

Osmosis!

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I put this yummy gummy through a science experiment,
That models what happens to a cell in an environment
That's more watery than the cell is inside,
And what I saw came as no surprise,

My gummy bear expanded -- quintupled in weight,
My gummy expanded, an increase so great,
So listen up as Mr. W explains this!
It's all about osmosis!

Osmosis is the diffusion of water,
Across a membrane or a water-permeable border.
Diffusing like all molecules in fluid situations,
From higher to lower concentration.

CHORUS

OSMOSIS!

H₂O diffusing

OSMOSIS!

See that water oozing

Hypotonic to hypertonic flow

OSMOSIS!

Let's go!

Let's talk about our gummy, in osmotic terms,
Hypotonic, hypertonic, isotonic are the words
You can use to discuss water's watery diffusion,
Learn 'em well, to avoid confusion.

Hypotonic means higher water concentration
And relatively lower solute concentration,
Hypertonic is the opposite --percent of water's less,
With more solute dissolved inside, as you might guess

So let's take these terms and apply them to our gummy bear,
I'm looking at the package, and seeing what it says here,
Each bear is mostly sugar with some other stuff mixed in,
And holding it together is the protein gelatin

So when you put a gummy in a cup of H₂O
It's readily apparent that the gummy is so
Hypertonic to the water that it's in,
and the water's hypotonic to our little gummy friend,

And so through osmosis the water will diffuse,
Into the gummy which soon will look so huge,
The mass it gains is water which will infiltrate the gummy,
Which one day later, is looking pretty funny

CHORUS

Next I took this freshwater plant, name is elodea
It lives in lake and ponds never in the salty sea,
In fresh water elodea cells are full and firm,
It's all about osmosis as we're gonna confirm.

See the cells are hypertonic to their watery exterior,
So water will diffuse into the cell's interior,
Expanding the membrane, pushing it against the wall,
In fact you can't see the membrane at all,

But add some salty water so the outside's hypertonic,
And water leaves the hypotonic cells, it's so osmotic!
Membrane leaves the wall, the cells' insides are scrunched.
With the chloroplasts all stuck together in a bunch

That's why at the grocery they always have that mister
The water on the veggies helps to keep them crisper,
Those droplets on the veggies are a hypotonic brew,
osmosis moves the water in, the veggies look brand new.

Dried fruit and beef jerky preservation is osmotic
Their low water content makes the dry food hypertonic
So any germs or molds that fall upon them lose their water
And die and don't contaminate the dried food in the larder

CHORUS

Animal cells, in situation hypertonic
Lose their water, shrink and shrivel look so sick
But an animal cell in hypotonic abode
Gains water and expands, eventually explodes

'Cause animals cells lack a wall, of course
So nothing pushes back at the osmotic force,
Water flows from hypotonic to the hypertonic cell,
Which bursts cause the membrane can't stop the swell,

If you want to keep a frog heart outside a body beating,
An isotonic fluid, is what you'll be needing,
Water concentration's same on each side of the cell,
No gain or loss of water, the cell's feel so swell

And this paramecium which lives in ponds and lakes
Constantly fights osmotic water uptake,
The contractile vacuole's a pumping adaptation
To deal with this osmotic situation