Membranes Rap

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If you're in a cell's cytoplasm, heading outside,
Your last stop's a barrier, 8 nanometers wide,
The cell membrane: our subject for today
It's as basic to life as DNA

It's *Selectively permeable,* like a border patrol
of a country it maintains control.
Selecting what leaves or what gains entry
It's a guard, bouncer, watchman, patrolman or sentry.

But not *just* a guard, it sends signals in nerves
White blood cells use their membranes to eat germs like hors d'oeuvres,
Membranes have receptors, enzymes and junctions,
So what kinds of structure can have all these functions?

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C-E double L, "Mem" B-R-A-N-E
Controlling transport selective permeability
Phospholipids, Carbohydrates, Proteins and Cholesterol
The Fluid Mosaic Bilayer in us all

So let's take a look at what makes up the membrane,
Phospholipids rule this domain,
In fact membrane structure emerges directly
from phospholipids' chemical properties.

There's a head and a tail on every phospholipid,
The tail's two long chain fatty acids
Bound to a glycerol, it's made to order
The tail's non-polar --hydrophobic-- fears water

The head's got a phosphate, it's charged negatively,
makes the head hydrophilic--plays in water happily
So tail avoids water while the head's attracted to it,
When phospholipids form the membrane that's how they do it.

Cause when phospholipids into water get submerged,
A phospholipid bilayer structure will emerge
The tails hang together in a water free zone,
Hear their hydrophobic moan, "water leave me alone!"

While the heads are sticking out touching all those H_2Os
Tails in, heads out, it's how every membrane goes
Tails in, heads out, in a cellular sphere,
It's the bilayered basis of membranes everywhere.

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But a cell membrane's not just a phospholipid scene
There's cholesterol, carbohydrates, lots of proteins.
In fact, membrane proteins have a presence so great,
that they often exceed the phospholipids by weight.

And all of these components are in constant motion,
Moving, mixing like a boiling potion,
Flowing like dancers in a party in Passaic
That's why the membrane's thought of as a fluid mosaic.

Let's start with proteins since they're key in this mix.
Transmembrane proteins span the entire width.
Typically they're ports--think of channels or conveyors,
For things that don't go through the lipid bilayer.

Any protein embedded in the hydrophobic middle
Built right into the inside is considered integral
While peripheral proteins either hang on the exterior,
Or inside on the cytoplasmic interior.

Cholesterol keeps membranes flowing with ease,
In cold it keeps the lipids moving so they don't freeze,
In heat it slows the lipids down limiting their traveling,
Cholesterol: it keeps membranes from unraveling

Membrane carbohydrates work as markers or signs
So your immune system knows which flag your cells are flyin'
The blood types AB, O, and B and A
Are about the carbohydrates on red blood cell membranes.

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