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Lipids. Utility carriers. Short communication

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Abstract

Research in field supports determining role of superior organic acids and derived substances as mediators (utility carriers), for proper functioning of cellular entities (gene activation, cell signal regulation, etc.). From this class, superior essential organic acids (polyunsaturated), fat-soluble vitamins (E, D, provitamin A), are recognized as carriers of utilities in cellular permeation ("transmembrane translators") and in the regulation of nervous system functions.

The dual hydrophobic/hydrophilic competence allows translation of lyophilic substances (fats and non-polar substances) and polar components or water. If the attractive forces are greater than those of Brownian repulsion and motion, the particles clump together to form aggregates or coagules, resulting in complex internal inhomogeneous structures.

Keywords: lipids, utility carriers, skills

1. Introduction

Studies in field of lipoproteins (colloidal entities that transport insoluble lipids in blood, lymph, cerebrospinal fluid) are of particular interest, because disturbances in lipoprotein metabolism (eg cholesterol) are one of the causes responsible for mortality among Western populations [1, 2, 3]. Edible lipids are essential for growth, development and maintenance of vital functions of the body, fulfilling roles of major importance. Research in field supports determining role of superior organic acids and derived substances as *mediators* (***utility carriers***), for proper functioning of cellular entities (gene activation, cell signal regulation, etc.) [1]. Commonly, fats and oils are referred to as *triacylglycerols* (triglycerides (TG)), identity determined by presence of three hydroxyl groups in glycerin molecule to which a superior organic acid can be *encumbered*. The structure of triacylglycerol is influenced by nature and position (sn-1 (α)); central (SN-2); peripheral (Sn-3)), to each superior organic acid in the glycerin molecule. This greatly conditions chemical, physical behavior, rheological abilities and bioavailability [2].

Length of hydrocarbon chain of higher organic acids varies in range of 4÷24 carbon atoms (C), with a maximum of three double bonds. $C_{18:0}$ (stearic acid (octadecanoic acid)), being most common. Currently, over 1000 different typodimensional higher organic acids are known (length, positions, configurations, degree of unsaturation, substitutes along the aliphatic chain). However, ≈20 higher organic acids are found predominantly in nature. Of these, palmitic, oleic and linoleic acid account for ≈80% by weight of base oils and fats [3].

Thus, it is stated that lipids are a heterogeneous group of *defined organic molecular complexes*, fulfilling *target* biological functions of utmost importance. Knowledge of how to *manifest* is still an obstacle, compared to polynucleotides (DNA, RNA), proteins, organic acids or sugars, even in a present of the development of genomics, of sequential information in field of *life sciences*.

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From this perspective, it is difficult to "*express*" recommendations in direction of food diets supported only by physicochemical behavioral mechanisms and rheological competences. Utility, it is known that lipids are cell membrane structure element that isolates the cell and its subcellular components from environment. From this class, superior essential organic acids (polyunsaturated), fat-soluble vitamins (E, D, provitamin A), are recognized *as carriers of utilities in cellular permeation* ("*transmembrane translators*") and in the *regulation of nervous system functions*. *The dual hydrophobic/hydrophilic* competence allows translation of lyophilic substances (fats and non-polar substances) and polar components or water. If the attractive forces are greater than those of Brownian repulsion and motion, the particles clump together to form aggregates or coagules, resulting in complex internal inhomogeneous structures.

The center is denser relative to peripheral regions, so mass does not change compared to bodies of constant density [4]. Previous statements are reflected on a macroscopic scale, on rheological properties influenced by all levels of structure defined during network formation, conditioned by structure of individuals, triacylglycerols, crystalline units and *polymorphic nature* of the network. In order to explain manifestation of colloidal aggregates and other lipid systems (eg crystal lattices), the *fractal concept* was used that explains/quantifies how the mass of the aggregate/crystal network increases in relation to its size, depending on the *fractal dimension*. [5].

This process of self-assembly of lipid layers assigns defined properties to the "*barrier*" between cell/cellular elements and the outside world. Moreover, this dual manifestation allows the cell membrane to separate molecular species and allow through "*transmembrane channels*" "*passage*" of a wide range of proteins [6].

Studies in field of lipoproteins (colloidal entities that transport insoluble lipids in blood, lymph, cerebrospinal fluid) are of particular interest, because disturbances in lipoprotein metabolism (eg cholesterol) are one of the causes responsible for mortality among *Western populations* [7]. Previous claims support the contribution of lipid competencies to the "*design*" of "*personalized*" functions with "*targeted*" applications in diet and treatment of various diseases. *Advances in lipid competence design* have as substrate the possibility of their stereospecific orientation, in the triacylglyceride molecule.

This process of self-assembly of lipid layers assigns defined properties to the "barrier" between cell/cellular elements and the outside world. Moreover, this dual manifestation allows the cell membrane to separate molecular species and allow through "transmembrane channels" "passage" of a wide range of proteins (Fig. 1).

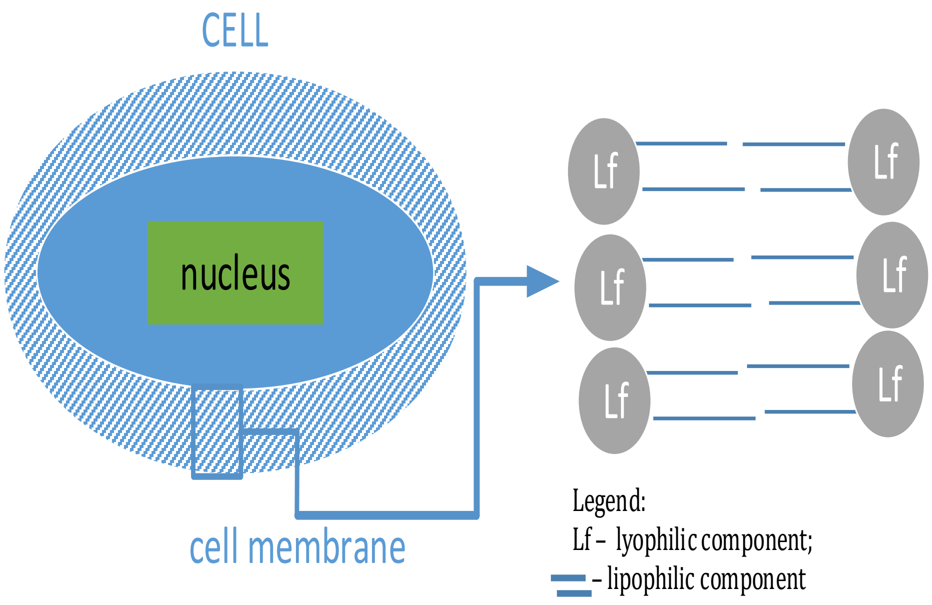

Figure. 1. Cell membrane-lipid layers, "barrier" between cell/cellular elements and the outside world

Conclusions

Previous claims support the contribution of lipid competencies to the "design" of "personalized" functions with "targeted" applications in diet and treatment of various diseases. Advances in lipid competence design have as substrate the possibility of their stereospecific orientation, in the triacylglyceride molecule.

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