# A brief note on plasma membrane organization.

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## Introduction

The phospholipid bilayer, which creates a permanent barrier between two aqueous compartments, is the membrane's basic structural component. These compartments are the inside and outside of the cell in the case of the plasma membrane. The particular tasks of the plasma membrane, such as the selective transport of chemicals and cell-cell recognition, are carried out by proteins embedded inside the phospholipid bilayer. Of all cell membranes, the plasma membrane has been studied the most, and it is largely thanks to these studies that our current theories on membrane structure have developed. Particularly helpful as a model for research of membrane structure are the plasma membranes of mammalian red blood cells (erythrocytes). As mammalian red blood cells are devoid of internal membranes and nuclei, they serve as a source of pure plasma membranes that are simple to separate for biochemical investigation. In fact, research on the plasma membrane of the red blood cell offered the first proof that lipid bilayers make up biological membranes. The surface area that a monolayer of the extracted lipid spread out at an air-water interface occupied was then calculated. The erythrocyte plasma membranes' surface area came out to be twice as large as that of the lipid monolayer, which led researchers to believe that lipid bilayers rather than monolayers made up the membranes [1].

The plasma membranes of animal cells also include cholesterol and glycolipids in addition to phospholipids. With their carbohydrate parts exposed on the cell surface, glycolipids are only present in the outer leaflet of the plasma membrane. In most plasma membranes, they make up just approximately 2% of the lipids, making them very insignificant membrane constituents. On the other hand, cholesterol is a crucial component of animal cells' membranes and is present in almost the same molar levels as phospholipids. To operate properly, phospholipid bilayers must have two specific characteristics. First, the fundamental role of membranes as barriers between two aqueous compartments is dictated by the structure of phospholipids. The hydrophobic fatty acid chains that make up the phospholipid bilayer prevent water-soluble molecules, such as ions and the majority of biological molecules, from passing through the membrane. Second, naturally occurring phospholipid bilayers are viscous fluids rather than solids. The majority of natural phospholipids' fatty acids include one or more double bonds, which cause the hydrocarbon chains to twist and are challenging to pack together. Thus, the interior of the membrane can move freely due to the long hydrocarbon chains of the fatty acids, making the membrane itself flexible and supple. Moreover, the ability of proteins and phospholipids to freely diffuse laterally inside the membrane is a crucial characteristic for many membrane processes [2].

While proteins are in charge of carrying out particular membrane functions, lipids are the fundamental structural components of membranes. The majority of plasma membranes are composed of around 50% lipid and 50% protein by weight, with glycolipid and glycoprotein carbohydrate components making up 5–10% of the membrane mass. This ratio translates to around one protein molecule for every 50 to 100 lipid molecules since proteins are significantly bigger than lipids. The fluid mosaic model of membrane is now widely regarded as the fundamental framework for the organization of all biological membranes. This concept sees proteins injected into lipid bilayers to form membranes as two-dimensional fluids [3].

Red blood cell research has produced several excellent examples of peripheral and integral proteins connected to the plasma membrane. Around a dozen key proteins were initially found in the membrane preparations of human erythrocytes using gel electrophoresis. The majority of them are cytoskeletal elements that make up the cortical cytoskeleton, which supports the plasma membrane and regulates cell shape, and are designated as peripheral membrane proteins. Examples of trans membrane protein structure may be seen in the two main integral membrane proteins of red blood cells, band 3 and glycophorin. A tiny glycoprotein called glycophorin has 131 amino acids and a molecular weight of roughly 30,000. Its composition is split 50/50 between protein and carbohydrates. Glycophorin is a 23-amino acid monomeric helix that spans the membrane, with its glycosylated amino-terminal end exposed on the cell surface. According to structural research, the porins lack hydrophobic -helical regions. Instead, they pass through the membrane as "barrels," formed when 16 sheets are folded into a shape that encloses an aqueous pore. Whereas the side chains of hydrophobic amino acids interact with the interior of the membrane, those of polar amino acids line the pore. Each of the stable trimers formed by the association of the porin monomers comprises three open channels that allow polar molecules to permeate through the membrane [4].

## References

1. Bartke N, Hannun YA. Bioactive sphingolipids: metabolism and function. J Lipid Res.;50:S91-6.
2. Boxer SG, Kraft ML, Weber PK. Advances in imaging secondary ion mass spectrometry for biological samples. Ann Rev Biophys. 2009;38:53-74.

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3. Chen Y, Qin J, Chen ZW. Fluorescence-topographic NSOM directly visualizes peak-valley polarities of GM1/GM3 rafts in cell membrane fluctuations. J Lipid Res. 2008;49(10):2268-75.

4. D'Auria L, Fenaux M, Aleksandrowicz P, et al. Micrometric segregation of fluorescent membrane lipids: relevance for endogenous lipids and biogenesis in erythrocytes. J Lipid Res. 2013;54(4):1066-76.

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