

# THOSE MAGIC MEMBRANES

(Short version - the one recorded)

by Arthur W. Siebens, Ph.D., Copyright 1995

(to the tune of "La Bamba" by Richie Valens and "Twist and Shout," by Medley and Russell)

How do things get into cells?  
How do things get out?  
Transport across cell membranes  
Is what this song's about.

Diffusion, osmosis  
Active transport, too.  
To make your cells and organs work right  
The right solutes must get through.

## CHORUS

Oh, those magic membranes  
In each and every cell  
Differences between solutes may be small  
But membrane transporters can tell.

Oh those magic membranes!

They let the good stuff in  
Get the bad stuff out  
Through transporters made of protein  
There's lots of different routes.

Membranes are mainly made of lipid  
Most solutes can't penetrate  
Proteins transport specific solutes  
Many change their shape (conformational state).

## Facilitated diffusion

(From) high concentration to low.  
In cotransport a solute going "downhill"  
Moves another "uphill" as it goes (secondary active transport).

There's also (primary) active transport  
And that takes energy  
Solute are moved uphill  
Energy from ATP.

## CHORUS

If solutes can't cross a membrane  
But water can diffuse  
It will cross 'til equilibrium (the water concentration is the same)  
Osmosis is when water moves (across cell membranes).

## CHORUS

Oh those magic membranes! Yeah!