

## Koronare arterielle Erkrankungen

**Oravec S, Gavornik P, et al.** Neuroendocrinology Letters: Volume 32, No. 4, 2011. *Lipoprotein profile in patients who survive a stroke.*

Comments: The aim of the study was to identify and quantitatively evaluate atherogenic lipoproteins and to determine the lipoprotein profile phenotypes in subjects who had suffered an ischemic cerebral-vascular event. An atherogenic lipoprotein profile phenotype B was identified in the individuals who survived a stroke. There were increased concentrations of total cholesterol, triglycerides, VLDL, LDL2 and LDL 3-7 in the group of stroke patients.

**Oravec S, Gruber K, et al.** Neuroendocrinology Volume 32, No 3. 2011. *Atherogenic normolipidemia- a new phenomenon in the lipoprotein profile of clinically healthy subjects.*

Comments: The aim of this study was to identify the type of lipoprotein profiles in a group of healthy volunteers with no clinical manifested or chemically identified signs of cardiovascular diseases. Of the 150 subjects tested, 10 subjects presented an atherogenic lipoprotein profile which consisted of large quantities of small dense LDL. The researchers claim that this represents a beneficial contribution to lipid diagnostics since these patients have serious cardiovascular risk and until now these patients have not been identified, diagnosed, or treated.

**Pauciullo P, Rubba P, et al.** Atherosclerosis 203 (2009) 320-324. *Small dense low-density Lipoprotein in familial combined hyperlipidemia: Independent of metabolic syndrome and related to history of cardiovascular events.*

Comments: The aim of the present study was to evaluate whether small dense LDL is a marker of familial combined hyperlipidemia (FCHL), independent of the occurrence of Metabolic Syndrome (MS). The researchers found that small dense LDL are highly specific markers of FCHL status, independent of the presence of MS. In FCHL patients high levels of small dense LDL were associated with history of CVD independent of the coexistence of MS and of serum levels of cholesterol and apo B.

**Nytyintyane LM, Gill GV, et al.** QJ Med 2008; 101:111-119. *Postprandial lipaemia, metabolic syndrome and LDL particles size in urbanized South African blacks with and without coronary artery disease.*

Comments: The aim of this study was to assess postprandial lipaemia in black coronary artery disease (CAD) patients with and without MS and to measure their fasting and postprandial lipid profiles and LDL particles. The study found that small dense LDL was highly associated with CAD. In fact, 70% of CAD patients had a predominance of small dense LDL.

**Kim J-S, Kim C, et al.** Circulation Journal 2008, 72:1059-1064. *Effects of Increasing Particle Size of Low-Density Lipoprotein on Restenosis After Coronary Stent Implantation.*

Comments: The aim of the study was to investigate whether changes in LDL particle size are related to in-stent restenosis (ISR). The researchers found that increased LDL particle size was associated with reduced incidence of ISR. Therefore modification of LDL particle size may have a beneficial effect on the risk of ISR.

**Moon JY, Kim HS, et al.** Cardiology 2007; 108:282-289. *Lipoprotein (a) and LDL Particle Size are related to the Severity of Coronary Artery Disease.*

Comments: This study investigated the relationship between serum Lp(a) levels and LDL particles size in patients with coronary artery disease. The researchers found a correlation between the level of Lp(a) and small dense LDL. The study also demonstrated that both sdLDL and Lp(a) were predictors of CAD severity.

**Kwon SW, Hong BK, et al.** Yonsei Medical Journal; Vol. 47, No3, 405-414, 2006. *Significance of Small Dense Low-Density Lipoprotein as a Risk Factor for Coronary Artery Disease and Acute Coronary Syndrome.*

Comments: This study was performed to investigate how LDL particle size is related to CAD and acute coronary syndrome (ACS). LDL particle size was found to be smaller among CAD patients, and correlated with the extent of CAD and ACS. The study demonstrated that sdLDL levels are strongly associated with CAD and are independent of traditional and nontraditional coronary risk factors.

**Ballantyne CM, Kullo IJ.** Mayo Clin Proc February 2005; 80(2):219-230. *Conditional Risk Factors for Atherosclerosis.*

Comments: This review focuses on the newer technologies that exist for predicting Coronary Heart Disease in patients given the fact that the ability to accurately predict CHD for a specific individual based on traditional risk factors is limited. The authors classify sdLDL testing as a conditional risk factor for atherosclerosis, which means sdLDL is association with increase risk for CAD although the causative, independent, and quantitative contributions are not well documented. The author also states that a potential use of measuring LDL particle size may be in aiding decision making regarding the choice of a Lipid lowering agent.

## Metabolisches Syndrom

**Sancho-Rogriguez N, Parra-Pallares, et al.** Lipids in Health and Disease 2011, 10:162. *Observational study of lipid profile and LDL particle size in patients with metabolic syndrome.*

Comments: The aim of this study was to establish the importance of LDL particle size measurement by gender in a group of patients with (MS). The researchers found that males had smaller LDL particle size than females, and patients with MS had smaller LDL than those without MS. The researchers consider LDL particle size a worthy measurement due to its relationship with the lipid profile and cardiovascular risk.

**Lagos K, Elisaf M, et al.** Lipids (2009) 44:9-16. *Alteration in the High Density Lipoprotein Phenotype and HDL-Associated Enzymes in Subjects with Metabolic Syndrome.*

Comments: The purpose of the study was to determine the distribution of HDL subclasses and HDL-LpPLA2 and PON1 activities in patients with and without Metabolic Syndrome. The results demonstrated that patients with MS had decreased HDL-C. MS patients also had a greater percentage of small HDL-3 and a lower percentage of HDL-2 subclasses compared to patients without MS. The researchers also found that as the number of MS components increased in the patients, the HDL phenotypes comprised of a greater percentage of HDL-3.

**Gentile M, Rubba P, et al** Clinica Chimica Acta 388 (2008) 179-183. *Small dense LDL particles and metabolic syndrome in a sample of middle-aged women. Findings from Progetto Atena.*

Comments: This study analyzed the association between sdLDL and Metabolic Syndrome in a sample of 210 Italian women, 84 of which were diagnosed with MS. Women with MS had significantly higher LDL scores compared to women without MS. The authors suggest that sdLDL could be a valuable marker for diagnosis and severity of MS.

**Chang C, Vega GL, et al.** Metabolic Syndrome and Related Disorders Vol. 5:1, 2007. *Metabolic Syndrome Phenotype in Very Obese Women.*

Comments: The study was carried out to determine the pattern of metabolic risk factors in very obese women who were considered candidates for bariatric surgery. The researchers found that neither LDL cholesterol nor LDL-apo B levels were higher in obese subjects than in nonobese subjects but in both obese groups, mean LDL particle sizes were lower than in controls.

**Satoh N, Yoshihiro O, et al.** Diabetes Care, Volume 30(1). January 2007, 144-146. *Purified Eicosapentaenoic Acid Reduces Small Dense LDL, Remnant Lipoprotein Particles, and C-Reactive Protein in Metabolic Syndrome.*

Comments: This study measured the effects of Eicosapentaenoic Acid (EPA), in patients with Metabolic Syndrome. The researchers found that purified EPA significantly reduces sdLDL and CRP in the metabolic syndrome. EPA affected not the quantity of LDL, since LDL cholesterol levels remained the same, but the quality.

**Gazi I, Elisaf M, et al** Metabolism Clinical and Experimental 55 (2006) 885-891. *Concentration and relative distribution of low-density lipoprotein subfractions in patients with metabolic syndrome defined according to the National Cholesterol Education Program criteria.*

Comments: The aim of the study was to directly determine the concentration and relative distribution of LDL subfractions in 175 patients with metabolic syndrome. The results demonstrated that patients with metabolic syndrome exhibit higher concentrations of small, dense LDL than individuals who do not fulfill the criteria for MS. This increase is directly related to the number of components of metabolic syndrome and is mainly determined by the serum concentrations of triglycerides.

## Lipoproteine & Erkrankungen

**Suh S, Lee MK, et al.** Diabetes Metab J 2011; 35:536-542. *Smaller mean LDL Particle Size and Higher Proportion of small Dense LDL in Korean Type 2 Diabetic Patients.*

Comments: The study sought to estimate LDL particle size and risk factors associated with sdLDL in a larger number of Korean type 2 diabetic patients and matched non-diabetic controls. The researchers found that diabetic patients had smaller mean LDL particle size and higher proportions of sdLDL when compared to non-diabetic controls.

**Olusi SO, George S.** Vascular Health and Risk Management. 2011;7: 75-80. *Prevalence of LDL atherogenic phenotype in patients with systemic lupus erythematosus.*

Comments: The purpose of the study was to determine the prevalence of sdLDL particle size in patients with systemic lupus erythematosus (SLE). The researchers found that SLE patients have smaller dense LDL particles than patient controls. The researchers suggest that sdLDL may be an independent risk factor for the development of premature atherosclerosis in SLE patients.

**Tselepis AD, Alexopoulos DC, et al.** The Journal of Lipid Research, November 2010; 51 3331-3341. *The plasma levels of lipoprotein-associated phospholipase A2 are increased in patients with B-thalassemia.*

Comments: In the following study, plasma levels of Lp-PLA2 activity/mass, plasma lipid levels, LDL subclass profile, and oxidative stress were measured in patients with B-thalassemia. It was found these patients exhibit high Lp-PLA2 levels which could be primarily attributed to increased enzyme production and secretion from monocytes/macrophages as well as the predominance of sdLDL particles in plasma.

**Phelan N, Gibney J, et al.** J Clinical Endocrinol Metab, August 2010, 95(8):3933-3939. *Lipoprotein Subclass patterns in Women with Polycystic Ovary syndrome (PCOS) Compared with Equally Insulin-resistant Women without PCOS.*

Comments: The aim of this study was to establish whether the diagnosis of Polycystic Ovary Syndrome (PCOS) per se is a risk factor for sdLDL independent of obesity and or hyperinsulinemia. The study found that only PCOS status and serum triglyceride levels were independently associated with LDL particle size.

**Foley KF, McConnell JP, et al.** Clinical Chemistry 55:1 187-192 (2009). *A Patient with Primary Biliary Cirrhosis and Elevated LDL Cholesterol.*

Comments: The following article is a case study of a female patient with primary biliary cirrhosis. When the patient was initially tested for LDL-C her result was 1060 mg/dl. Thus the client was tested using the Lipoprint Method. From the pattern observed, the patient was diagnosed with primary biliary cirrhosis and the physicians concluded the discrepant results were due to the presence of LpX which is known to interfere with routine lipid panel measurements.

**Liberopoulos En, Apostolou F, et al.** Journal of Lipid Research. 2009 December, 50(12), 2532-2539. *Persistence of an Atherogenic Lipid Profile after Treatment of Acute Infection with Brucella.*

Comments: The study aimed at evaluating the possible quantitative and qualitative effects of acute Brucellosis on lipoprotein metabolism. The results demonstrated that patients with Brucellosis had increased sdLDL-C. After four months of successful treatment LDL particle size and sdLDL-C decreased and they were not significantly different from baseline values.

**Doi SAR, Phil D et al.** American Journal of Clinical Pathology 2008; 129:802-810. *LDL Species Heterogeneity in the Atherogenic Dyslipidemia of Polycystic Ovary Syndrome*

Comments: This study was aimed at establishing whether the diagnosis of Polycystic Ovary Syndrome (PCOS) is a risk factor for sdLDL independent of obesity and/or hyperinsulinemia. The study found that a diagnosis of PCOS increase the odds of sdLDL 20 fold when compared to controls. Also, there was a strong association between LDL particle size and triglyceride concentrations independent of PCOS.

**Abbas JM, Akanji AO, et al.** Endocrine Journal 55:381-389, 2008. *Hypothyroidism results in small dense LDL independent of IRS traits and Hypertriglyceridemia.*

Comments: This study analyzed the relationship between hypothyroidism and sdLDL to define a biochemical basis for better management of the coronary heart disease risk of these patients. The analysis revealed that there was a strong association between hypothyroidism and sdLDL. Also the researchers found that only thyroid status and serum triglyceride levels were independently associated with LDL particle size.

**Mohan V, Gokulakrishnan K, et al.** Journal of Association of Physicians of India 2005 February; Vol. 53 95-100. *Association of Small Dense LDL with Coronary Artery Disease and Diabetes in Urban Asian Indians- The Chennai Urban Rural Epidemiology Study (CURES-8).*

Comments: The study investigated the association of small dense LDL with diabetes and coronary artery disease in a native Indian population. The study demonstrated that small dense LDL is associated with diabetes and CAD. Furthermore 58% of the diabetic subjects with CAD and 51% of the subjects without CAD had elevated levels of small dense LDL.

**Landray MJ, Lip GYH, et al.** Q J Med 2002; 95: 165-171. *Abnormal low-density lipoprotein subfraction profile in patients with untreated hypertension.*

Comments: The study intended to test the hypothesis that untreated patients with essential hypertension in the absence of vascular disease may exhibit abnormalities in their LDL subfractions. The researchers found that the controls and the hypertensive group exhibited similar total, HDL, and LDL cholesterol levels. At the same time the study demonstrated that hypertensive patients had abnormalities in their LDL subfraction profile. Surprisingly, hypertensive patients exhibited abnormal LDL subfraction profiles even when they had low levels of triglycerides. The researchers suggested that this dyslipidaemia is not readily detected by conventional methods.

## Pharmakologie

**Castro-Perez J, Johns DG, et al.** The Journal of Lipid Research. November 2011; 52, 1965-1973. *Anacetrapib promotes reverse cholesterol transport and bulk cholesterol excretion in Syrian golden hamsters.*

Comments: The study used multiple in vivo and in vitro approaches to assess the effects of anacetrapib on cholesterol metabolism in dyslipidemic Syrian golden hamsters. When HDL subfractions were analyzed, it was found that anacetrapib increased large HDL particles and intermediate HDL particles. LC/MS analysis of the electrophoresed gels showed that all sterols (FC and CE's) were up-regulated in the HDL fractions with CE 18:2 being the most abundant cholesterol ester component of the HDL fraction.

**Saumoy M, Podzamczar D, et al.** Antiviral Therapy 2011; 16: 459-468. *Low-Density Lipoprotein size and Lipoprotein-Associated phospholipase A2 in HIV-infected patients switching to abacavir or tenofovir.*

Comments: The aim of this study was to evaluate qualitative lipid changes, including LDL size and subfractions, LP-PLA2 activity and quantitative lipid changes occurring in stable HIV-infected patients randomly switching to abacavir + lamivudine or tenofovir + emtricitabine. The researchers found that a more atherogenic LDL profile, including a decrease in LDL size, was found in the abacavir + lamivudine group and not the tenofovir + emtricitabine group.

**Ason B, Kuklin NA et al.** The Journal of Lipid Research. April 2011. 52, 679-687. *Improved efficacy for ezetimibe and rosuvastatin by attenuating the induction of PCSK9.*

Comments: The following study intended to determine if PCSK9 inhibition could enhance LDL-C lowering of both statins and ezetimibe in a mouse model with a human-like lipid profile. It was observed that PCSK9 knockdown in combination with either treatment lead to greater reduction in serum non-HDL with a near uniform reduction of all LDL-c subfractions.

**Azar RR, Kassab R, et al.** The American Journal of Cardiology, Volume 106 (2) 193-197. July 2010. *Effect of ezetimibe/Atorvastatin Combination on Oxidized Low Density Lipoprotein Cholesterol in Patients with Coronary Artery Disease or Coronary Artery Disease Equivalent.*

Comments: The objective of the study was to determine the effects of Ezetimibe on ox-LDL. LDL-C, ox-LDL and LDL subfractions were measured in 100 patients at baseline and 8 weeks after treatment. It was found that Ezetimibe decreased ox-LDL cholesterol through reductions in total LDL and in large buoyant LDL. The change in ox-LDL did not correlate with small dense LDL.

**Rizos EC, Elisaf M., et al.** The Open Clinical Chemistry Journal, 2008, 1, 64-68. *Improvement of the Lipid Profile with Zofenopril in hypertensive Patients with Metabolic Syndrome.*

Comments: The study evaluated whether Zofenopril affects the parameters involved in atherogenesis beyond its antihypertensive action in hypertensive patients with metabolic syndrome. The researchers found that Zofenopril improved the lipid profile towards a preponderance of large LDL subfractions over small dense LDL.

**Nakou ES, Elisaf MS, et al.** Expert Opinion on Pharmacotherapy. (2008) 9(18):3151-3158. *The effects of ezetimibe and orlistat, alone or in combination, on high-density Lipoprotein (HDL) subclasses and HDL-associated enzyme activities in overweight and obese patients with hyperlipidaemia.*

Comments: This is an open-label randomized study of the effects of orlistat and ezetimibe, alone or in combination, on plasma HDL subclasses and HDL-associated enzyme activities in overweight and obese subjects with hypercholesterolemia. The researchers found that orlistat treatment resulted in an increase of HDL-2 while HDL-3 decreased significantly. Ezetimibe, alone or in combination with orlistat, led to a decrease in the HDL-3 subclass while HDL-2 did not significantly change.

**Kostapanos MS, Elisaf MS et al.** European Journal of Pharmacology August 2008, 590 (1-3) 327-332. *Baseline Triglyceride levels and insulin sensitivity are major determinants of the increase of LDL particle size and buoyancy induced by rosuvastatin treatment in patients with primary hyperlipidemia.*

Comments: This study examines the effects of rosuvastatin in patients with hyperlipidemia. The researchers concluded that rosuvastatin at 20 mg/day exerted a favorable effect of LDL-cholesterol distribution on the LDL subfractions as well as on the mean LDL particle size in patients treated for primary dyslipidemia.

**Kalogirou M, Elisaf M, et al.** Current Medical Research and Opinion, Vol. 23, No. 5, 2007 1169-1176. *Effect of ezetimibe monotherapy on the concentration of lipoprotein subfractions in patients with primary dyslipidaemia.*

Comments: This study measures the effects of ezetimibe on the concentrations of lipoprotein subfractions in patients with primary dyslipidaemia. The results demonstrated that Ezetimibe favorably affects the distribution of LDL subfractions, especially in those with elevated triglyceride values. A potential side effect was the reduction of dense HDL particles.

**Kalogirou M, Elisaf M, et al.** Archives of Medical Science 2007;3,4:344-350. *Effect of ezetimibe on lipoprotein subfraction concentrations: the role of atorvastatin in pretreatment.*

Comments: The aim of the study was to directly compare the effects of ezetimibe added to established atorvastatin treatment on lipoprotein subfractions with those obtained by ezetimibe monotherapy. Ezetimibe monotherapy reduced all LDL subfractions while ezetimibe administered to individuals already receiving conventional doses of atorvastatin decreased exclusively the concentrations of large LDL without affecting the serum levels of sdLDL. Additionally while ezetimibe monotherapy decreased dense HDL, ezetimibe on a background of atorvastatin reduced all HDL subfractions.

**Lautamaki R Ronnema T, et al.** Rev Diabet Stud. 2006 Spring; 3(1): 31–38. *The Effect of PPAR $\gamma$ -Agonism on LDL Subclass Profile in Patients with Type 2 Diabetes and Coronary Artery Disease.*

Comments: The aim of the study was to determine the effects of rosiglitazone on the LDL subclass profile in type 2 diabetes mellitus patients with verified CAD. It was found that rosiglitazone treatment increases the concentration of large LDL but not small dense LDL in patients with type2 diabetes and CAD.

**Manuel y Keenoy B, de Leeuw I, et al.** Atherosclerosis 175 (2004) 369-376. *Impact of Vitamin E supplementation of lipoprotein peroxidation and composition in Type 1 diabetic patients treated with atorvastatin.*

Comments: This study investigated the impact of Vitamin E on lipids and peroxidation during statin treatment in patients with type 1 diabetes. The results demonstrated that atorvastatin caused a shift toward less dense LDL but not when tocopherol supplements were added.

**Vega GL, Grundy SM, et al.** The American Journal of Cardiology 2003; 91:956-960. *Effect of adding Fenofibrate (200 mg/day) to Simvastatin (10 mg/day) in Patients with Combined Hyperlipidemia and Metabolic Syndrome*

Comments: The aim of this study was to determine whether the addition of fenofibrate to simvastatin therapy significantly improves the lipoprotein profile. The results showed that Simvastatin monotherapy decreased total cholesterol by 27% at the same time it only increased HDL cholesterol by 6%. When fenofibrate was added to simvastatin therapy, HDL increased by 23% and triglycerides decreased by an additional 38%. Finally there was a significant increase in the large LDL to sdLDL ratio.

## Lipids & Lipoproteine

**Kotani K, Sakane N, et al.** Int J Prev Med 2012 March; 3(3): 160-166. *LDL particle size and reactive Oxygen metabolites in Dyslipidemic Patients.*

Comments: The aim of the present study was to investigate the correlation between the mean LDL particle size and the oxidative stress status as evaluated by the d-ROMs in dyslipidemic patients. The researchers concluded that the co-existence of both markers suggest that sdLDL and oxidative stress can be cooperative in atherogenesis, possibly leading to the incidence of CVD, in dyslipidemic patients.

**Makariou S, Elisaf M, et al.** Arch Med sci 2012;8, 3: 437-443. *The relationship of Vitamin D with non-traditional risk factors for cardiovascular disease in subjects with metabolic syndrome.*

Comments: The purpose of this study was to evaluate whether 25 (OH) Vit D levels could be associated with emerging CVD risk factors of MetS, such as sdLDL, Lp-PLA2 activity and hsCRP concentration. The researchers found that lower 25 (OH) Vit D levels are associated with higher sdLDL-C concentration in subjects with MetS, possibly through elevated triglycerides.

**Ocadlik I, Oravec S, et al.** Neuroendocrinology Letters, Volume 32. No3, 2011. *Relationship between unconjugated hyperbilirubinemia and lipoprotein spectrum.*

Comments: The aim of this study was to find out the relationship between unconjugated hyper-bilirubinemia and the occurrence of atherogenic plasma lipoproteins with the emphasis on the small dense LDL particles in individuals with Gilbert's syndrome. The researchers found an inverse relationship of serum bilirubin levels and atherogenic small dense LDL levels.

**Oravec S, Ocadlik I, et al.** Bratis Lek Listy 2011; 112 (1) 4-7. *Contribution of the atherogenic lipoprotein profile to the development of arterial hypertension.*

Comments: The objective of the following study was to determine the occurrence of atherogenic vs. non-atherogenic lipoprotein profiles in patients with arterial hypertension and to compare this result with lipoprotein parameters of control subjects.

**Kaitosaari T, Ronnema T, et al.** European Journal of Pediatrics 2009; 168: 531-539. *Tracking and determinants of LDL particle size in healthy children from 7 to 11 years of age: the STRIP Study.*

Comments: The purpose of the following study was to track LDL particles size in children at the ages of 7, 9, and 11 using the Lipoprint System. The researchers concluded that although mean LDL particle size tracks in 7 to 11 year old healthy children, changes in serum triglycerides, HDL, LDL, and total cholesterol concentration, BMI, and pubertal status all modify LDL particle size.

**Kim CS, Kim KR, et al.** Clinical Endocrinology (2009) 71, 130-136. *Relationship of low-density lipoprotein (LDL) particle size to thyroid function status in Koreans.*

Comments: The purpose of this study was to measure the effects of thyroid dysfunction on the development of cardiovascular disease. The researchers examined LDL particle size and lipid profiles in subjects with different thyroid function. The researchers found that LDL particle size, did not appear to be significantly affected by the degree of thyroid dysfunction

**Filippatos TD, Elisaf MS, et al.** Archives of Medical Science 2008; 4,3:263-269. *Small dense LDL cholesterol and apolipoproteins C-II and CIII in non-diabetic obese subjects with metabolic syndrome.*

Comments: The purpose of the study was to explore the relationship between Apolipoprotein C, triglycerides, and sdLDL. The study found apo C-II and C-III are not independently associated with sdLDL-C levels. Also it was found that apo B and triglycerides were independently positively associated with sdLDL-C levels.

**Barter P, Grundy S, et al.** The Journal of Clinical Endocrinology & metabolism 92 (6): 2041-2045. *Serum Insulin and inflammatory Markers in Overweight Individuals with and without Dyslipidemia.*

Comments: The objective of the study was to define relationships between dyslipidemia and other metabolic abnormalities in overweight subjects. Within the study it was found that patients with Low HDL and elevated triglycerides had smaller LDL size. The final result of the study suggested that not all overweight people have the same risk. Overweight people who are normolipidemic and have low levels of inflammatory markers are at low risk. While those with low HDL and elevated triglycerides have much a much higher risk.

**Gazi I, Tselepis AD, et al.** Clinical Chemistry 51:12: 2264-2273 2005. *Lipoprotein-Associated Phospholipase A<sup>2</sup> Activity is a Marker of Small, Dense LDL Particles in Human Plasma.*

Comments: This study investigated whether Lp-PLA<sup>2</sup> could be a marker of sdLDL in human plasma. The researchers found that Lp-PLA<sup>2</sup> activity, but not the enzyme mass, is a marker of sdLDL in plasma.

**Lip GYH, Felmeden DC et al.** Hypertension 2003; 41; 528-533. *Low-Density Lipoprotein Subfractions and Cardiovascular Risk in Hypertension: Relationship to Endothelial Dysfunction and Effects of Treatment.*

Comments: The study investigated the possible contribution of sdLDL to endothelial dysfunction measured through flow-mediated dilation (FMD). The researchers suggest that LDL particle size is a more important determinant of endothelial function than serum HDL, LDL, or total cholesterol levels.

## HDL-Subfraktionen

**Castro-Perez J, Johns DG, et al.** The Journal of Lipid Research. November 2011; 52, 1965-1973. Anacetrapib promotes reverse cholesterol transport and bulk cholesterol excretion in Syrian golden hamsters.

Comments: The study used multiple in vivo and in vitro approaches to assess the effects of anacetrapib on cholesterol metabolism in dyslipidemic Syrian golden hamsters. When HDL subfractions were analyzed, it was found that anacetrapib increased large HDL particles and intermediate HDL particles. LC/MS analysis of the electrophoresed gels showed that all sterols (FC and CE's) were up-regulated in the HDL fractions with CE 18:2 being the most abundant cholesterol ester component of the HDL fraction.

**Varady KA, Kroeger CM, et al.** Lipids in Health and Disease 2011, 10: 119. *Comparison of effects of diet versus exercise weight loss regimens on LDL and HDL particles size in obese adults.*

Comments: This study compared the effects of alternate day fasting, calorie restriction, and endurance exercise on LDL and HDL particle size in overweight and obese subjects. The results demonstrated that dietary restriction is able to increase LDL particle size while endurance training is able to augment HDL particle size. None of the interventions were able to modulate both LDL and HDL particle size.

**Sethi AA, Remaley AT, et al.** Clinical Chemistry 56:7 1128-1137 (2010). *High Pre-B1 HDL Concentrations and Low Lecithin: Cholesterol Acyltransferase Activities Are Strong Positive Risk Markers for Ischemic Heart Disease and Independent of HDL-Cholesterol.*

Comments: One of the main goals of this study was to examine the effectiveness of HDL subfraction distribution analysis in cardiovascular risk assessment in patients with and without Ischemic Heart Disease. The results of the study demonstrated that although minor differences were observed in the protein and lipid composition components of the HDL, these differences were small and none were useful as diagnostic discriminators of IHD.

**Lagos K, Elisaf M, et al.** Lipids (2009) 44:9-16. *Alteration in the High Density Lipoprotein Phenotype and HDL-Associated Enzymes in Subjects with Metabolic Syndrome.*

Comments: The purpose of the study was to determine the distribution of HDL subclasses and HDL-LpPLA2 and PON1 activities in patients with and without Metabolic Syndrome. The results demonstrated that patients with MS had decreased HDL-C. MS patients also had a greater percentage of small HDL-3 and a lower percentage of HDL-2 subclasses compared to patients without MS. The researchers also found that as the number of MS components increased in the patients, the HDL phenotypes comprised of a greater percentage of HDL-3.

**Nakou ES, Elisaf MS, et al.** Expert Opinion on Pharmacotherapy. (2008) 9(18):3151-3158. *The effects of ezetimibe and orlistat, alone or in combination, on high-density Lipoprotein (HDL) subclasses and HDL-associated enzyme activities in overweight and obese patients with hyperlipidaemia.*

Comments: This is an open-label randomized study of the effects of orlistat and ezetimibe, alone or in combination, on plasma HDL subclasses and HDL-associated enzyme activities in overweight and obese subjects with hypercholesterolemia. The researchers found that orlistat treatment resulted in an increase of HDL-2 while HDL-3 decreased significantly. Ezetimibe, alone or in combination with orlistat, led to a decrease in the HDL-3 subclass while HDL-2 did not significantly change.

**Helge JW, Dugaard JR, et al.** Scandinavian Journal of Medicine & Science in Sports 2008; 18:86-94. *Low-intensity training dissociates metabolic from aerobic fitness.*

Comments: This study investigated the effect of prolonged whole-body low intensity exercise on blood lipids, skeletal muscle adaptations and aerobic fitness. The results of the study demonstrated that low intensity training caused a shift from small LDL to larger particles of LDL. Similar results were obtained for IDL whereas no effect was observed on total HDL or HDL subfractions.

**Kalogirou M, Elisaf M, et al.** Current Medical Research and Opinion, Vol. 23, No. 5, 2007 1169-1176. *Effect of ezetimibe monotherapy on the concentration of lipoprotein subfractions in patients with primary dyslipidaemia.*

Comments: This study measures the effects of ezetimibe on the concentrations of lipoprotein subfractions in patients with primary dyslipidaemia. The results demonstrated that Ezetimibe favorably affects the distribution of LDL subfractions, especially in those with elevated triglyceride values. A potential side effect was the reduction of dense HDL particles.

**Kalogirou M, Elisaf M, et al.** Archives of Medical Science 2007;3,4:344-350. *Effect of ezetimibe on lipoprotein subfraction concentrations: the role of atorvastatin in pretreatment.*

Comments: The aim of the study was to directly compare the effects of ezetimibe added to established atorvastatin treatment on lipoprotein subfractions with those obtained by ezetimibe monotherapy. Ezetimibe monotherapy reduced all LDL subfractions while ezetimibe administered to individuals already receiving conventional doses of atorvastatin decreased exclusively the concentrations of large LDL without affecting the serum levels of sdLDL. Additionally while ezetimibe monotherapy decreased dense HDL, ezetimibe on a background of atorvastatin reduced all HDL subfractions.

**Ordóñez-Llanos J, Zapico-Muniz E, et al.** Clinical Biochemistry 38(2005) 46-49. *A cause of falsely Low HDL concentrations in HIV-infected patients: increased polyclonal serum immunoglobulin.*

Comments: HIV patients exhibit lipid abnormalities regardless of whether or not they are on antiretroviral therapy. Many HIV patients show very low or undetectable HDL values when tested by direct means. The objective of the study was to describe the interference of polyclonal hypergammaglobulinemia in a direct HDL method. In this study the results using the Lipoprint showed HDL bands for all patient samples. Additionally, the results from the lipoprint test were in concordance with the results obtained by ultracentrifugation.

## Ernährung

**Vecka M, Zak A, et al.** Neuroendocrinology Letters Volume 33 Suppl 2. 2012. *N-3 Polyunsaturated fatty acids in the treatment of atherogenic dyslipidemia.*

Comments: The aim of this study was to examine the effects of therapeutic doses of n-3 polyunsaturated fatty acids on the three major lipid abnormalities of atherogenic dyslipidemia (hypertriglycerolemia, low HDL cholesterol, and elevated sdLDL). Treatment with n-3 polyunsaturated fatty acids decreased sdLDL cholesterol by 16%. The researchers concluded that hypertriglycerolemic patients can benefit from treatment.

**Klempel MC, Varady KA, et al.** Nutrition Journal 2012; 11:98. *Intermittent fasting combined with calorie restriction is effective for weight loss and cardioprotection in obese women.*

Comments: The following study examined the effects of Intermittent fasting combined with caloric restriction on body weight, body composition, and coronary heart disease risk. The researchers found that patients LDL particle size increased when undergoing the intermittent fasting and caloric restriction diet.

**Kroeger CM, Varady KA, et al.** Nutrition & Metabolism 2012, 9:98. *Improvement in coronary heart disease risk factors during an intermittent fasting/calorie restriction regimen: Relationship to adipokine modulations.*

Comments: The researchers examined the effects of an intermittent fasting diet combined with caloric restriction on adipokine profile, body composition, and markers for coronary heart disease in obese women. The researchers found that an intermittent fasting and caloric restriction diet (liquid diet), increased LDL particle size and decreased the proportion of small dense LDL.

**Munch-Andersen T, Helge JW, et al.** Int J of Circumpolar Health 2012, 71: 17342. *Metabolic profile in two physically active Inuit groups consuming either a western or a traditional Inuit diet.*

Comments: The aim of the study was to measure the effects of dietary changes in Inuit consuming a western diet compared to those who consumed a traditional diet. It was found that the metabolic profile of traditionally living Inuit were more favorable than those who had changed to a westernized diet.

**Varady KA, Kroeger CM, et al.** Lipids in Health and Disease 2011, 10: 119. *Comparison of effects of diet versus exercise weight loss regimens on LDL and HDL particles size in obese adults.*

Comments: This study compared the effects of alternate day fasting, calorie restriction, and endurance exercise on LDL and HDL particle size in overweight and obese subjects. The results demonstrated that dietary restriction is able to increase LDL particle size while endurance training is able to augment HDL particle size. None of the interventions were able to modulate both LDL and HDL particle size.



**Forsythe CE, Volek JS, et al.** *Lipids* (2010); 45: 947-962. *Limited effect of Dietary Saturated Fat on Plasma Saturated Fat in the Context of a Low Carbohydrate Diet.*

Comments: The researchers assessed plasma fatty acid composition response in men who participated in two 6-week weight maintenance carbohydrate restricted diets varying only in fatty acid composition. One diet stressed saturated fatty acids and the other unsaturated fat. The results of the study found that both LDL mean and peak particle size following the two diets were significantly higher than baseline.

**Yucesan FB, Turan I, et al.** *Anadolu Kardiyol Derg* (2010); 10:28-35. *Hazelnut consumption decreases the susceptibility of LDL to oxidation, plasma oxidized LDL level and increases the ratio of large/small LDL in normolipidemic healthy subjects.*

Comments: The aim of the study was to investigate antiatherogenic effects of hazelnut consumption on LDL particle by evaluating the susceptibility of LDL to oxidation, the vitamin E content of LDL particle, plasma oxidized LDL, the ratio of large/small LDL, lipid and lipoprotein levels in normolipidemic subjects. The study found that hazelnut enriched diets decreased the VLDL and IDL-C levels and caused an increase in the ratio of large/small LDL in patients.

**Volek JS, Feinman RD, et al.** *Lipids* (2009) 44:297-309. *Carbohydrate Restriction has a More Favorable Impact on the Metabolic Syndrome than a Low Fat Diet.*

Comments: The researchers proposed that the biological markers improved by carbohydrate restriction were precisely those that define the metabolic syndrome (MetS). To test this hypothesis, the researchers compared a carbohydrate restricted diet versus a low fat diet (LFD). The results demonstrated that a diet restricted in carbohydrates can provide a more comprehensive improvement in clinical risk factor associated with MetS than a LFD at reduced caloric intake.

**Shrestha S, Fernandez ML, et al.** *The Journal of Nutrition* 137:1165-1170, May 2007. *A Combination of Psyllium and Plant sterols Alters Lipoprotein metabolism in Hypercholesterolemic Subjects by modifying the intravascular Processing of Lipoproteins and Increasing LDL Uptake.*

Comments: The purpose of the study was to assess the secondary mechanisms of plasma LDL-C lowering and the remodeling of Lipoprotein subfractions resulting from the action of psyllium and plant sterols. The researchers suggest that hypocholesterolemic mechanisms of psyllium and plant sterols are partially related to reduced CEPT activity, resulting in changes in the intravascular processing of lipoproteins that are associated with modifications in LDL composition, size, and potential atherogenicity. An increase in LDL uptake from circulation through receptor-mediated mechanisms also explains in part the LDL-C lowering caused by psyllium and plant sterols.

**Satoh N, Yoshihiro O, et al.** *Diabetes Care*, Volume 30(1). January 2007, 144-146. *Purified Eicosapentaenoic Acid Reduces Small Dense LDL, Remnant Lipoprotein Particles, and C-Reactive Protein in Metabolic Syndrome.*

Comments: This study measured the effects of Eicosapentaenoic Acid (EPA), in patients with Metabolic Syndrome. The researchers found that purified EPA significantly reduces sLDL and CRP in the metabolic syndrome. EPA affected not the quantity of LDL, since LDL cholesterol levels remained the same, but the quality.

**Zern TL, Fernandez ML et al.** *The Journal of Nutrition* 135:1911-1917, August 2005. *Grape Polyphenols Exert a Cardioprotective Effect in Pre- and Postmenopausal women by Lowering Plasma Lipids and Reducing Oxidative Stress.*

Comments: The objective of this study was to investigate the effects of lyophilized grape powder on plasma lipids, lipoprotein metabolism, LDL oxidation, inflammation, oxidative stress, and LDL size in pre- and postmenopausal women. The results found that even though grape treatment significantly reduced plasma TG, LDL-C, apo B, and apo E concentrations as well as CETP activity, the LDL particle was not affected.

**Ballesteros MN, Fernandez ML, et al.** *The Journal of Nutrition*. 135:70-73, January 2005. *High Intake of Saturated Fat and Early Occurrence of Specific Biomarkers May Explain the Prevalence of Chronic Disease in Northern Mexico.*

Comments: This study explored the hypothesis that both lifestyle and genetic components would affect the potential risk for Coronary Heart Disease or type II diabetes in children from this region. The researchers concluded that there is a multifactorial component of the presence of CHD and type II diabetes that involves both genetics and lifestyle.

**Herron KL, Fernandez ML, et al.** *Metabolism*, Vol 53, No 6 (June), 2004: pg 823-830. *High intake of cholesterol results in less atherogenic low-density lipoprotein particles in men and women independent of response classification*

Comments: The objective of this study was to determine LDL particle size and composition and the distribution of cholesterol across LDL subclasses in men and women classified as hyper and hypo responders to a diet high in cholesterol. The hyper responder group was found to have elevated LDL-C. However, the population was found to have a predominance of large LDL. The researchers concluded that egg intake by a healthy population of men and premenopausal women does not pose negative health implications with regard to LDL atherogenicity.

**Fernandez ML, Ballesteros MN, et al.** American Journal of Clinical Nutrition 2004;80:855-861. *Dietary Cholesterol does not increase biomarkers for chronic disease in a pediatric population from northern Mexico.*

Comments: The purpose of the study was to evaluate the effects of dietary cholesterol provided by whole eggs on the lipoprotein profile, LDL size, and phenotype in children from this region. Intake of 2 eggs/d results in the maintenance of LDL: HDL and in the generation of a less atherogenic LDL in the population of Mexican children.

**Sharman MJ, Volek JS, et al.** Journal of Nutrition 134:880-885, 2004. *Very Low-Carbohydrate and Low-Fat Diets affect Fasting Lipids and Postprandial Lipemia Differently in Overweight Men.*

Comments: The purpose of this study was to compare the effects of a very low-carbohydrate and a low-fat diet on fasting blood lipids and postprandial lipemia in overweight men. The researchers found that mean and peak LDL particle size increased on after the very low-carbohydrate diet.

**Volek JS, Kraemer WJ, et al.** Journal of Nutrition 133: 2756-2761, 2003. *An Isoenergetic Very Low Carbohydrate Diet Improves Serum HDL Cholesterol and Triacylglycerol Concentrations, the Total Cholesterol to HDL Cholesterol Ratio and Postprandial Lipemic Responses Compared with a Low Fat Diet in Normal Weight, Normolipidemic Women.*

Comments: The aim of this study was to compare the effects of a very low carbohydrate and a low fat diet on fasting lipids, postprandial lipemia and markers of inflammation in women. The researchers found that a short-term isoenergetic very low carbohydrate diet significantly decreased fasting and postprandial triacylglycerols, increase HDL, decreased the total cholesterol/HDL ratio but did not affect markers of inflammation.

**Sharman MJ, Volek JS, et al.** The Journal of Nutrition 132, 1879-1885, 2002.

*A Ketogenic Diet Favorably Affects Serum Biomarkers for Cardiovascular Disease in Normal-Weight Men.*

Comments: This study tested the effects of a 6 week Ketogenic diet on normolipidemic men. The results suggest that a short-term ketogenic diet does not have a deleterious effect of CVD risk profile and may improve the lipid disorders characteristic of atherogenic dyslipidemia.

## Genetik & Ethnizität

**K Tsuzaki, N Sakane, et al.** BMC Medical Genetics (2010), 11:150. *The association of the Clock 311 T/C SNP with lipids and lipoproteins including small dense low-density Lipoproteins: results from the Mima Study.*

Comments: The study intended to investigate whether the Clock 311 T/C SNP may affect lipids and Lipoproteins including sdLDL. The researchers found that the Clock 311 T/T homozygous form might increase the area of sdLDL, independently of potential confounding factors.

**Aydogan HY, Isbir T et al.** In Vivo 23:155-162 (2009). *Associations of Lipoprotein Lipase S447X and Apolipoprotein E Genotypes with Low-Density Lipoprotein Subfractions in Turkish Patients with Coronary Artery Disease.*

Comments: This study investigates associations of specific lipoprotein lipase (LPL) S447X and apolipoprotein (Apo) E allelic patterns with LDL subfraction profiles in patients with CAD. The researchers concluded that X447 allele of LPL gene may protect from atherogenic LDL subfraction, although this effect is small. They suggest that the S447X polymorphism of the LPL gene may modify the risk of atherogenic sdLDL fraction in an APOE-dependent fashion.

**Hamada T, Sakane N, et al.** Medical Science Monitor, 2008; 14 (3): CR107-111. *The UCP2-866 A/A genotype is associated with low density lipoprotein particles sizes in the general population.*

Comments: This study investigated whether the UCP2-866 G/A SNP was associated with serum LDL particle characteristics in a general Japanese population. The researchers found that -866 A/A genotype may reduce LDL particle size in the general Japanese population.

**Kullo IJ, Turner ST, et al.** Journal of Clinical Lipidology, 2007 July; 1(3) 218-224.

*Ethnic Differences in Low-Density Lipoprotein Particle Size in Hypertensive Adults*

Comments: The goal of the study was to assess whether low-density lipoprotein particle size differs between hypertensive African Americans and whites. The researchers found that hypertensive African American men and women have lower LDL particle size than their white counterparts despite having higher HD-C and lower triglycerides.

**Kullo IJ, de Andrade M et al.** Journal of Lipid Research Vol 47 2006. *Quantitative trait loci influencing low density Lipoprotein particle size in African Americans.*

Comments: The researchers performed family based linkage analyses to identify genomic regions that influence LDL particle size and also exert pleiotropic effects on two closely related lipid traits, HDL and TG, in African Americans. The researchers found that genomic regions may contain genes that influence interindividual variation in LDL particle size and potentially coronary heart disease susceptibility in African Americans.

**Turner S, Kullo I, et al.** American Journal of Hypertension 2005; 18:99-103. *Pleiotropic Genetic Effects Contribute to the Correlation between HDL Cholesterol, Triglycerides, and LDL Particle Size in Hypertensive Sibships.*

Comments: The researchers investigated the heritability of three traits (HDL cholesterol, TG, and LDL particle size) and the extent to which shared effects of genes contribute to the additive genetic variation in each trait in hypertensive sibships. The study revealed that pleiotropy contributes to the additive genetic variation in the traits.

## Anwendungen

**Kotani K, Taniguchi N, et al.** J Clin Med Res 2012; 4 (3): 161-166. *The Correlation between Small Dense LDL and Reactive Oxygen Metabolites in a Physical Activity Intervention in Hyperlipidemic Subjects.*

Comments: The present study demonstrated that there was an independent, significant inverse correlation between the changes in the mean LDL particle size and the d-ROMS levels during a 6 month period of increased physical activity in hyperlipidemic subjects. The study showed that even a moderate increase in physical activity can increase LDL particle size.

**Varady KA, Kroeger CM, et al.** Lipids in Health and Disease 2011, 10: 119. *Comparison of effects of diet versus exercise weight loss regimens on LDL and HDL particles size in obese adults.*

Comments: This study compared the effects of alternate day fasting, calorie restriction, and endurance exercise on LDL and HDL particle size in overweight and obese subjects. The results demonstrated that dietary restriction is able to increase LDL particle size while endurance training is able to augment HDL particle size. None of the interventions were able to modulate both LDL and HDL particle size.

**Ibanez J, Gorostiaga M, et al.** Obesity (2010) 18, 535-541. *Resistance training improves cardiovascular risk factors in obese women despite a significant decrease in serum adiponectin levels.*

Comments: In the following study the researchers compared metabolic variables and lipoprotein profiles in two groups undergoing a caloric restriction diet and the same caloric restriction plus resistance training. The results of the study demonstrated a favorable response of plasma TC and LDL-C to resistance training. The lipid profiles in the caloric restriction group showed no modification.

**Helge JW, Dugaard JR, et al.** Scandinavian Journal of Medicine & Science in Sports 2008; 18:86-94. *Low-intensity training dissociates metabolic from aerobic fitness.*

Comments: This study investigated the effect of prolonged whole-body low intensity exercise on blood lipids, skeletal muscle adaptations and aerobic fitness. The results of the study demonstrated that low intensity training caused a shift from small LDL to larger particles of LDL. Similar results were obtained for IDL whereas no effect was observed on total HDL or HDL subfractions.

**Donovan GO, Bird SR, et al.** Int J Sports Med 2007; 28:1-6. *LDL Particle Size in Habitual Exercisers, Lean Sedentary Men and Abdominally Obese Sedentary Men.*

Comments: The researchers compared LDL particle size in lean exercisers, lean sedentary men and obese sedentary men. The researchers suggested that habitual exercise influences LDL concentration but does not influence LDL particle size in men aged 30-45 years.

## Vergleichende Forschungsarbeiten

**Bañuls C, Hernandez-Mijares A, et al.** Clinica Chimica Acta 413 (2012) 251-257. *Comparability of two different polyacrylamide gel electrophoresis methods for the classification of LDL pattern type.*

Comments: The aim of this study was to compare the pattern of LDL particles measured by Polyacrylamide gradient gel electrophoresis (PGGE) and polyacrylamide tube gel electrophoresis (PTGE). The researchers found PTGE correlates favourably and is in very good agreement with PGGE.

**KA Varady, B Lemarche.** *Lipids* (2011) 46: 1163-1167. *Lipoprint Adequately Estimates LDL Size Distribution, but not Absolute Size, Versus Polyacrylamide Gradient Gel Electrophoresis.*

Comments: The following study compared the results between Lipoprint and polyacrylamide gradient gel electrophoresis (PGGE). The researchers concluded there is good agreement between lipoprint and PGGE for the determination of LDL size distribution. However absolute LDL size values may differ between the two methods.

**A Vandermeersch, MR Langlois, et al.** *Clinica Chimica Acta*, 411 (2010) 1361-1366. *Estimation of the low-density lipoprotein (LDL) subclass phenotype using a direct, automated assay of small dense LDL-cholesterol without sample pretreatment.*

Comments: The article compares the results between the sLDL-EX Seiken for the estimation of small dense LDL with the results provided by the Lipoprint System. The researchers concluded that the sLDL-Ex Seiken show satisfactory performance to predict the electrophoretic LDL subclass phenotype.

**Hirany SV, Devaraj S, et al.** *American Journal of Clinical Pathology*, 2003; 119:439-445. *Comparison of Low-Density Lipoprotein Size by Polyacrylamide Tube Gel Electrophoresis and Polyacrylamide Gradient Gel electrophoresis*

Comments: The researchers evaluated a low-density lipoprotein (LDL) subfraction separation method using polyacrylamide tube gel electrophoresis (PTGE) with polyacrylamide gradient gel electrophoresis (PGGE). The researchers concluded that PTGE is precise and compares favorably with PGGE. It also has the advantage of being simple, less expensive, and more suitable for use in the clinical laboratory.

**Hoefner DM, McConnell JP, et al.** *Clin. Chem.* 47:2 266-274 (2001). *Development of a Rapid, Quantitative Method for LDL subfractionation with use of the Quantimetrix Lipoprint LDL System.*

Comments: The researchers compared the results from a modified lipoprint method to a commercially available nondenaturing gradient gel electrophoresis and NMR. The researchers concluded that the Lipoprint method is suitable for routine use in the clinical laboratory.

## Tierversuche

**Castro-Perez J, Johns DG, et al.** *The Journal of Lipid Research*. November 2011; 52, 1965-1973. *Anacetrapib promotes reverse cholesterol transport and bulk cholesterol excretion in Syrian golden hamsters.*

Comments: The study used multiple in vivo and in vitro approaches to assess the effects of anacetrapib on cholesterol metabolism in dyslipidemic Syrian golden hamsters. When HDL subfractions were analyzed, it was found that anacetrapib increased large HDL particles and intermediate HDL particles. LC/MS analysis of the electrophoresed gels showed that all sterols (FC and CE's) were up-regulated in the HDL fractions with CE 18:2 being the most abundant cholesterol ester component of the HDL fraction.

**Ason B, Kuklin NA et al.** *The Journal of Lipid Research*. April 2011. 52, 679-687. *Improved efficacy for ezetimibe and rosuvastatin by attenuating the induction of PCSK9.*

Comments: The following study intended to determine if PCSK9 inhibition could enhance LDL-C lowering of both statins and ezetimibe in a mouse model with a human-like lipid profile. It was observed that PCSK9 knockdown in combination with either treatment lead to greater reduction in serum non-HDL with a near uniform reduction of all LDL-c subfractions.

**Videan EN, Cutler RG, et al.** *Comparative Medicine*. Vol. 59, No 3, June 2009. 187-296. *Comparison of Biomarkers of Oxidative Stress and Cardiovascular Disease in Humans and Chimpanzees (Pan Troglodytes).*

Comments: The purpose of this study was to compare biochemical markers for cardiovascular disease, oxidative stress, and aging directly between male chimpanzees and humans. The lipid profile of chimpanzees exhibited higher levels of large HDL but significantly higher levels of small LDL subfractions. Overall these data suggest an increased risk for cardiomyopathy in chimpanzees.

**Zern TL, Fernandez ML, et al.** *The Journal of Nutrition* 133:2268-2272, July 2003. *Grape Polyphenols Decrease Plasma Triglycerides and Cholesterol Accumulation in the Aorta of Ovariectomized Guinea Pigs.*

Comments: The goal of the study was to evaluate the effect of grape preparation on plasma lipids, lipoprotein cholesterol distribution, LDL size and composition, and atherosclerosis in ovariectomized guinea pigs, a model for menopausal women. The researchers found that although no reductions in plasma cholesterol were observed, the potential atherogenicity of the LDL particle was reduced by grape intake.

## Nicht-Liposcan spezifische Publicationen

**Mora S, Ridker P, et al.** Diabetes. 2010 May; 59 (5) 1153-60. *Lipoprotein Particle Size and Concentration by Nuclear Magnetic Resonance and Incident Type 2 Diabetes in Women.*

Comments: The purpose of the study was to examine the association of lipoprotein particle size and concentration measure by NMR with clinical type 2 diabetes. The researchers found that lipoprotein size and concentrations were associated with incident type II diabetes and remained significant after adjustment for established risk factors including HDL and Triglycerides.

**Anonymous.** NIH Publication No 02-5215. September 2002. *The Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, And Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III)*

Comments: NCEP ATP III classifies small dense LDL as an emerging risk factor for coronary heart disease. While APT II does not recommend measurement of small LDL particles in routine practice, it states that their evaluation supports intensified therapeutic lifestyle changes.

**Lamarche B, Despres JP, et al.** Circulation 1997;95 69-75. *Small, Dense Low-Density Lipoprotein Particles as a Predictor of the Risk of Ischemic Heart Disease in Men.*

Comments: This prospective study analyzed the extent to which the risk attributed to small LDL particles may be independent of concomitant variations in plasma lipoprotein-lipid concentrations. The researchers found small LDL particles may be associated with an increased risk of subsequently developing IHD in men. Results also suggest that the risk attributed to small LDL particles may be partly independent of the concomitant variation in plasma lipoprotein-lipid concentrations.

**Austin MA, Laakso M, et al.** Circulation 1995; 92:1770-1778. *Prospective Study of small LDLs as a Risk Factor for Non-Insulin Dependent Diabetes mellitus in Elderly Men and Women.*

Comments: The purpose of the study was to evaluate the role of small dense LDL as a risk factor for incident of Non-insulin-dependent Diabetes Mellitus (NIDDM). The study demonstrated that sdLDL is a risk factor for the future development of NIDDM. The researchers also suggest that small LDL contribute to risk of coronary heart disease in prediabetics.

**Feinglod KR, Krauss RM, et al.** Arterioscler Throm (1992) 12:1496-1502. *LDL subclass phenotypes and triglyceride metabolism in non-insulin dependent diabetes.*

Comments: The objective of the study was to determine the LDL subclass phenotype in subjects with Non-insulin-dependent Diabetes mellitus (NIDDM) without severe dyslipoproteinemia. The study demonstrated that NIDMM is associated with an increased prevalence of the LDL subclass phenotype B, even in the absence of frank hyperlipidemia.