Welcome back students.

In this lecture we will learn

the third module that is energy

rich compounds part one.

The outline of this lecture is.

Energy rich compounds which are ATP 4

square in all pyruvate and 1/3 bespoke.

This phosphoglycerate the learning

outcomes of this lecture are you will

be able to describe and achieve which

compounds he will be able to classify,

high energy compounds and you'll gain

knowledge of an achieve transfers.

Take a minute and re collect

what is hydrolysis.

Hydrolysis is a chemical decomposition

reaction in which a compound is split into

other compounds by reacting with water.

Will see an example.

Yeah, we haven't a still which

is being hydrolyze with water

and it will be decomposed into

a carboxylic acid and alcohol.

OK so hydrolysis is the

chemical decomposition.

Now that we have seen

the hydrolysis reaction,

we will see hydrolysis of various compounds.

Let's begin with energy rich

compounds on hydrolysis,

compounds yield energy and they can be

classified as high energy compounds

or low energy compounds based on

the amount of energy they release.

So this is our first classification.

Energy.

Rich compounds are substances which

possess sufficient free energy

to liberate at least 7 calories

per mol at PH-7 energy.

Rich compounds are also known

as high energy compounds.

Low energy compounds are compounds which

deliberate less than 7 calories per mole.

Why is this seven limit chosen?

Is becaused on hydrolysis of ATP

to ADP and inorganic phosphate

minus 7.3 calories per mole?

Is the energy released?

So we have the structure of ATP.

Below you can see that it consists

of an adenine group, ribose sugar,

and three phosphate bonds.

So when this Atps hydrolyze,

it is converted into ADP an

in Uncorrect first wait,

and along with that and energy of minus

7.3 calories per mole is released.

Now we will see ATP in detail.

ATP is most important high energy

compound in the living cell.

As I already told you,

it contains an adenine grouper.

I pose group Anna three and

a Tri phosphate group.

ATP is considered as in high energy compound

because of the presence of the two four.

So,

anhydride bonds.

Hydrolysis of the terminal phosphate

group yields a high negative free energy

that is up minus 7.3 calories per move.

It transfers phosphoryl groups from high

energy compounds to less energetic compounds.

You will learn more about ATP

in the next video.

Novacyt the other energy rich compounds.

In this table you can see the standard free

energy of hydrolysis of various compounds.

On top of the high energy phosphates

below that you have 4 screen,

all pyruvate cyclic amp,

1/3 bis,

phosphoglycerate,

and so on in red is your ATP which is

hydrolyzing to ADP and inorganic phosphate

that is marked in red and it is it gives.

An energy of minus 7.3 calories per moon.

And below ATP,

the compounds are said

as low energy compounds,

so all the high energy compounds,

when hydrolyze liberate more energy than ATP.

Most of the high energy compounds

contain phosphate group.

As you can see in the table,

most of them contain phosphates only as a

tile Co A it does not contain phosphate,

but it contains a sulfur

group and since most of them,

these compounds contain phosphate group,

they are known as high energy phosphate.

Now, high energy bonds.

The high energy compounds

possess acid anhydride bonds,

mostly phospho anhydride bond.

Formed by the condensation of two

asidic groups or related compounds,

these bonds are referred

to as high energy bonds.

Since the free energy is liberated

when these bonds are hydrolized

and these bonds are notated

bio symbol called Esquivel.

As you can see here and this was

invented by Fritz Albert Lippman.

Example you have ATP which is returned

as AMP and with the quibble P.

Quibble people key that shows you

that it is a acid anhydride bond

between the two phosphate groups.

Now we see in the first classification

where we classify the compounds into high

energy compounds and low energy compound.

Now they can also be classified based on

the bond which is present in the compound.

The first class you can see

here is the in all four space.

That is the pond which is present.

And how is this bond form is when

phosphate group attaches to a

hydroxyl group bonded to a carbon and

having a double bond in all profit.

Bond is formed and the compounds which

have this bond up forceful enough pyruvate.

The second bond is the asile phosphate bond.

This is formed by the reaction between

carboxylic acid and phosphate group and

it is present in 1/3 bisphosphoglycerate.

You can see the bond in the structure.

The next class is teyo esters and it

is formed from the reaction between

thiol and carboxylic acid group.

It is present in acetal koehan aside going.

The next bond is granito phosphates.

It is formed by attachment of phosphate

group to the quantity in Group,

and this present in possible

create in an phospho action in.

Pyrophosphates are formed by the condensation

of acid groups and its derivatives and

their present in ATP and pyrophosphate.

Now we will see the.

High energy compounds.

The first one is the

horsepower in all pyruvate.

We have heard about this compound.

It's an intermediate in

glycolysis and gluconeogenesis.

OK, so this phosphate Ester bond

undergoes hydrolysis and use

the in all form of pyruvate.

You can see possible in all pyruvate in the

picture and you can see the phosphate bond.

So this was billed as the one it will undergo

hydrolysis to give you this in all form of,

by the way,

and in all form of pyruvate will

tautomer eyes to get a more stable form.

Lettuce keto former pyruvate.

And during this process,

minus 14.8 calories per MOL energy

is released.

The next compound we have is 1/3

bisphosphoglycerate on hydrolysis,

1/3 bisphosphoglycerate gives

3 phosphoglycerate acid,

which immediately loses a protein

to give a carboxylate ion.

So you have 1/3 bisphosphoglycerate

which will undergo hydrolysis to

give you 3 phosphoglycerate IC acid,

and then finally you will have

the three phosphoglycerate.

And the three phosphoglycerate has

equally probable resonance form.

As you can see in the pink curve.

Removal of the direct product and

formation of the resonance stabilized

iron favors the forward reaction

and there is release of energy

of minus 7.8 calories per moon.

But reflection spot for you.

What is the standard free energy

change of ATP?

It is large and negative. Thank you.