Abstract
Diabetes is one of the main health problems worldwide causing approximately 1.5 million deaths per year. A major complication associated with diabetes is diabetic cardiomyopathy (DCM), changes in the heart muscle in the absence of coronary artery disease or hypertension. DCM is characterized by left ventricular hypertrophy and cardiac remodeling causing diastolic dysfunction with or without concurrent systolic dysfunction. Altered myocardial metabolism is suggested to be one of the key players in the development of DCM. The healthy heart generates 30% of its energy through mitochondrial metabolism of carbohydrates, whereas fatty acid oxidation accounts for 70% of the ATP generation. During diabetes glucose utilization by cardiomyocytes is restricted thereby increasing the reliance on fatty acid metabolism. The main question during this colloquium is therefore: ‘How is fatty acid metabolism in cardiomyocytes altered during diabetes?’ First fatty acid supply to cardiomyocytes is elevated in diabetic patients by increasing the activity of lipoprotein lipase, an enzyme catalyzing the hydrolysis of triglycerides to free fatty acids. Next it will be discussed how diabetes alters the uptake of fatty acids by cardiomyocytes through translocation of the fatty acid transporter CD36 to the plasma membrane. On the short term increased fatty acid uptake might be beneficial to sustain the generation of energy necessary for contraction of the heart. However, elevated fatty acid uptake on the long term has been shown to cause cardiac damage leading to DCM. Therefore also the potential of interventions focusing on fatty acid uptake by the heart for treatment of DCM will be discussed.