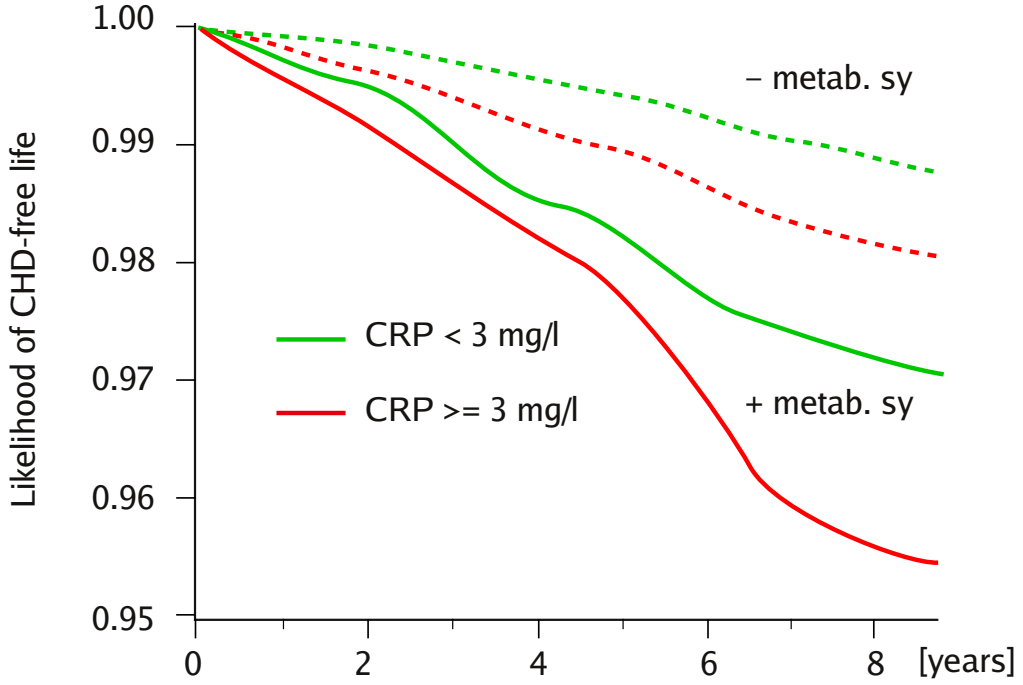
Metabolic syndrome

is diagnosed if any 3 holds of the following:

- androgenous obesity (waist>102/88cm male/female)
- high TG (>1.7mmol/l)
- low HDL-C (<1/1.3 mmol/l male/female)
- high BP (>=140/90 mmHg)
- insulin resistence (IFG, IGT, DM)

CRP is an independent risk factor





This is the CRP concentration measured when there is no inflammation.
CRP levels increase to very high values during inflammatory reactions.