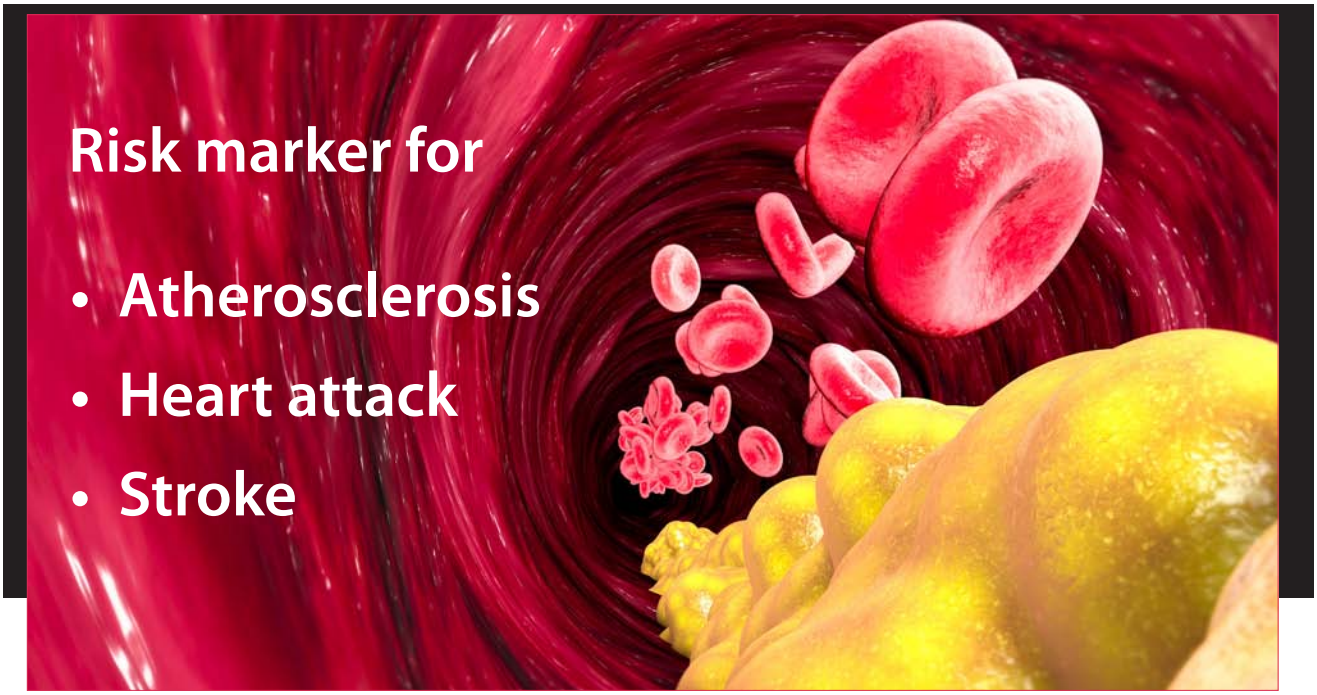
Oxidized LDL



ox-LDL / MDA Adduct ELISA*

for the determination of oxidative stress

- Plasma, serum and dried blood samples
- For research and routine application
- Automatable on open microtiter plate-based platforms
- Ideal for therapy monitoring of diabetes type-II patients and myocardial risk patients

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* US: FDA Class I Exempt Device. For In Vitro Diagnostic Use.

ox-LDL

Oxidized LDL as marker for lipid peroxidation

Lipid peroxidation promotes vascular deposits

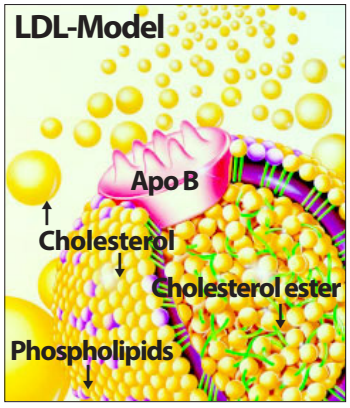
Lipid peroxidation plays an important role in the pathogenesis and progression of a number of diseases. Oxidized cholesterol, in particular oxidized low-density lipoprotein (ox-LDL), is a key player in the development of atherosclerosis and coronary heart disease.

One important aspect of pathogenesis in cardiovascular risk groups, such as patients with adipositas, metabolic syndrome, diabetes or hypertension, is an impaired microcirculation which promotes inflammatory endothelial damage of vessel walls. Subsequently, LDL-particles infiltrate from the blood stream in subendothelial areas of the vessel where oxidative stress causes lipid peroxidation of LDL by free radicals.

Oxidized LDL binds massively and in an unregulated manner to macrophages with a detrimental effect: The macrophages transform into lipid-loaded „foam cells" and activate a cascade of events marked by extensive cell proliferation and accumulation of extracellular matrix components. Cholesterol-loaded macrophage foam cells represent the earliest detectable atherosclerotic damages. These lesions ultimately represent the sites of thrombosis leading to myocardial infarction and stroke.

Accurate and clinically relevant determination of oxidative stress

The monitoring of oxidative stress biomarkers, especially of oxidized cholesterol in cardiovascular risk groups aims at early prevention of atherosclerotic lesions and can be used for monitoring the effect of a cardiovascular therapy.



(modified, J. Bavosi / Photo Researchers, Inc.)

One way to determine LDL is to measure the associated transport molecule apolipoprotein B (Apo B) which reflects the number of LDL-particles. A product of lipid peroxidation of LDL by oxidative stress is malondialdehyde (MDA). The level of MDA-modified Apo B can therefore serve as benchmark for the ox-LDL status.

The basic principle of Immundiagnostik's ox-LDL/MDA Adduct ELISA is the specific immunological detection of MDA-modified Apo B. This method has the advantage of measuring only oxidized lipoproteins with high sensitivity and specificity, exactly those particles, which correlate with the cardiovascular risk.

The exceptional clinical significance of our ELISA for atherosclerosis risk analysis has been confirmed in a clinical trial with diabetes patients (Pfützner et al., 2009). Accordingly, our assay is especially suited for monitoring cardiovascular therapies with drugs which modify LDL-particles (e. g. Pioglitazon, see figure).

Indications of ox-LDL/MDA Adduct

- Determination of lipid peroxidation as benchmark for oxidative stress
- Early detection of atherosclerotic lesions
- Cardiovascular risk analysis in risk groups (e. g. diabetes patients)
- Therapy monitoring in cardiovascular diseases
- Pregnancy and preeclampsia

Immundiagnostik's ox-LDL/MDA Adduct ELISA with superior sensitivity in therapy control
Clinical trial of Pfützner et al. (2009)

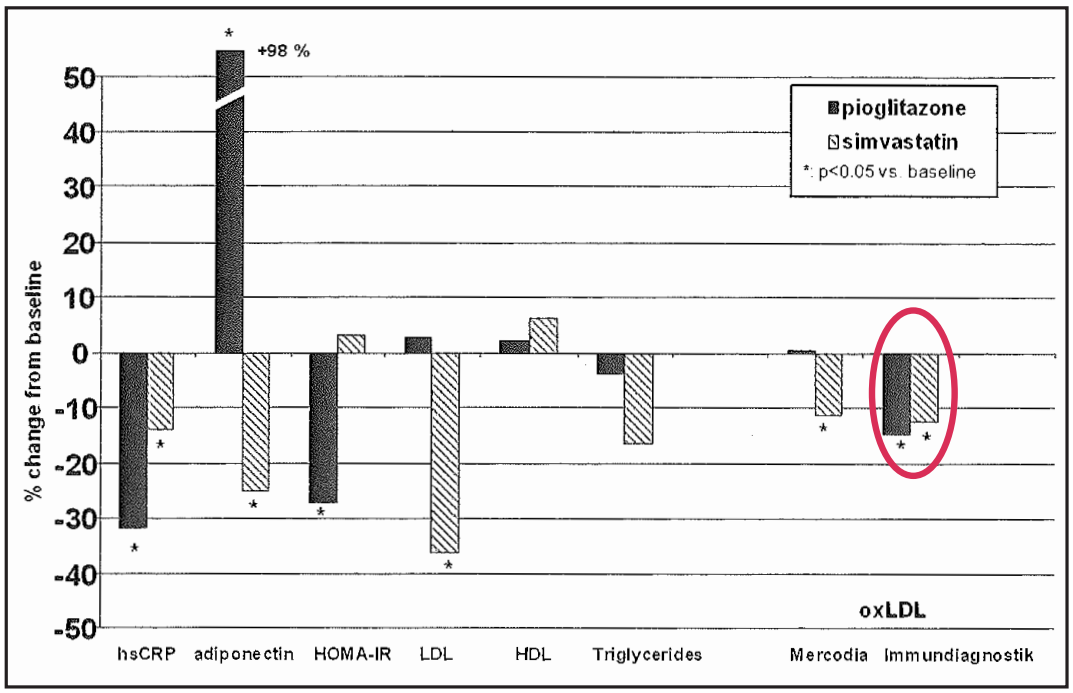


Fig.: Changes from baseline in observation parameters in diabetes patients treated with pioglitazon or simvastatin (from Pfützner et al., 2009).

Pfützner et al., 2009:

" Based on the different epitopes of the detection antibodies, the Immundiagnostik ELISA for determination of oxLDL appeared to be more sensitive and specific to detect the modifications of the oxLDL particles that were induced by pioglitazone in our clinical study than the Mercodia assay.

It may therefore be more suitable for the assessment of atherosclerotic risk change resulting from modifications in the size of oxLDL particles."

Immundiagnostik's ox-LDL/MDA Adduct ELISA for risk assessment in diabetes patients
Scientific study of Koubaa et al. (2007)

Sample	ox-LDL [ng/ml]
Healthy controls (n=120)	95.32 ± 37.85
Type-2 diabetes patients (n=86)	142.37 ± 49.84

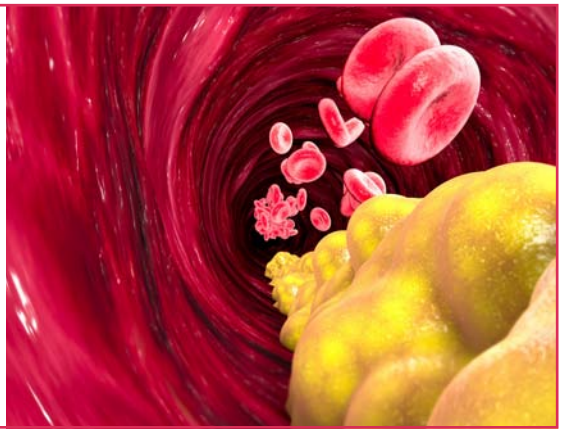
Sample	ox-LDL [ng/ml]
Type-2 diabetes patients without hypertension	111.16 ± 33.42
Type-2 diabetes patients with hypertension	157.4 ± 49.9

- The Immundiagnostik ELISA determined a **mean value of 95,32 ± 37,85 ng/ml ox-LDL** in healthy controls in serum/plasma.
- **Type-2 diabetes patients** on the other hand **revealed a significantly elevated ox-LDL concentration** compared with the control group.
- **Type-2 diabetes patients with high blood pressure** exhibit elevated ox-LDL-levels in comparison to those with normal blood pressure.

ox-LDL/MDA Adduct*	
Matrix	Serum, EDTA plasma, dried blood samples
Sample volume	10 µL (serum, EDTA Pl.) 50 µL (dried blood)
Test principle	ELISA
Cat. No.	K 7810

automatable!

* US: FDA Class I Exempt Device. For In Vitro Diagnostic Use.



Other products for the determination of lipid peroxidation

anti ox-LDL ELISA

- for the detection of anti-ox-LDL antibodies, MDA Adduct
- utilizes oxidized LDL, MDA Adduct
- short incubation times (3 h)

anti ox-LDL **	
Matrix	EDTA Plasma, Serum
Sample volume	50 µL
Test principle	ELISA
Cat. No.	K 7809

Malondialdehyde (MDA)

- indicator for lipid peroxidation in biology, medicine and food industry
- biochemical marker for oxidative stress
- runs in only 5 min.

Malondialdehyde (MDA) **	
Matrix	Serum, Plasma, Urine
Sample volume	20 µL
Test principle	HPLC
Flow rate	0.8–1.2 mL/min
Detection	Fluorescence: Ex.: 532 nm; Em.: 550 nm
Elution	isocratic
Cat. No.	KC1900

Literature

Schreurs MP et al. (2013)
Increased oxidized low-density lipoprotein causes blood-brain barrier disruption in early-onset preeclampsia through LOX-1.
FASEB J 27(3):1254-63

Pfützner A et al. (2009)
Differences in the results and interpretation of oxidized LDL cholesterol by two ELISA assays - an evaluation with samples from the PIOstat Study.
Clin Lab 55:275-281

Koubaa N et al. (2007)
Hyperhomocysteinemia and elevated ox-LDL in Tunisian type 2 diabetic patients: Role of genetic and dietary factors.
Clin Biochem 40(13-14):1007-14

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