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BACKGROUND AND AIM

Lipoprotein profile and low molecular weight metabolites (LMWM) characterization are powerful tools to determine metabolic alterations in breast cancer (BC) and improve the understanding of the metabolic state of BC patients. The aim of this project is to combine an advanced NMR molecular profile of lipoproteins, glycoproteins and LMWM in order to study the metabolic profile of BC in serum samples.

MATERIAL AND METHODS

The samples were collected from 268 women in the oncology department, 86 were healthy controls and 182 of the women had breast cancer. The advanced NMR profiling of intact serum included the lipoprotein profile, the glycoprotein profile and the quantification of fifteen LMWM.

RESULTS

Table 1. Characteristics of the group

Study group data	Control (n=69)	Breast cancer (n=171)	P value
Clinical data			
Age	43 (38-54)	44 (37-50)	0,316
Children	2 (1-2)	2 (1-2)	0,768
Age of Menarche	12 (11-13)	12 (12-14)	0,116
Menopause (Yes, %)	30,3	20,2	0,12
BMI (Kg/m ²)	24,02 (22,20-28,13)	25,07 (22,72-28,36)	0,196
Biochemical data			
Cholesterol (mg/dl)	194,18 ± 28,31	208,06 ± 31,40	0,002
Apo A1 (mg/dl)	147,22 ± 28,66	147,64 ± 27,34	0,917
Apo B100 (mg/dl)	91 (78-104)	101 (85-118)	0,008
Triglycerides (mg/dl)	76,55 (56,83-98,74)	86,73 (67,69-120,16)	0,004
FABP4 (ng/ml)	13,085 (8,73-18,05)	17,53 (13,15-23,33)	0,000
FABP5 (ng/ml)	6,12 (5,44-7,91)	7,00 (5,26-9,04)	0,086
CETP activity (pmol/μl)	47,87 (26,95-69,54)	51,98 (31,71-76,43)	0,527
CETP protein (ng/μl)	596,51 ± 163,39	579,63 ± 155,76	0,464
CD36 (pg/ml)	908,67 (762,00-1037,56)	897,00 (763,37-997,56)	0,616

Data are expressed as median (IQR) for non-normally distributed data, the mean ± SD for normally distributed data, or percentages for categorical variables. The statistical tests used were Student's t test (for data that were normally distributed), Mann-Whitney U test (for data that were not normally distributed), or chi-square tests (for data gathered as categorical variables). Abbreviations: ApoA1, apolipoprotein A1; ApoB100, apolipoprotein B100; BMI, body mass index; CETP, Cholesterol ester transfer protein; CD36, cluster of differentiation 36; IQR, interquartile range; SD, standard deviation.

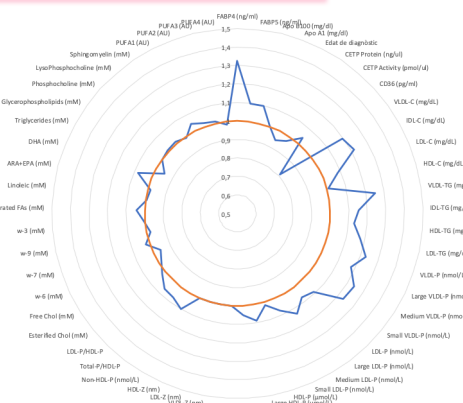


Figure 2. Radar Chart are presented as fold change between control woman and breast cancer patients. Radar chart compares quantitative variables.

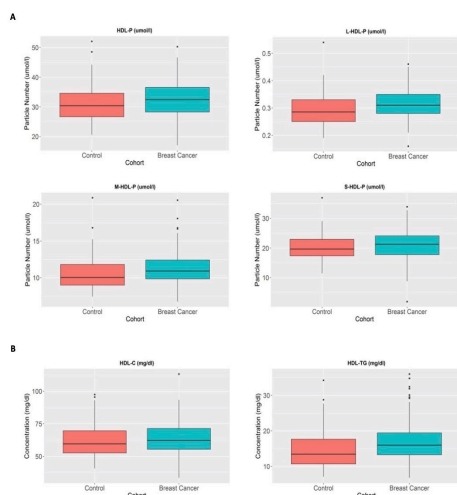


Figure 3. HDL-P, HDL-C and HDL-TG serum concentrations in BC patients and control women. A) HDL-particles (total, large, medium and small). B) HDL-C, HDL-cholesterol and HDL-TG, HDL-Triglycerides.

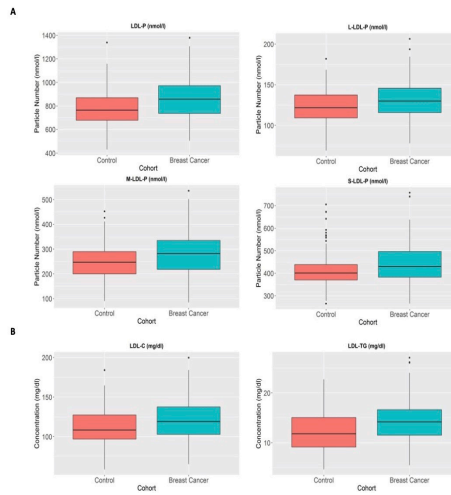


Figure 4. LDL-P, LDL-C and LDL-TG serum concentrations in BC patients and control women. A) LDL-particles (total, large, medium and small). B) LDL-C, LDL-cholesterol and LDL-TG, LDL-Triglycerides.

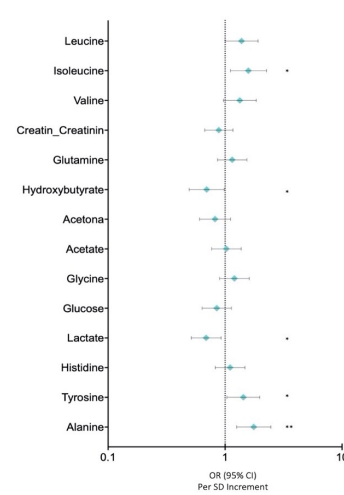


Figure 5. Data are presented as OR (95% CI) per 1-SD higher metabolic marker. Models are adjusted for body mass index and age.

CONCLUSIONS

Using advanced NMR profiling allowed us the identification of relevant biochemical information in order to characterize serum BC samples and provided a simple visualization of the metabolic differences between BC patients and healthy patients. Therefore, these results contribute to a better understanding of the metabolic background of BC.