

BIOACTIVE LIPIDS IN INFANT FORMULAS ENRICHED WITH MILK FAT AND MILK FAT GLOBULE MEMBRANE

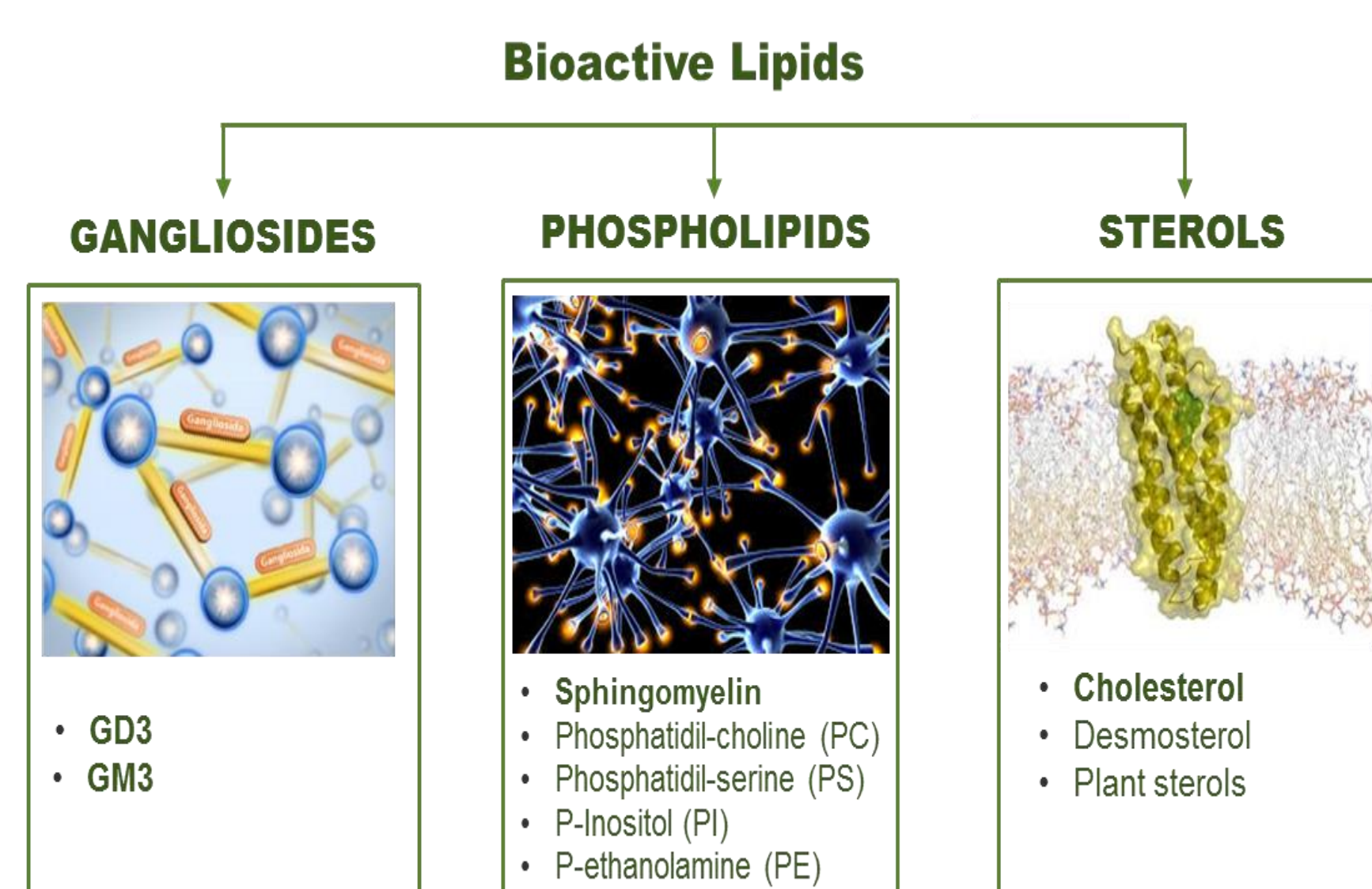
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INTRODUCTION

Currently the Milk Fat Globule Membrane (MFGM) and concretely its lipids, have gained interest in relation to its nutritional composition and functional properties.

MFGM is perfectly structured and it contains bioactive polar lipids such as cholesterol, sphingomyelin, gangliosides. In fact, diverse beneficial health effects have been attributed to MFGM bioactive lipids such as antimicrobial and antiviral effects.



This could explain the possible beneficial effects found in Infant Formulas (IFs) supplemented with MFGM since it seems to have health promoting effects in neurodevelopment and defense against infections¹ (Hernell et al. 2016).

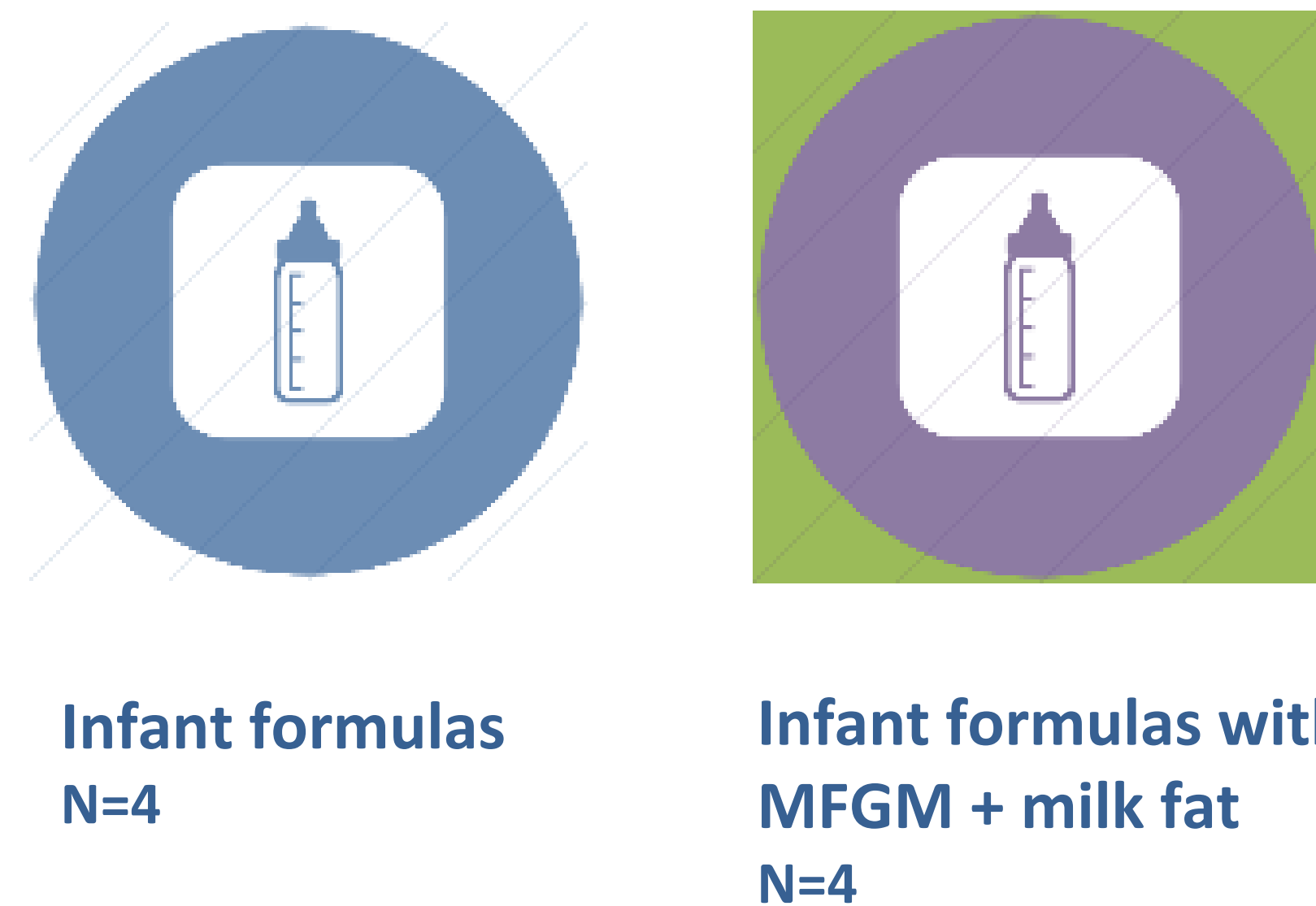
Regarding the MFGM composition, more studies about the characterization of its components are needed with the aim to understand the role of bioactive lipids and proteins found in the MFGM structure.

We aimed to quantify the bioactive lipids in IFs enriched in Milk Fat (MF) and MFGM and to compare them with IFs without these two ingredients.

METHODS

Four IFs enriched with milk fat and MFGM marketed in Czech Republic, Netherlands, Spain and Sweden were compared to the most sold IFs without MF and MFGM in each country.

THE STUDY



Bioactive lipids (Gangliosides, cholesterol, β -palmitate, sphingomyelin) were analyzed:

- Gangliosides GM3 and GD3 were identified and quantified by HPLC-MS/MS (method described by Sorensen² with modifications);
- Sphingomyelin analyzed by ³¹P-NMR (method described by García et al³ with modifications);
- Cholesterol analyzed by GC-FID-MS⁴ (Al-Hasani et al. 1993) and
- β -palmitate analyzed by GC-FID (method described by López et al⁵ with modifications).

Duplicate analysis were performed on each sample (double sample preparation and double detection).

RESULTS

Infant formulas enriched in MFGM and MF, showed significantly higher amounts of bioactive lipids (cholesterol, gangliosides, Sphingomyelin and SN-2 palmitate) than infant formulas without them.

CONCLUSION

- Our results showed that the addition of milkfat and MFGM increase the quantity of bioactive lipids in infant formulas.
- The quantification of these bioactive compounds could help to understand the beneficial health effects of MFGM enriched IFs.
- Research related to MFGM components and its beneficial effects have been focused on protein components and it seems that bioactive lipids may also play an important role.
- More studies are needed to characterize and quantify MFGM and milkfat bioactive compounds.

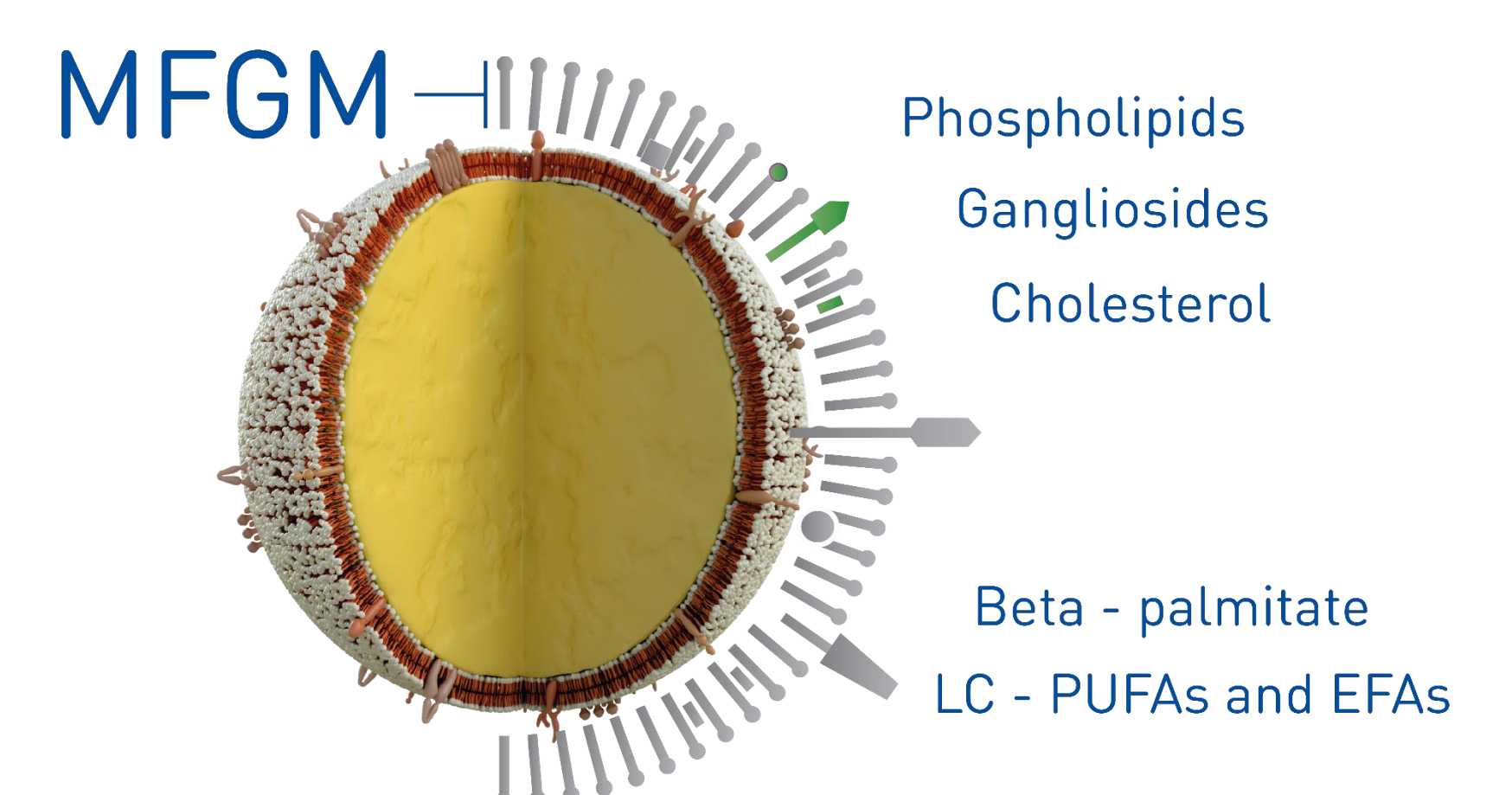


Table 1. Mean values (sd) of bioactive lipids in infant formulas with and without milkfat and MFGM.

Bioactive lipids mean (SD)	IFs with MF and MFGM (N=4)	IFs without MF and MFGM (N=4)	p – value ¹
Gangliosides (GD3+GM3) (mg/100 ml)	1.64 (0.36)	1.11 (0.159)	0.002
Cholesterol (mg/100ml)	6.49 (1.05)	2.46 (0.49)	0.001
Sphingomyelin (mg/100ml)	13.94 (0.67)	5.75 (2.14)	0.001
SN2 Palmitate (%)	23.12 (2.75)	10.12 (2.90)	0.001
1 p<0.05 shows significant differences			

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Disclosure of Interest

E. Matencio, F. Romero, B. Philipsen, C. Tennefors, S. Bodenstab, L.M. Sanchez-Siles. : Conflict with Hero Group.