

Glycolysis Rap

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Glenn Wolkenfeld © 2012

Glycolysis is a series of reactions,
Enzymatic actions, energy transactions,
Takes glucose, a molecule so sugary,
Breaks it down for NADH and ATP

It's an anaerobic cytoplasmic pathway that amazes
Organized easily into three phases,
Investment, cleavage, and energy harvest,
Tell me later which one you like best.

Investment: activation energy's supplied,
Cleavage: our six carbon sugar divides
Harvest: we get our energy yield,
So beautiful, so intricate keep your eyes peeled

CHORUS

Glycolysis!

Come on sugar, come on sugar for the breakdown,

Investment's like striking a match,
That energy you put in makes the fire catch
For glycolysis investments two ATPs,
Which act as activation energy

Enzymes take phosphate from ATPs
Jam 'em on a glucose rearranging it to fructose,
Leaving Fructose 1-6 biphosphate on the table,
With two phosphates, it's highly unstable!

Moving us to the second phase
The cleaving of Fructose biphosphate
Cause *glycolysis* means *splitting sugar*, you can see
cleavage yields two molecules with carbons three

One is glyceraldehyde 3 phosphate G3P
It continues on our pathway broken down for energy
But the second one an enzyme will immediately,
Convert into a second G3P

CHORUS

Phase 3: G3P gets rearranged and oxidized,
By an enzymatic assembly line,
That harvest energy from each G3P
One NADH and 2 ATPs

Double this yield per G3P
To two NADH and 4 ATPs
That's the gross yield for every glucose in
A generous accounting of glycolysis's win

But 2ATPs were invested in phase 1
So you net just two you can use to jump or run,
Put two in, get four out, your net gain is two,
Two ATPs that you can use.

If that doesn't seem like very much, it's cause it ain't,
There's tons of energy left in pyruvate,
The two three carbon molecules we're left with at the end.
And what happens to pyruvate is gonna depend,

On the metabolic pathway where pyruvate gets sent,
If its anaerobic it'll be fermented
But in aerobic cells pyruvate's termination
Will be the Krebs cycle and total oxidation!

CHORUS

Review: glycolysis starts with investment
of two ATPs to the glucose that we started with,
The product is cleaved into two G3Ps
From which the cell harvests NADH and ATPs.

This anaerobic pathway is respiration's first phase,
It's billions of year's old evolved in ancient days
before O₂ accumulated in the seas, before
eukaryotic cells like ours arrived on the scene

It's everywhere, ubiquitous, in every organism,
Bacteria, sequoia tree, no matter your metabolism,
Happens in the cytoplasm doesn't need no organelles.
You wanna find glycolysis? Look in any cell!!!

repeat chorus and fade