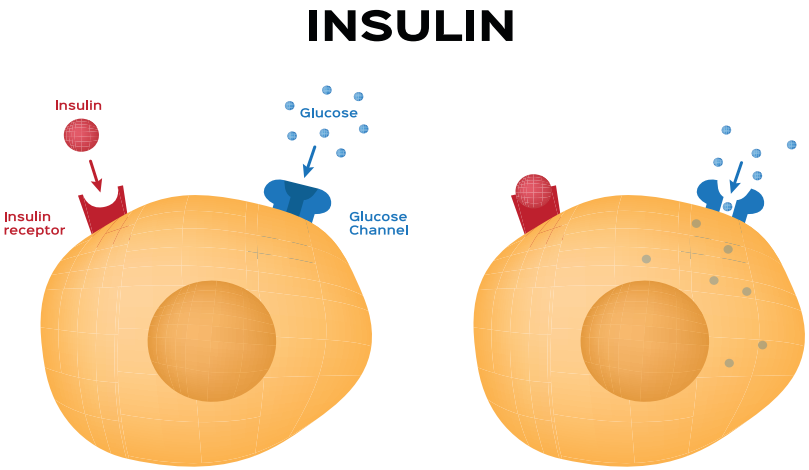
ADD 15 YEARS TO OUR LIFE
CAN WE? OF COURSE, WE CAN!!

Add 15 Years | Body makes Insulin! Why body needs Insulin so badly?

USA/India Edition 2020 | ENGLISH



Author:

(Prof.) Dr. S. Om Goel, MD/DM

From family of doctors

from AIIMS, MAMC & Delhi University

MD Medicine, USA

DM/Fellowship, USA

PREFACE

Think About It!

Let me give an example which all of us can identify with

Say, If we have to study for the complete year, all our subjects in the school and suppose we never really opened our books and missed so many classes, never paid attention in class.
Then surely we cannot be in the top 25% of the class, chances are, we will fail that class.

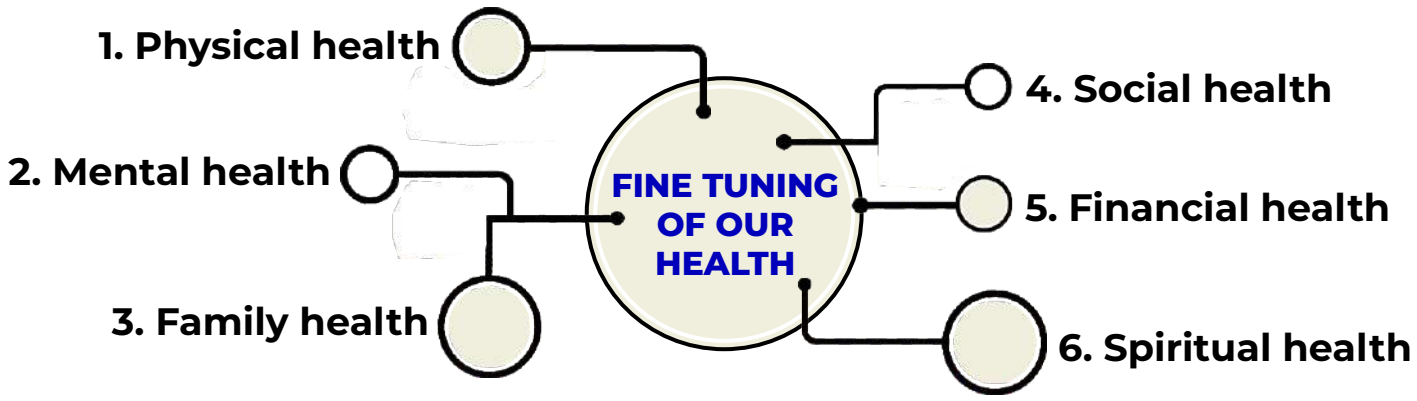
Miracles do not happen in real life.

Atleast in India (Not very common in U.S.) we seek care & M.D./ Physicians provide care and their focus is on so called "alarming symptoms" (we call it "crisis medicine")

Personally in 2020 and in coming years, those "alarming symptoms" (called "Crisis Medicine") should be RARE before we get into 75 to 85 years of age group.

PROVIDED

We keep fine tuning our health (medical definition) and gain insight about fundamental medical knowledge, we actively plan and pay attention to our:



TRUST ME ALL 6 HEALTH ARE IMPORTANT

Results will be dramatic.

DISCLAIMER

All the books that I am writing as physician M.D. with a life time of experience (along with my team) –

mention most common medical facts which each one of us need to know in our day to day life.

Ignorance is **DEFINITELY NOT** a blessing in 2020.

I highly recommend that anybody entering middle school (8th grade i.e, a 13 year-old) should start reading these books and try to read as many as he or she can read **so that they can get an insight into the most common medical facts.**

These books are written in simple English and in several languages.

If we get an insight into medical facts before we get into chain smoking and excessive alcohol use etc., we can have a very healthy and a long life.

All my research and commonsense says that - starting at age 13 (that is when you enter your teenage years, our personality, our habits, **our likings and our dislikings - all are pretty much shaped by the time we get to 26 years old or older.**

Both India and USA are very dear to me,

In one country I was born, I have my parents.
In the other country, I have my wife and my children.

One thing became obvious to me as I live in USA, that the population is taking advantage of the latest medical advances.

Our Indian community, all our friends and families, when we have medical issues, are really putting themselves at the mercies of Government and private hospitals and doctors (with "zero" trust).

In India, people have to spend their own money. Realizing this, I have provided all the medical information which is available to us (doctors), so that one can make wise choices and confidently take their health in their own hands.

But still I request sincerely that you will not take any medications without the supervision of your own family doctors/any doctor.

The facts I have provided in my books, is available in every medical book, but I write them in simple English or in your language *because how are you going to make right choices in relation to your health, if you do know what the answer is.*

Our horoscope/stars are not enough, and consulting a pandit, priest or mullah is not enough. Blind faith is not enough.

Prayers help, yes! When we do not know the answer to a situation. If our car ran out of petrol, our car will not move (how much so ever we may pray, it is not going to happen).

If you anticipate and choose wisely, you will not have a crisis. So our disclaimer is we give you that insight but Please always consult your physicians before starting on any prescription medications.

TABLE OF CONTENT

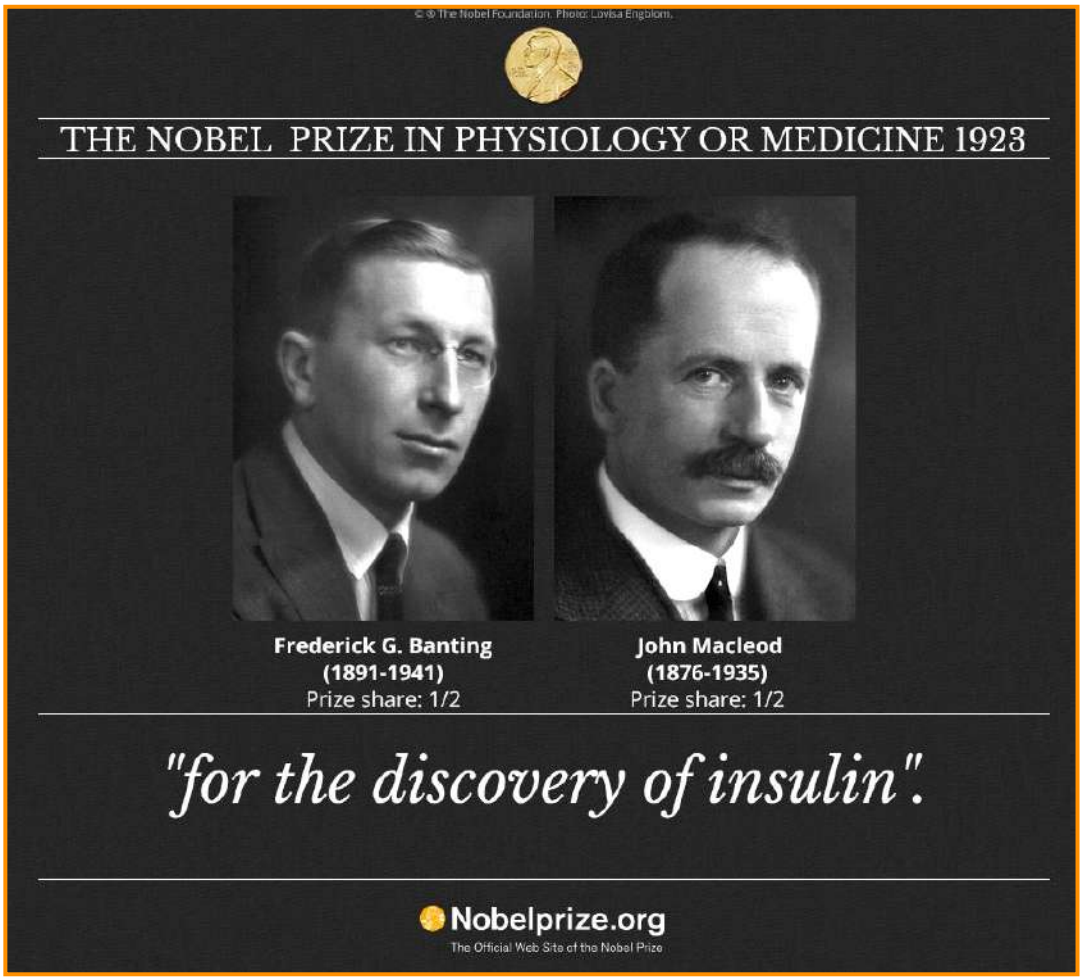
Chapter 1

Before 1921- unfortunately Everyone Died from Diabetes.

Think about it

1921-Was turning year in history of diabetes.

In 1920, the Banting and Best and Macleod, they received Nobel Prize in Medicine for their research in diabetes and discovery of diabetes.



Chap1Fig1

Chapter 2

Insulin hormone - with magical powers.

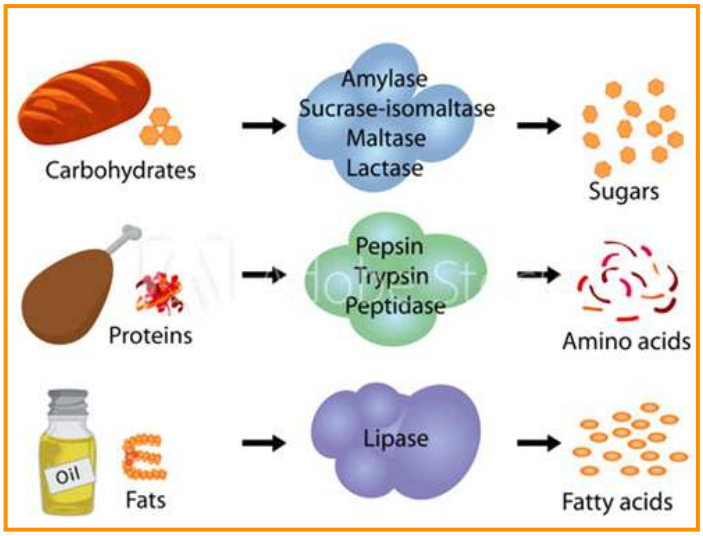
Think about it

Today, in 2020

We will not find anybody in this global environment who has not heard about "diabetes" or also traditionally called "sugar."

So, insulin is absolutely fundamental in the utilization of sugar as mentioned in the previous story.

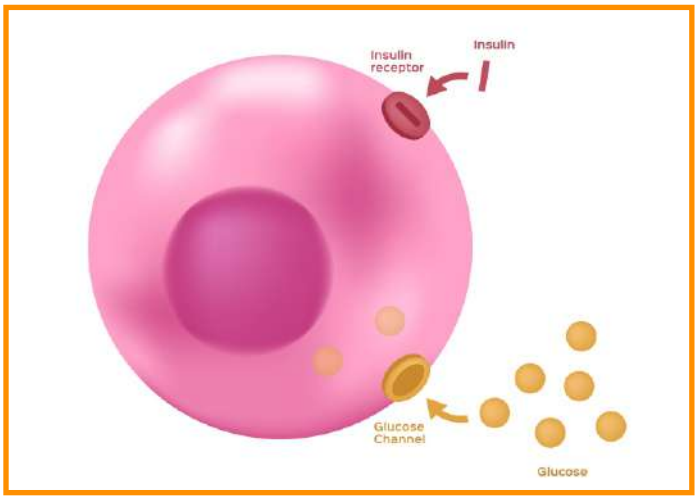
Insulin Hormone – miracle magical protein molecule



Chap2Fig1

A. Effect on Sugar Metabolism

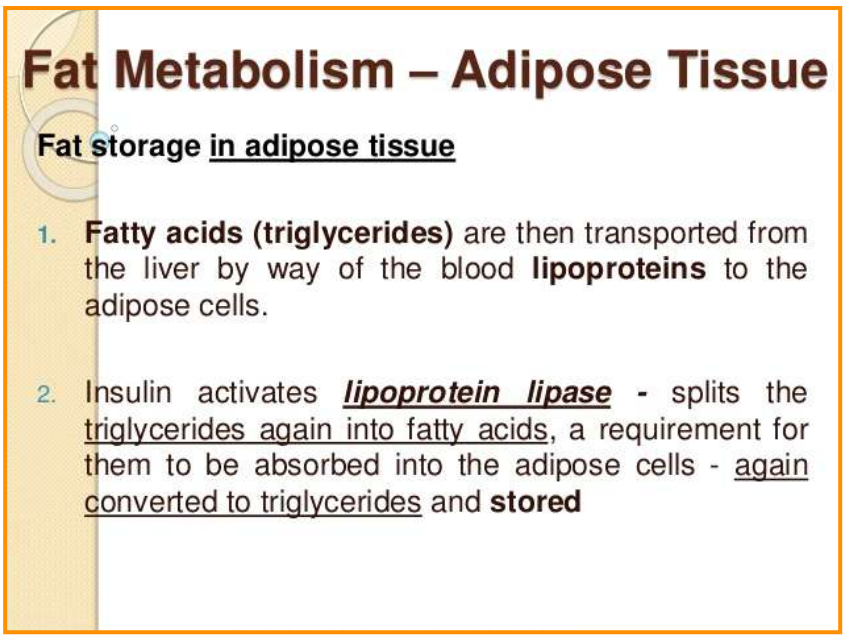
1. Dramatic and profound effect on carbohydrate and sugar metabolism.
2. Without insulin, body cannot utilize sugar/ glucose.
3. Whenever there is lack of insulin- **sugar cannot be utilized and full metabolism of the body goes in the wrong direction** and suddenly **the levels of cholesterol starts jumping high** which itself down the road leads to lot of complication.



Chap2Fig2

B. Effect on Fat Metabolism

4. Insulin not only helps in sugar metabolism, but also **helps in fat metabolism.**

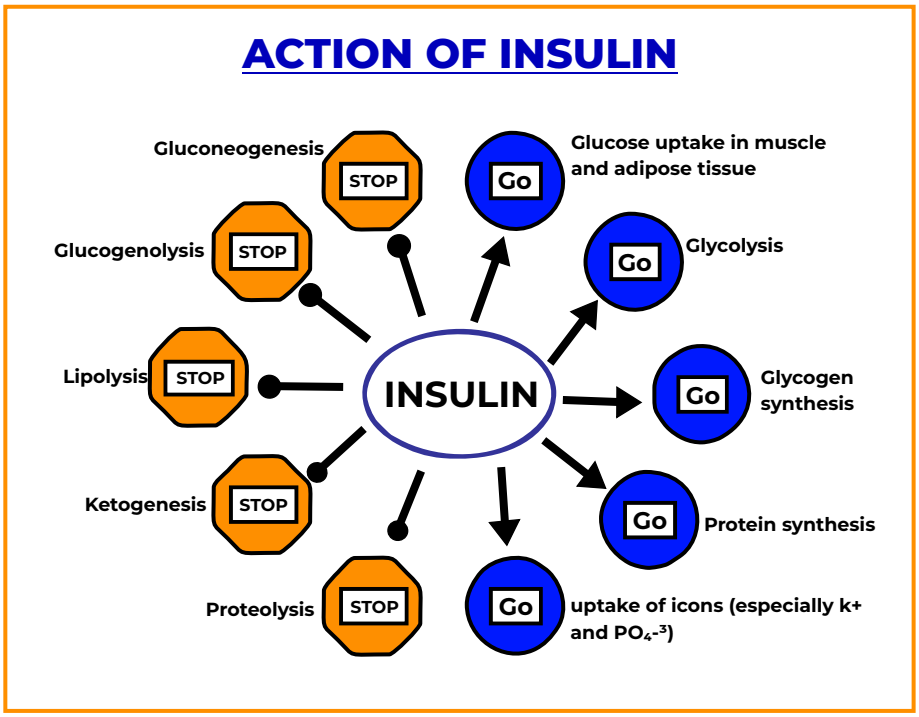


Chap2Fig3

S. Effect on Protein Metabolism

5. And then it also affects on the protein synthesis.

6. If there is no insulin, then our body CANNOT really make protein and body then starts breaking down its own protein.



Chap2Fig4

Chapter 3

What happens when we have our food?

Whenever we eat food,

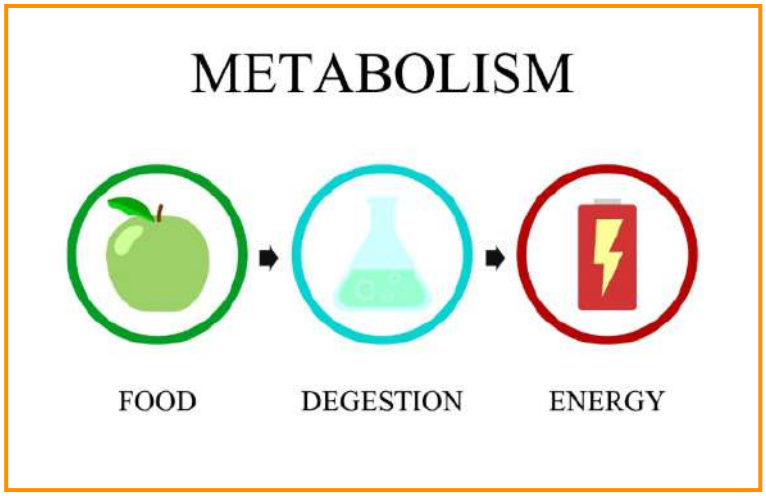
It is broken down/digested into our gut.

And absorbed as sugar or glucose which is the source of energy for the body.

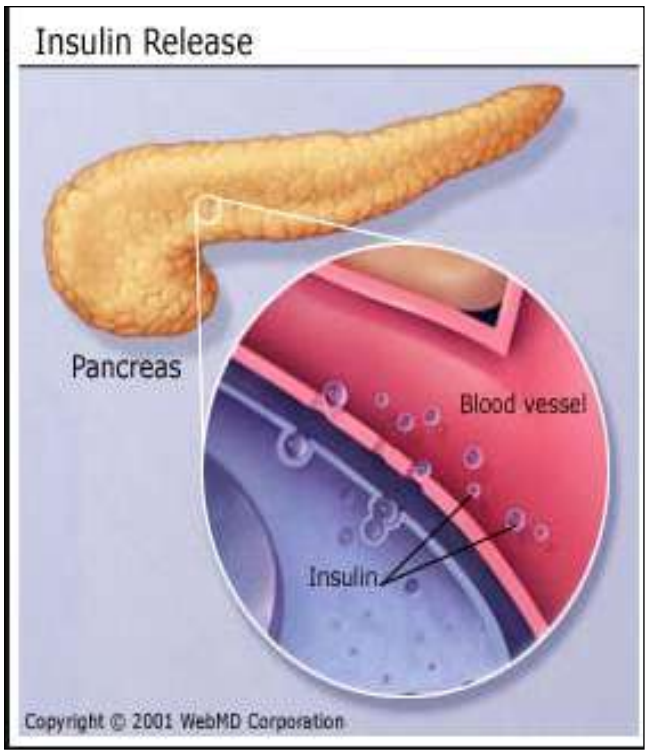
As blood sugar level rises in our blood,

It directlystimulates insulin production from the pancreas.

And insulin helps us to use glucose as a source of energy.



Chap3Fig1



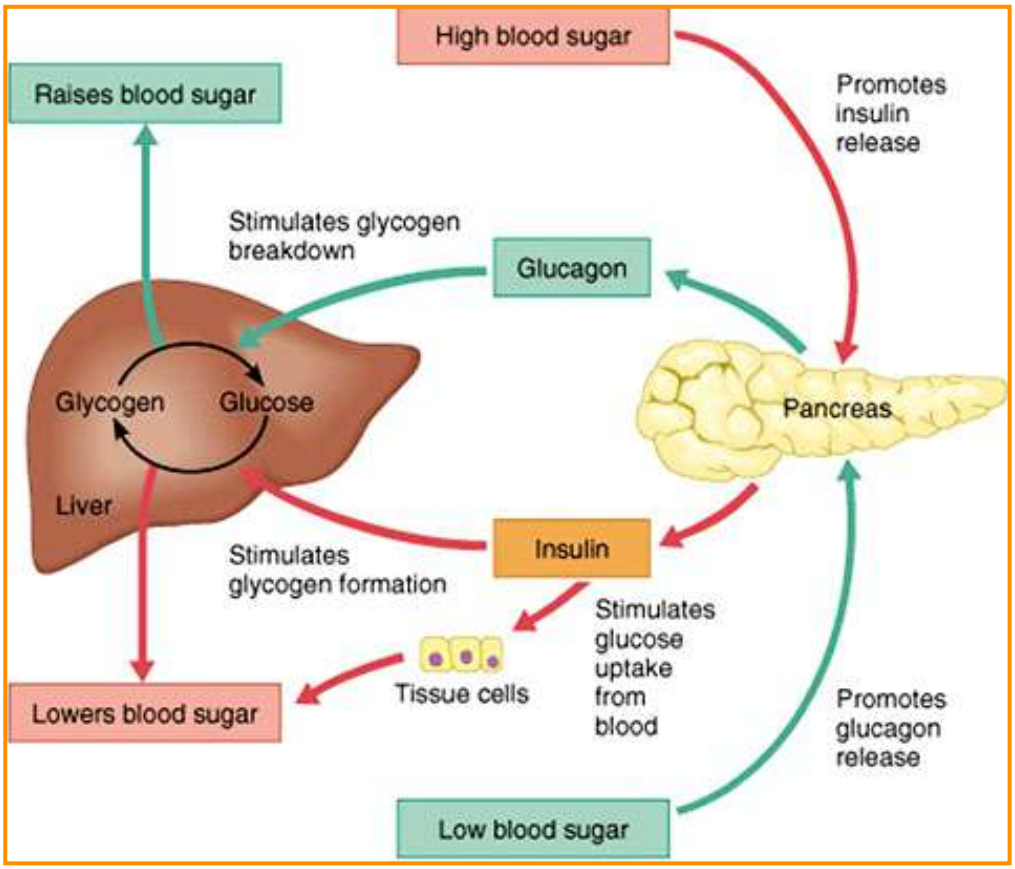
Chap3Fig2

Chapter 4

Where does the extra energy go?

And whatever extra energy from extra food is left,

1. Insulin is very important in storing extra energy As **glycogen** into **liver and muscles.**
2. And this energy can be used down the road when we do not have access to food. It is our survival mechanism.
3. Liver and muscles act like a bank Storing the extra energy as glycogen and then this extra energy is used whenever we need it in the future.



Chap4Fig1

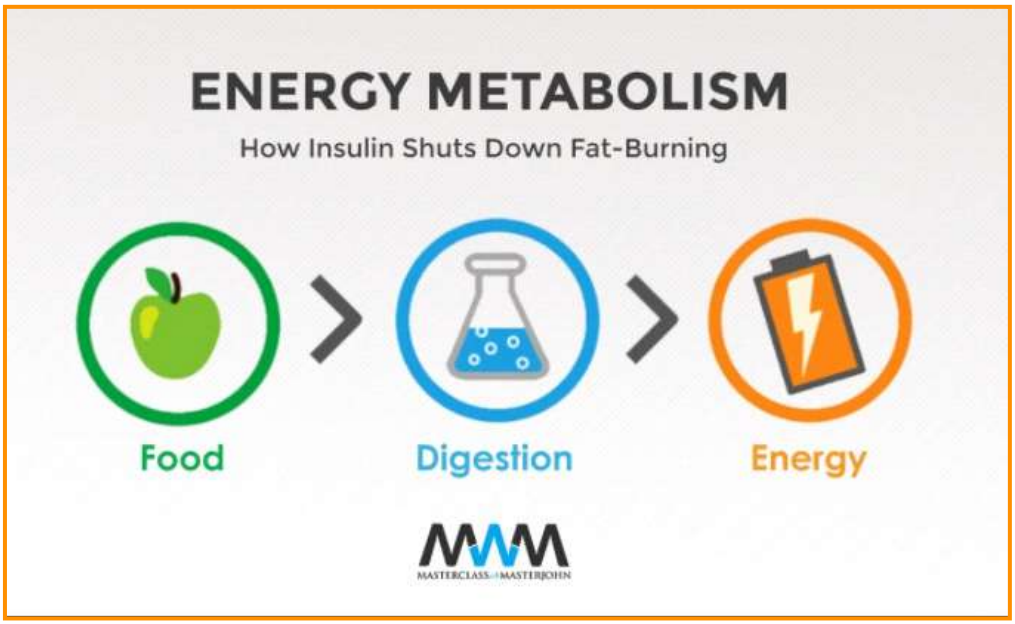
Chapter 5

What makes us gain weight?

When the so called energy bank is full-

- The insulin helps to convert **the extra energy into the fat and stores them into the fatty tissues.**

As we eat a lot, and energy after being stored in liver and muscles. Is converted into fat. And we start gaining weight.



Chap5Fig1

Chapter 6

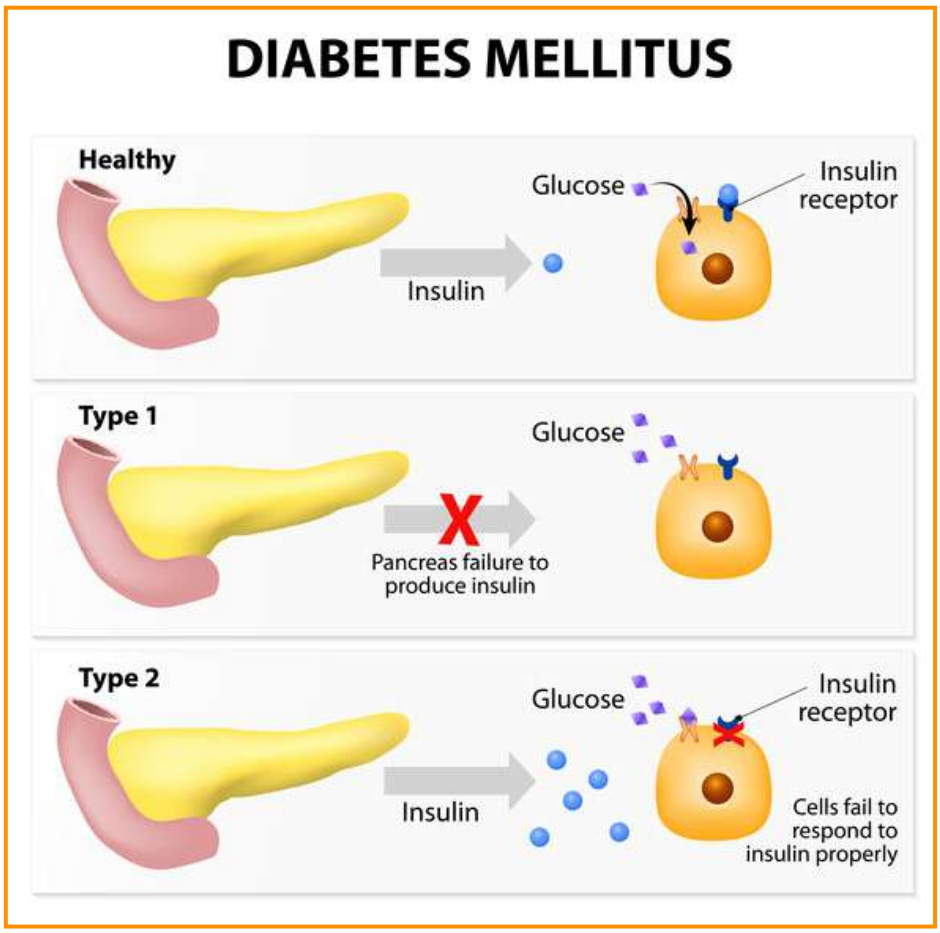
Not enough insulin causes what we call “sugar” or “diabetes.”

Almost everybody knows about or heard about “diabetes” or “sugar.”

The **word diabetes** came from a **word siphon.**

Three major symptoms of advanced diabetes are:

1. We pee a lot. (we siphon off a lot of water)
2. We eat a lot.
3. And we drink a lot.



Chap6Fig1

Chapter 7

What is insulin?

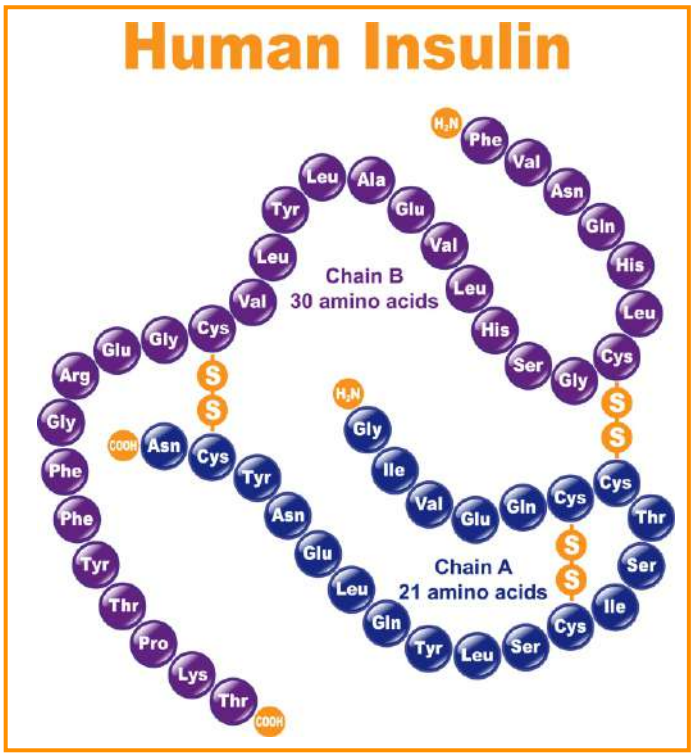
Insulin is hormone and tiny winy protein molecule key to our long life

Think About it

Every protein is made of amino acids. Our body has total of 20 amino acids and all these 20 Amino Acids are the one who make every protein.

Insulin is a small protein and hormone

In insulin,
Amino acids make **two chains** and those chains are connected by **disulfide link.**



Chap7Fig1

Chapter 8

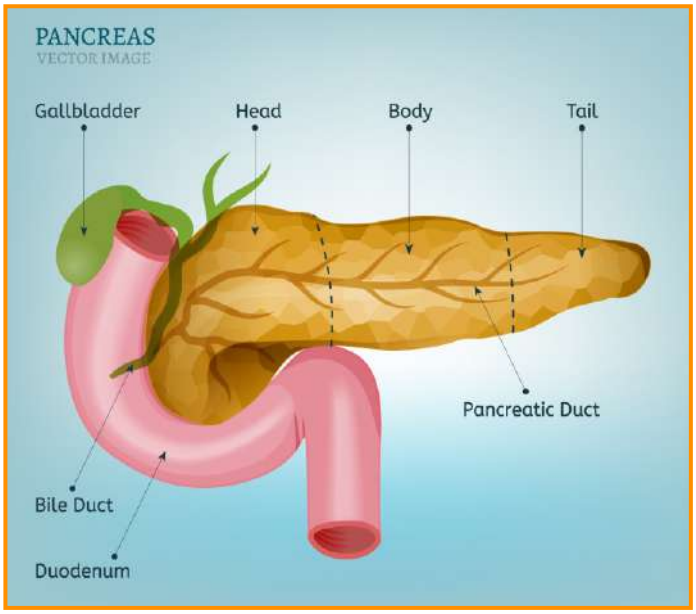
Insulin is actually made by pancreas in our body.

Think About it

Everybody has heard of pancreas. Famous founder of Apple, Steve Jobs, he died of pancreas cancer.

People might have heard that when we drink lot of alcohol we can develop pancreatitis. It is a serious condition which can cost us our life.

Pancreatic cancer is actually one of the most difficult cancers to diagnose.



Chap8Fig1

Pancreas has two important functions:

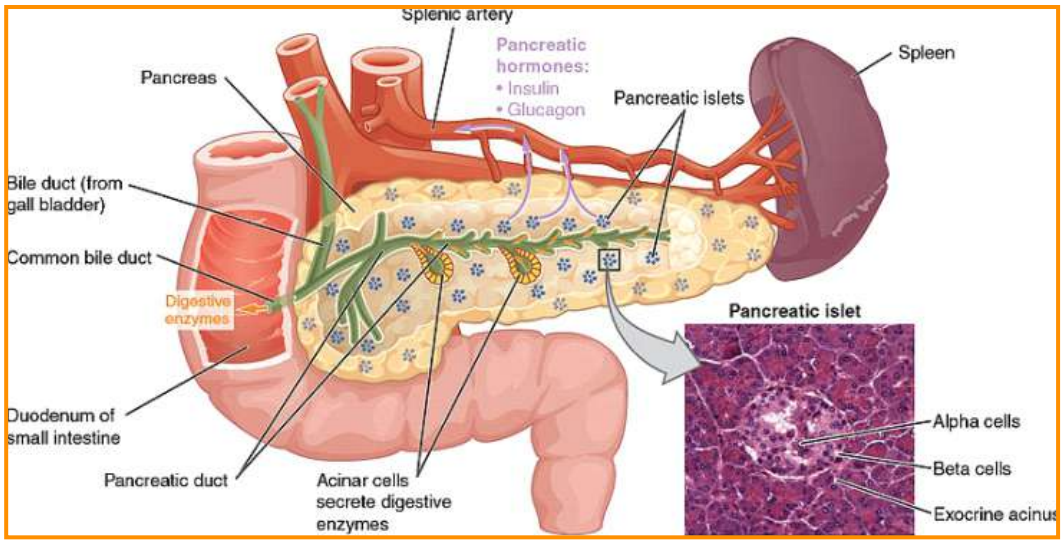
It makes digestive juice which is poured into our gut and which digests the food for us.

And it makes two very important hormones:

1. Insulin.
2. Glucagon

And both these hormones are very important in managing our:

- Glucose
- Fat
- Protein metabolism



Chap8Fig2

Think about it

More we doctors, physicians, and scientists understand the science of our metabolism, more we can come out with the solutions when things go in the wrong direction.

Pancreas

Has lot of glands.

Which are called Acini.

There are other cells which are grouped together as islets.

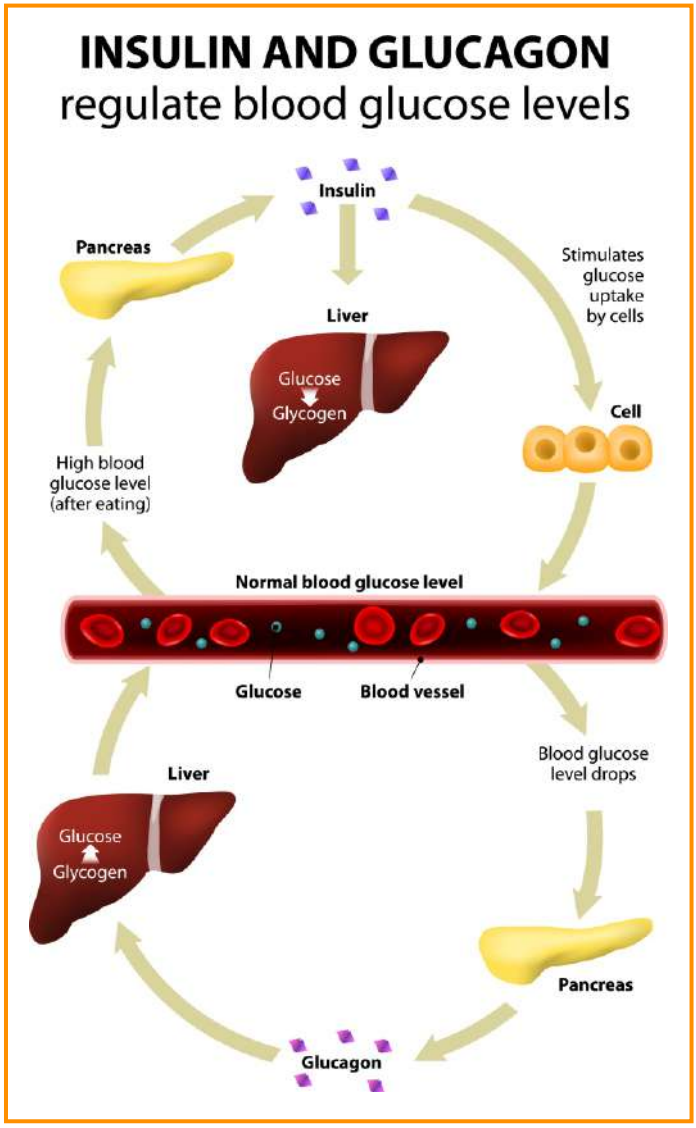
We call islets of **Langerhans.**

The islets or Langerhans.

Are part of the endocrine glands

All endocrine glands

Directly pour their hormones into the blood without any ducts versus exocrine glands which pour their contents via ducts.



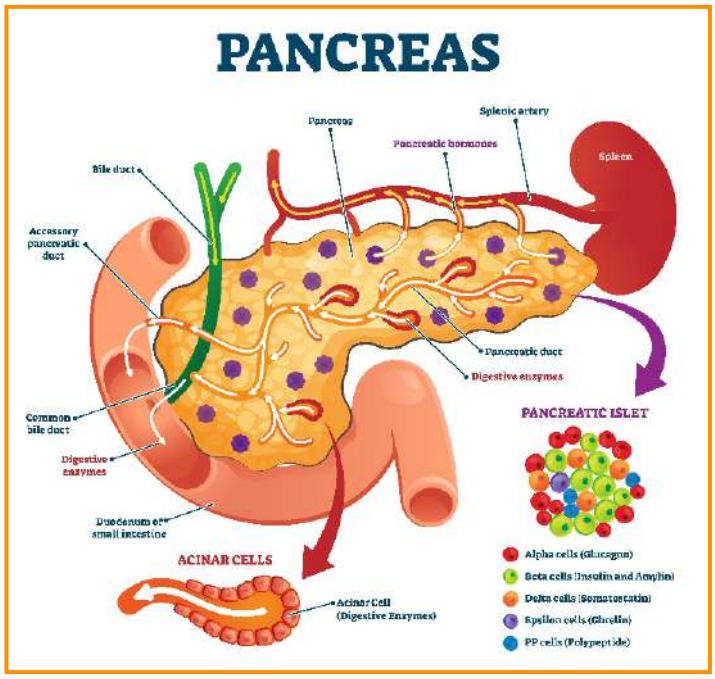
Chap8Fig3

<u>Islets of Langerhans</u> have three different kinds of cells:

1) It is the **beta cells** of islets of Langerhans <u>which makes insulin</u>

2) The **alpha cells** <u>secrete the hormone-Glucagon.</u>

3) The **delta cells** <u>secrete the hormones-Somatisation</u>



Chap8Fig4

Chapter 9

Steps in creating magical molecule- Insulin

Insulin is synthesized by the beta cells of islets of Langerhans in pancreas.

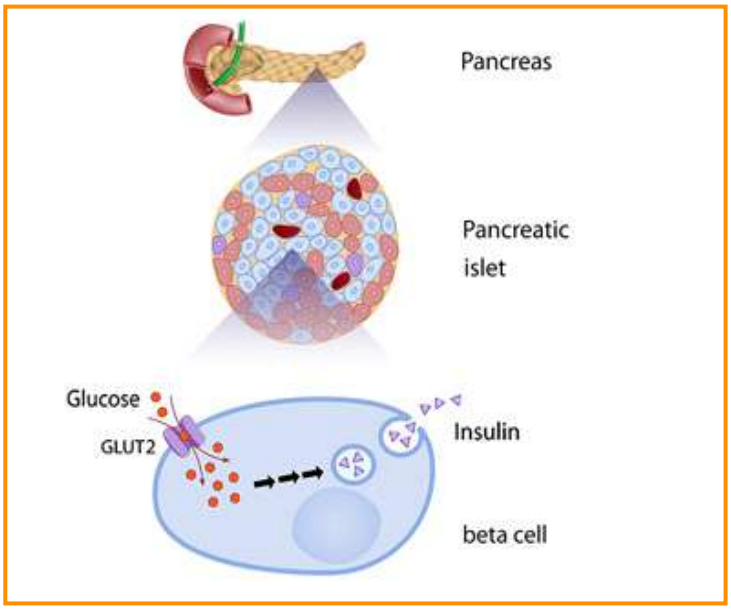
Initially, insulin is made as pro-insulin.

Which has three amino acid chains called:

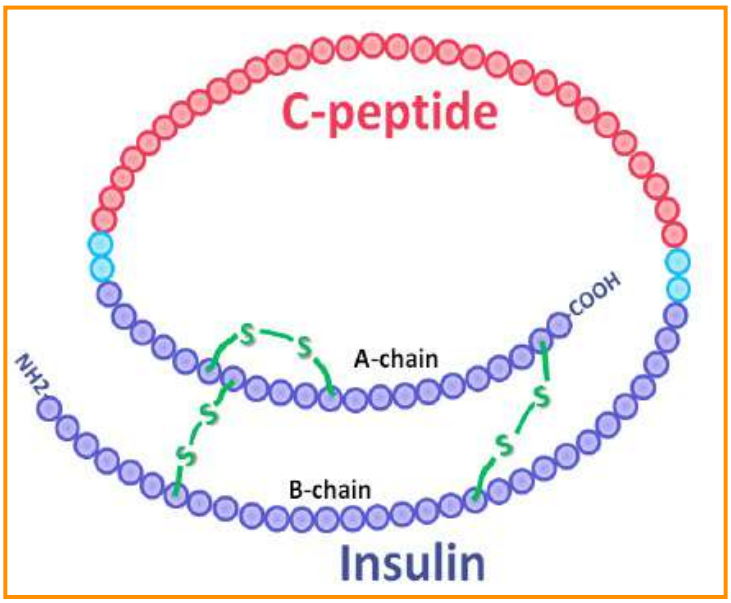
1. Chain A
2. Chain B
3. Chain C, we also call it C-peptide.

Pro Insulin is broken down into insulin and C-Peptide.

Both insulin and C-Peptide are stored in the granules and insulin and C-Peptide is directly released into the blood.



Chap9Fig1



Chap9Fig2

Chapter 10

Knowing about C-Peptide is very important and helpful

Think about it

We use a radioimmunoassay technique to check C-Peptide levels.

C-Peptide only comes by breaking of c chain of pro-insulin into insulin and C-Peptide.

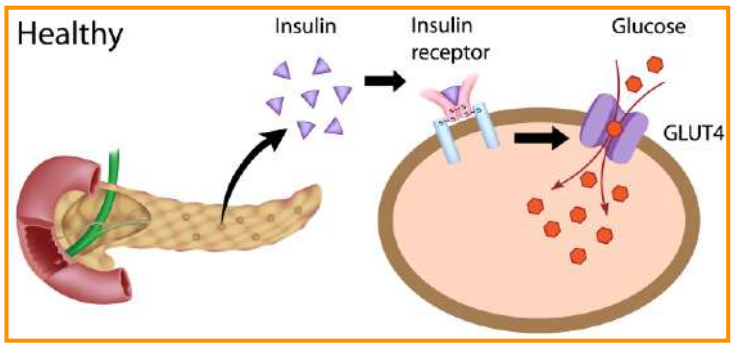
If there is no C-Peptide, it means there is no insulin being made by the body.

- C-Peptide is medically very important for us.

  C-Peptide - It is important clinically and in our medical profession.

  First thing, it helps us to decide between

- Type 1 diabetes.
- And type 2 diabetes.

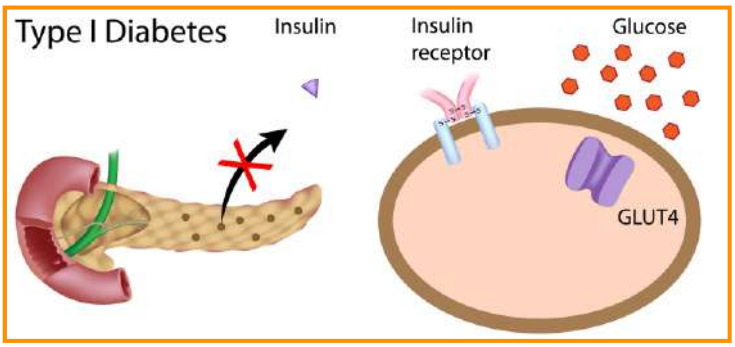


Chap10Fig1

Type 1 Diabetes (usually in young age)

If there is no C-peptide present in the blood testified then **body is making no insulin at all** children and young people can only use insulin.

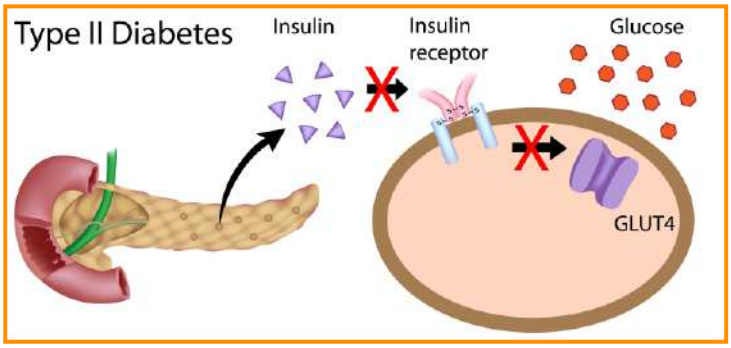
And we cannot use any other oral medications which we use in type 2 or adult-onset diabetes.



Chap10Fig2

In Type 2 Diabetes

Body does make insulin but not enough. We use several group of medications which helps us to manage type 2 diabetes.



Chap10Fig3

Chapter 11

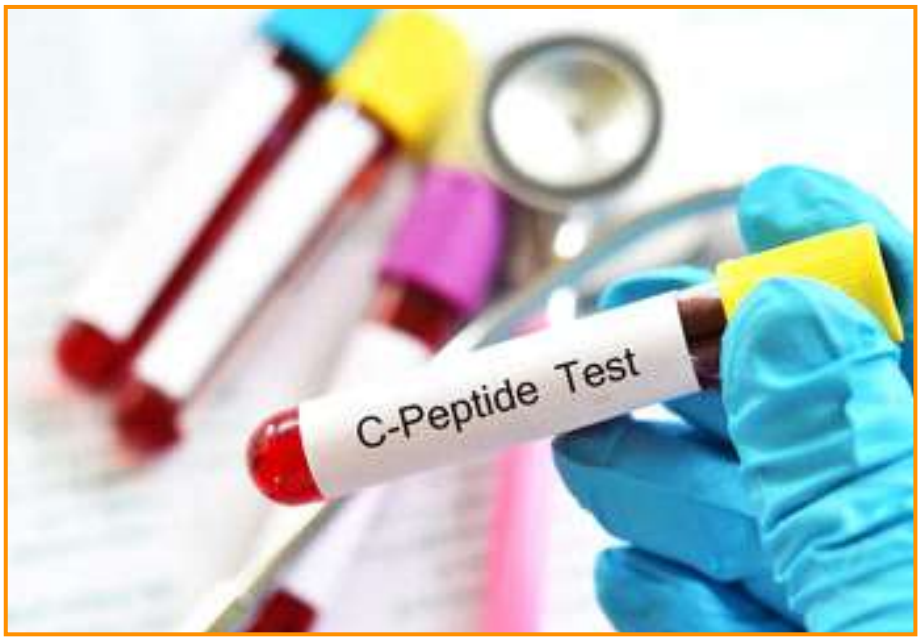
What is the difference between insulin given from outside and our own body makes?

How do we figure out whether our body is making any insulin or not?

If we can show that the diabetic patient who was given insulin has a low blood sugar and there is no C-Peptide present, that means the insulin was given from the outside.

(as human insulin given by us has no C-Peptide.)

Also low C-Peptide means that body making insulin but not enough.



Chap11Fig1

Chapter 12

Insulin is really "the key" which unlocks doors to let us use the "glucose"

Think about it

Every hormone in the body works through the receptors, on the cells. Only our brain cells do not need insulin receptors to use glucose.

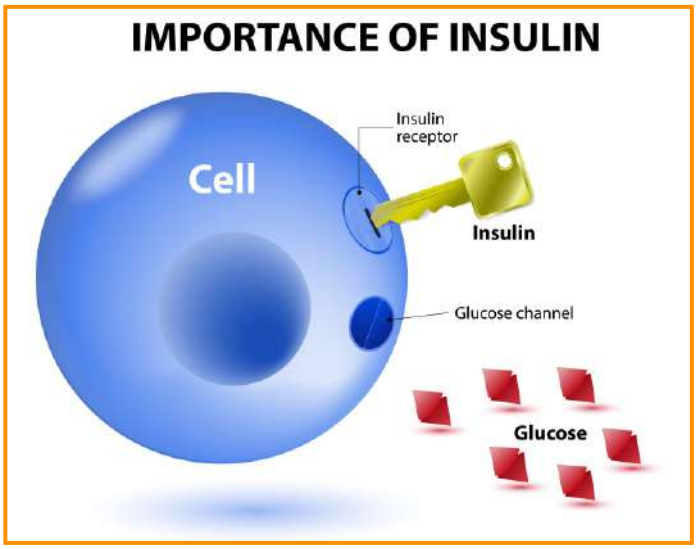
Insulin works through its receptor,

What we call as insulin receptor..

Receptors are like lock and insulin is a key.

As insulin combines with the insulin receptor, It is like the gates are opened wide and immediately there is a dramatic uptake of glucose by the cells.

With glucose, proteins and amino acids and other ions also enter the cell.



Chap12Fig1

<u>Once we take a high carb diet,</u>

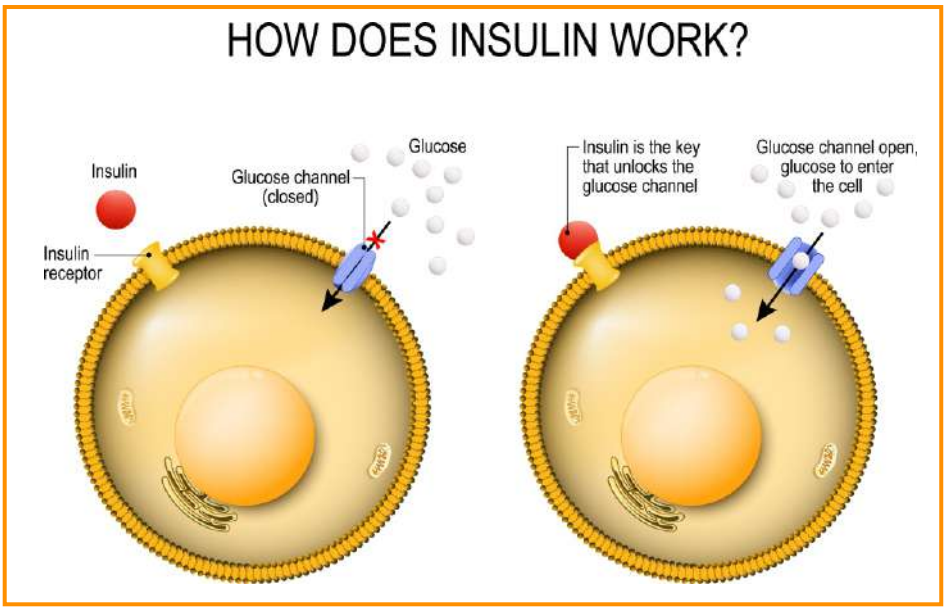
It is broken down and absorbed as glucose

And the increased level of the glucose causes the rapid secretion of insulin.

<u>Insulin in turn</u> <u>causes take up of glucose</u>

For use for energy and/Or storage by our:

- Body cells
- The muscles
- The fat tissue
- And the liver



Chap12Fig2

Chapter 13

Something all parents need to know

We all know young one who have type 1 diabetes can use only insulin,
Whenever they are participating in athletic activity.

Doctor request them to cut down the insulin dose.

Because:

1. Most of the **time our muscles in a day to day life use fatty acids** for the energy.
2. In a situation when, **we are doing strenuous exercises** or participating in the athletic activities, muscles are **working extra hard and they do not need insulin to utilize glucose to use it as an energy source.**
3. In other words, our blood glucose levels goes down as muscles use glucose without insulin, so parents need to cut down the insulin dose for that situation.
4. Because now we need less insulin.
   And if we do not cut down our insulin which we give ourselves
   Our blood sugar will go even further down because of unused insulin.
   And if it becomes low enough,
   We will pass out.