

Glycolysis Time

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Woke up this morning, sugar was on my mind (her name is glucose)

Woke up this morning, sugar was on my mind

It's time for my sugar's breakdown,

It's glycolysis time.

My sugar is so sweet,
She means so much to me,
But I'm prepared to give her up,
For a little ATP

Her chemical formula
 $C_6H_{12}O_6$
Glycolysis will break her down,
With enzymatic tricks

Ten separate reactions,
Ten separate enzymes,
In a cytoplasmic assembly line,
Cells do it all the time!

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Glycolysis
Has 3 basic parts.
The 1st part's activation,
So that's where we'll start

Enzymes take two phosphates from ATP,
And jam them onto glucose,
With through some rearrangements
Is now really a fructose

Fructose 1-6 diphosphate
Brimming with energy
About to fall apart
In the next step you will see,

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Glycolysis's name
Comes from its second part
When fructose 1-6 diphosphate
By enzymes is ripped apart.

Cause *glycolysis* means *splitting sugar*,
And this is really cool,
This *cleavage* results in two
Three-carbon molecules

And when the next enzyme does its work
We'll see that my sugar's fate
Was to be made into two
Glyceraldehydes 3 phosphates

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Glyceraldehyde 3 phosphate
Is known as G3P
And in step 3 of glycolysis
We harvest its energy

The harvest begins
With NAD⁺'s reduction
To NADH, which has
Electron carrying function.

Then enzymatic action,
Harvests more energy,
Which comes as the payoff
2 ATPs from each G3P

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1 NADH, 2 ATPs
From every G3P
So the gross yield per glucose is 2 NADH
and 4 ATPs

But remember the 2ATPs
Invested in step 1
So the net yield is 2 ATPs
You can use to jump or run

So our overall net is
2 NADH and 2 ATPs
My sugar it was worth it,
Forgive me baby please.

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When all was done, I looked at my sugar,
She didn't look that great,
Two ATPs, two NADHs,
two three-carbon pyruvates

NADH is used in the last part
Of cellular respiration
It's fuel to make ATP in
Oxidative phosphorylation

So when you look at your sugar.
Have some pity in your eyes
Glycolysis, getting energy,
Is based on your sugar's demise!