# Abstract

The topic of this diploma thesis is the study of lipide biosynthesis in a hypoxic environment with the use of chromatography and mass spectrography. The first part of the thesis explains the theoretical basis for the research stipulated in the study of OSA and its connection to Type 2 diabetes mellitus. I propose the theory that hypoxia leads to the heightened biosynthesis of fatty acids by way of the reductive citric acid cycle. The research of this reductive citric acid cycle was done by means of cultivated cells with added labeled [5-$^{13}$C] glutamine and its absorption into the fatty acids has been observed with the help of GC-MS. The lipides have been extracted from the cell samples, from which the fraction of triglyceride has been isolated with the help of thin layer chromatography. Furthermore, the transesterification to fatty acid methyl esters (FAME) has been performed.

The collected data showed a 91 % increase in FAME 16:0 and a 102 % increase in FAME 16:1 in a hypoxic environment compared to the control group. Furthermore, it has been found that samples in a hypoxic environment contained 5.9 % more [$^{13}C_1$] FAME 16:0, 12 % more [$^{13}C_1$] FAME 16:1 and almost 3 % more [$^{13}C_2$] FAME 16:1 compared to the control group.



# Keywords

Lipide biosynthesis, Type 2 diabetes mellitus, FAME, GC-MS, hypoxia, obstructive sleep apnea, 3T3-L1 preadipocytes, [5-$^{13}$C] glutamine.