PROBIOTIC FORMULATION INFLUENCES BLOOD CHOLESTEROL LEVELS: A RANDOMIZED, CONTROLLED TRIAL DURING THE COVID-19 PANDEMIC

F. Kerlikowsky, 1, T. Greupner 1, M. Müller 1, J. Espadaler-Mazo 2, H.-J. Müller 3, A. Hahn 1, 1Faculty of Natural Sciences, Institute of Food Science and Human Nutrition, Leibniz University, Hanover, Germany, 2 R&D Department, AB-BIOTICS SA, Sant Cugat del Velles, Spain, Director Business Development, SymbioPharm GmbH, Herborn, Germany

Leibniz Universität Hannover

INTRODUCTION

- The clinical manifestation of elevated cholesterol is a major risk factor for the development and progression of coronary heart disease (1)

- The pharmacological treatment against hypercholesterolemia is often associated with far-reaching side effects (2,3)

- There is a need to investigate alternative therapy approaches to lower elevated blood cholesterol concentrations in patients with mild-moderate dyslipidemia

AIM

- To study the effect of a probiotic formulation consisting of strains *Lactobacillus plantarum* Lp) on serum low density lipoprotein (LDL) cholesterol as primary target parameter, planned as a primary prevention study

- Total cholesterol (TC), triglycerides (TG) and high density lipoprotein (HDL) cholesterol as secondary parameters

RESULTS

- 91 subjects (of 100 planned) were randomized and completed the study

- Study groups were well balanced at baseline (see table 1)

- In contrast to the placebo, a decrease of LDL cholesterol was achieved in the Lp group. The effect was significantly different to the placebo with p=0.036 (LDL) and p=0.086 (TC)

- The effect was more pronounced in subjects with higher LDL cholesterol concentrations (LDL t0 > 199 mg/dL) with p=0,030)

- No effects were observed on HDL) or TG

- Adjusting for treatment wave and baseline TG increased significance of effect for both LDL and TC (p<0.001 vs placebo)

- Recruitment wave and baseline LDL, TC and TG values significantly modulated LDL and TC change (all p<0,05)

Table 1: Baseline characteristics of the study groups

	Lp	Placebo
Number of subjects	47	44
Sex (m/f)	14/33	14/30
Age (y)	63.7± 1.0	63.3 ± 1.2
BMI_(kg/m)	26.4 ± 0.6	26.2 ± 0.6
Syst._RR (mmHg)	142.1 ± 2.1	138.5 ± 2.0
Diast._RR(mmHg)	88.2 ± 1.2	86.3 ± 1.3
LDL-C (mg/dL)	187.9 ± 3.0	188.3 ± 3.1
TC (mg/dL)	276.5 ± 5.0	280.3 ± 5.2
TG (mg/dL)	122.8 ± 5.4	134.1 ± 8.2

Mean value ± standard error of the mean; m:men; f: female; BMI: Body-Mass-Index; Syst._RR: systolic blood pressure; Diast._RR: diastolic blood pressure
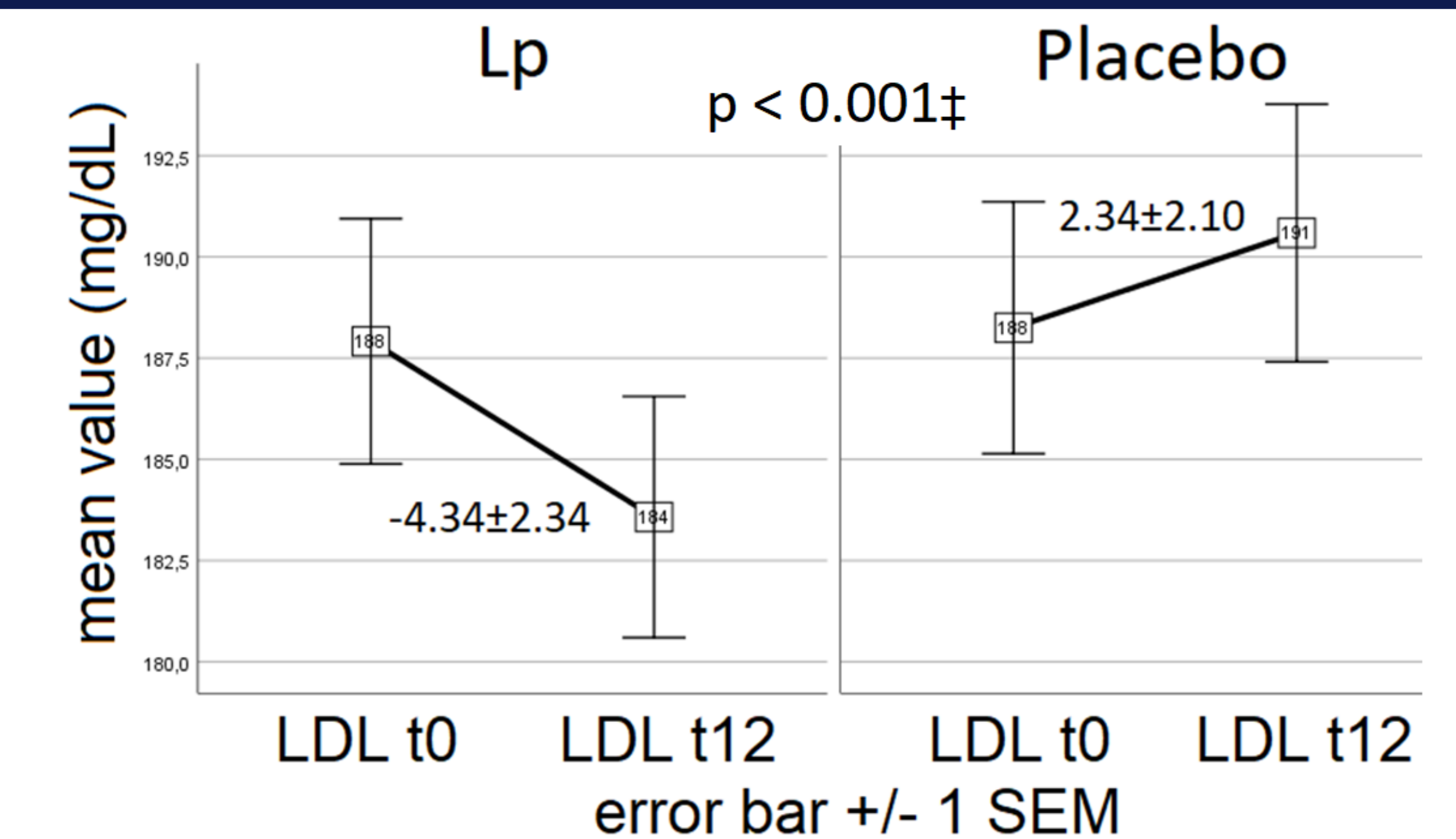

Figure 1: Change in mean LDL cholesterol concentration

Table 2: Comparison of study results

	Lp	Placebo	p-value
LDL*Δ t_{12}-t_0 (mg/dl)	-13.9 ± 11.8	-2.7 ± 13.2	0.030†
TC Δ t_{12}-t_0 (mg/dl)	-7.7 ± 24.9	1.2 ± 23.9	0.086†
TG Δ t_{12}-t_0 (mg/dl)	7.7 ± 40.3	1.1 ± 32.1	0.392†
HDL Δ t_{12}-t_0 (mg/dl)	0.4 ± 7.8	0.1 ± 7.7	0.812†
TC Δ t_{12}-t_0 (mg/dl)	-7.7 ± 24.9	1.2 ± 23.9	<0.001‡

† T-test for unpaired T test samples
*LDL t0 >199mg/dl subpopulation with (n) Lp=15; Placebo=12
‡ GLM with treatment, baseline LDL, TC, TG and wave as cofactors

METHOD

- A randomized, double-blinded, placebo-controlled clinical trial in otherwise healthy adult patients with untreated LDL cholesterol ≥160 mg/dL at screening and providing informed consent

- Subjects of the study were without drug treatment and had only moderately elevated LDL cholesterol concentrations up to 220 mg /dL

- Placebo or *L. plantarum* capsule (Lp) were taken once daily for 12 weeks

- The Lp capsule contained a dried lactobacillus powder and maltodextrin: 100 mg bacterial mixture of 1,2x10⁹ CFU of *L. plantarum CECT7527, CECT7528 and CECT7529* in a proportion 1:1:1 each and 340 mg maltodextrin

- Placebo contained 440 mg Maltodextrin only
- LDL, HDL, TC and TG were measured in serum at baseline and after 12 weeks
- Recruitment and intervention took place during the Covid-19 pandemic in Hanover University (Germany), in three consecutive waves, March to December 2020
- Data were analyzed with linear model (GLM), with treatment arm as fix factor, recruitment wave as random factor, and baseline LDL, TC and TG values as covariates

CONCLUSIONS

- The probiotic formulation significantly lowered LDL and TC during a 12-week intervention, compared to Placebo

- The effect was statistically significantly influenced by recruitment wave, baseline LDL, TC and TG values

REFERENCES

- (1) Silverman et al, 2016, JAMA 316(12):1289-97
- (2) Mills et al, 2008, J. Am. Coll Cardiol. 52: 1769-1781
- (3) Yebyo et al, 2019, Ann. Intern. Med. 170:1-10

ACKNOWLEDGEMENTS

CONTACT INFORMATION

Felix Kerlikowsky, Institute of Food Science and Human Nutrition, Leibniz University, Hanover, Germany

+49 511 762 5430

Nutrition and chronic disease
Felix Kerlikowsky

P-229