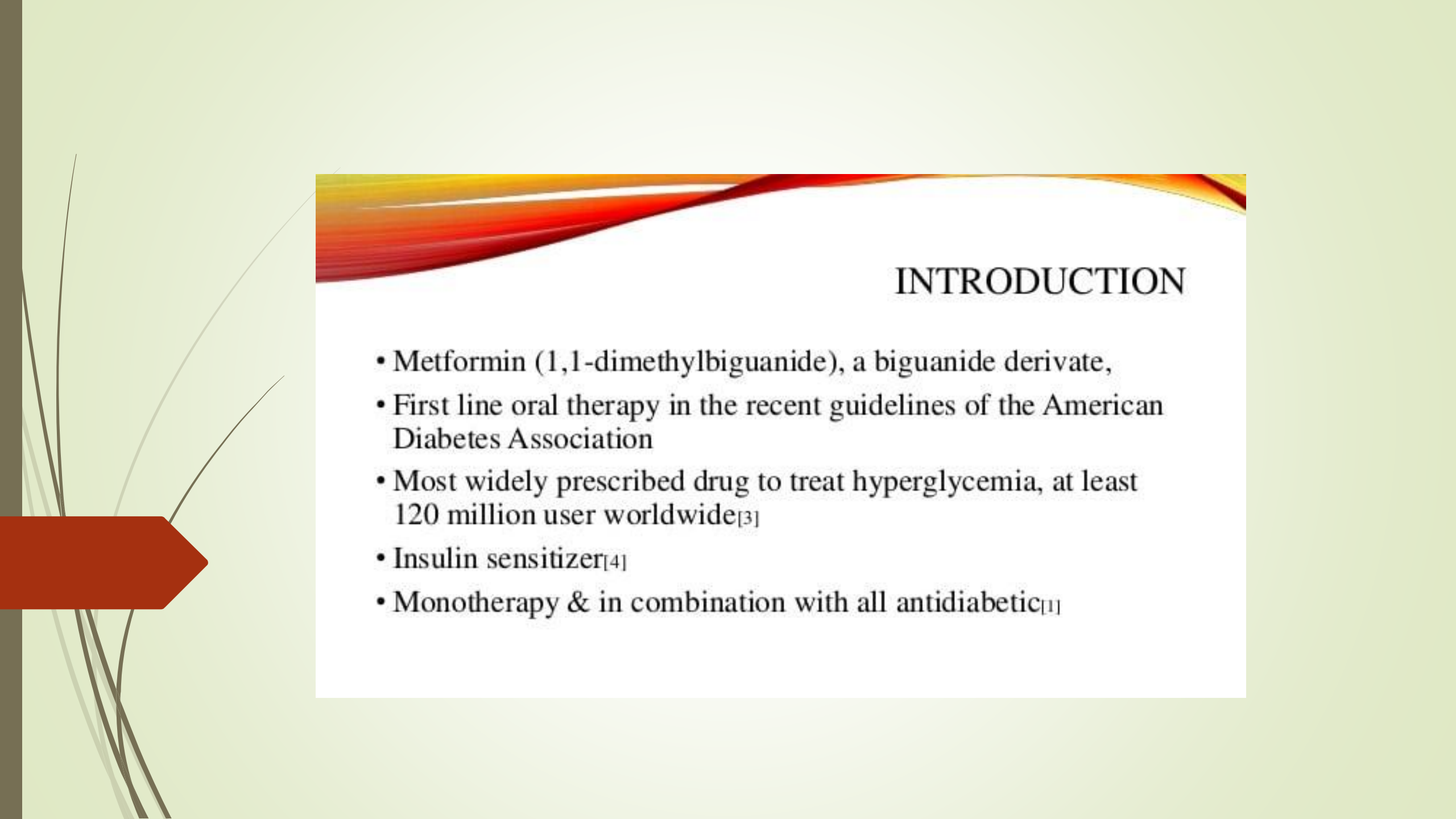




metformine

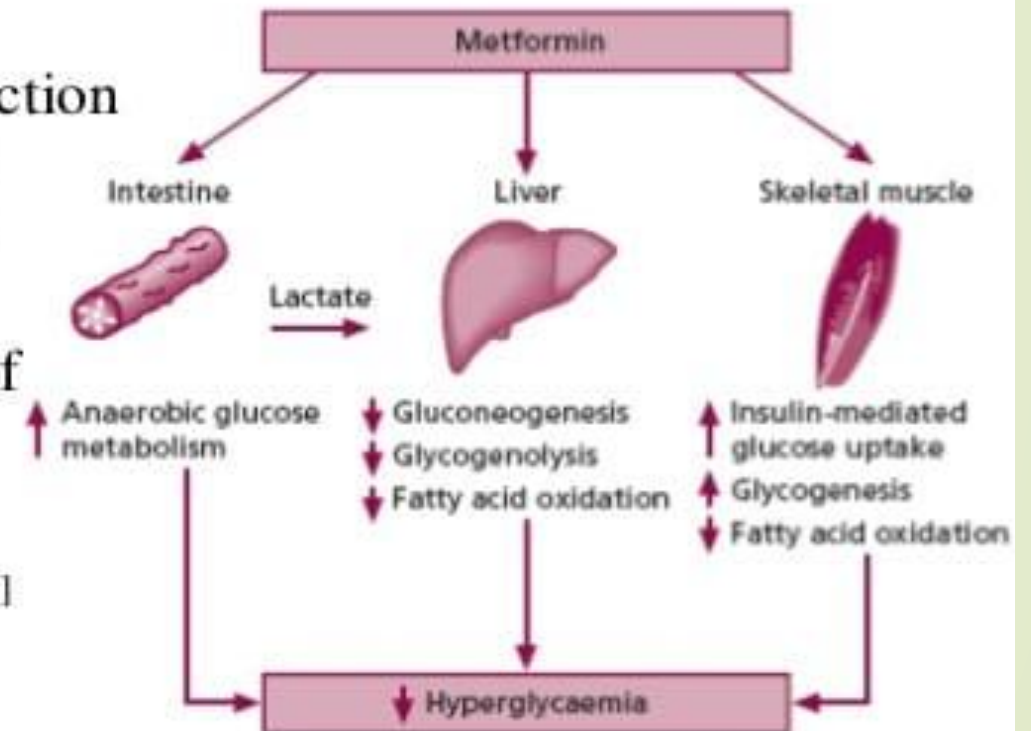


INTRODUCTION

- Metformin (1,1-dimethylbiguanide), a biguanide derivate,
- First line oral therapy in the recent guidelines of the American Diabetes Association
- Most widely prescribed drug to treat hyperglycemia, at least 120 million user worldwide^[3]
- Insulin sensitizer^[4]
- Monotherapy & in combination with all antidiabetic^[1]

MECHANISM OF ACTION

- Decrease hepatic glucose production through a mild inhibition of the mitochondrial respiratory-chain complex 1.[2]
- Decrease intestinal absorption of glucose
- anti-oxidative properties of metformin on endothelial cells[2]





ACTIONS OF METFORMIN

Anti-obesity effects:

- Decreased appetite
- Increased GLP-1 secretion

Anti-hyperglycemic effects:

- Decreased intestinal carbohydrate absorption
- Inhibition of hepatic gluconeogenesis
- Enhancement of insulin-stimulated glucose transport in skeletal muscle: increased activity of GLUT-4



Anti-lipidemic effects:

- Inhibition of lipolysis in adipose tissue

Anti-diabetic protective effects:

- Protection of β -cells from glucose toxicity and lipotoxicity

Hepatoprotective effects:

- Decreased hepatic insulin resistance and improved lipemia levels

Cardioprotective effects:

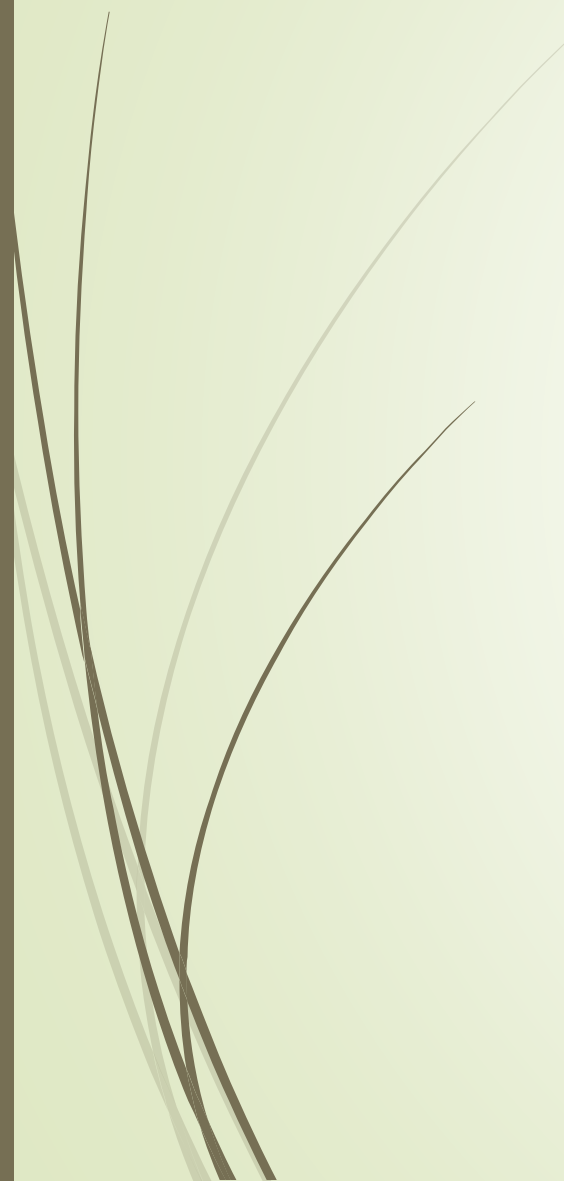
- Cumulative effects of decreased weight gain and better lipid profile

GLP-1 – glucagon-like peptide-1, AMPK – AMP-activated protein kinase, GLUT-4 – glucose transporter type 4,



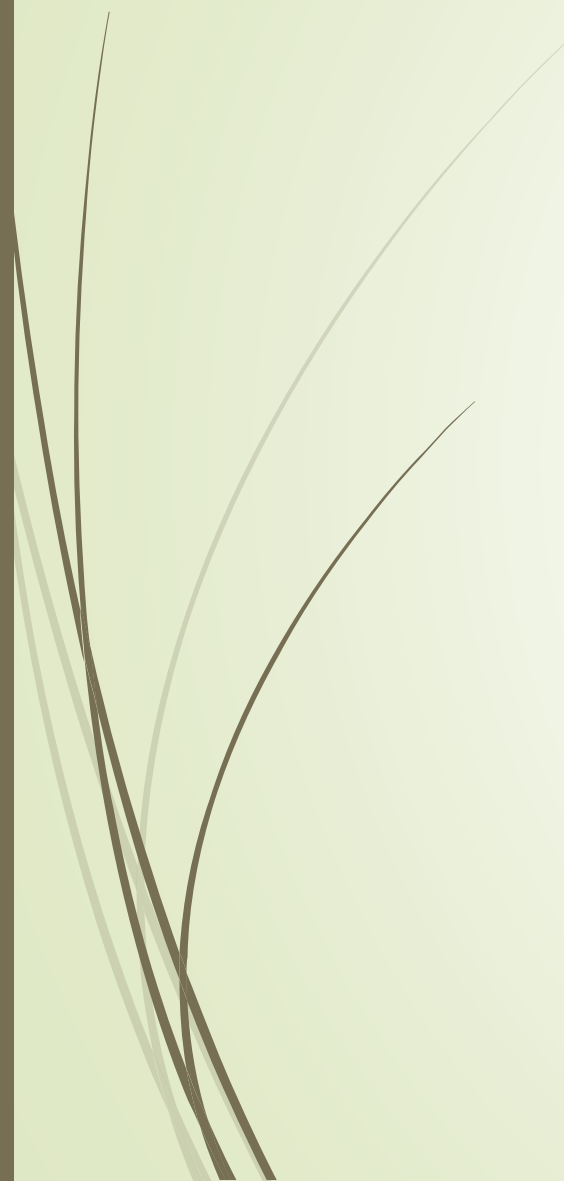
POLYCYSTIC OVARY SYNDROME^[5]

PCOS is a common endocrinopathy, 5 to 15% women .

- Menstrual disturbance , Hyperandrogenism , polycystic ovary on ultrasound.
 - Insulin resistance, obesity
 - Insulin sensitizer e.g. Metformin by alleviation of insulin excess acting upon ovary and through direct ovarian effects.
- 



METFORMIN AS ANTI-CANCER

- T2DM increase risk of cancer
 - Insulin resistance, Hyperglycemia and increase level of IGF-I due to hyperinsulinemia promote carcinogenesis
 - metformin reduce serum insulin and IGF-1 levels
 - LKB1/AMPK pathway controlling cellular proliferation
 - Apoptotic pathways by both caspase-dependent and caspase-independent mechanisms
- 

Metformin-containing drugs

Strengths

Glucophage

500 mg, 850 mg, 1,000 mg

Glucophage XR

500 mg, 750 mg

Glumetza

500 mg, 1,000 mg

Combination metformin drugs

Strengths

Actoplus Met (metformin and pioglitazone)

500 mg/15 mg, 850mg/15 mg

Actoplus Met XR (metformin and pioglitazone)

1000 mg /15 mg, 1000 mg/30 mg

Avandamet (metformin and rosiglitazone)

500 mg/2 mg, 500 mg/4 mg, 1000 mg/2 mg, 1000 mg/4 mg

Glucovance (metformin and glyburide)

250 mg/1.25 mg, 500 mg/2.5 mg, 500 mg/5 mg

Invokamet (metformin and canagliflozin)

500 mg/50 mg, 1000 mg/50 mg, 500 mg/150 mg, 1000 mg/150 mg

Invokamet XR (metformin and canagliflozin)

500 mg/50 mg, 1000 mg/50 mg, 500 mg/150 mg, 1000 mg/150 mg

Janumet (metformin and sitagliptin)

500 mg/50 mg, 1000 mg/50 mg

Janumet XR (metformin and sitagliptin)

1000 mg/100 mg, 500 mg/50 mg, 1000 mg/50 mg

Jentadueto (metformin and linagliptin)

500 mg/2.5 mg, 850 mg/2.5 mg, 1000 mg/2.5 mg

Jentadueto XR (metformin and linagliptin)

1000 mg/5 mg, 1000 mg/2.5 mg

Kazano (metformin and alogliptin)

500 mg/12.5 mg, 1000 mg/12.5 mg

Kombiglyze XR (metformin and saxagliptin)

500 mg/5 mg, 1000 mg/5 mg, 1000 mg/2.5 mg

Prandimet (metformin and repaglinide)

500 mg/1 mg, 500 mg/2 mg

Segluromet (metformin and ertugliflozin)

500 mg/2.5 mg, 1000 mg/2.5 mg, 500 mg/7.5 mg, 1000 mg/7.5 mg

Synjardy (metformin and empagliflozin)

500 mg/5 mg, 1000 mg/5 mg, 500 mg/12.5 mg, 1000 mg/12.5 mg

Synjardy XR (metformin and empagliflozin)

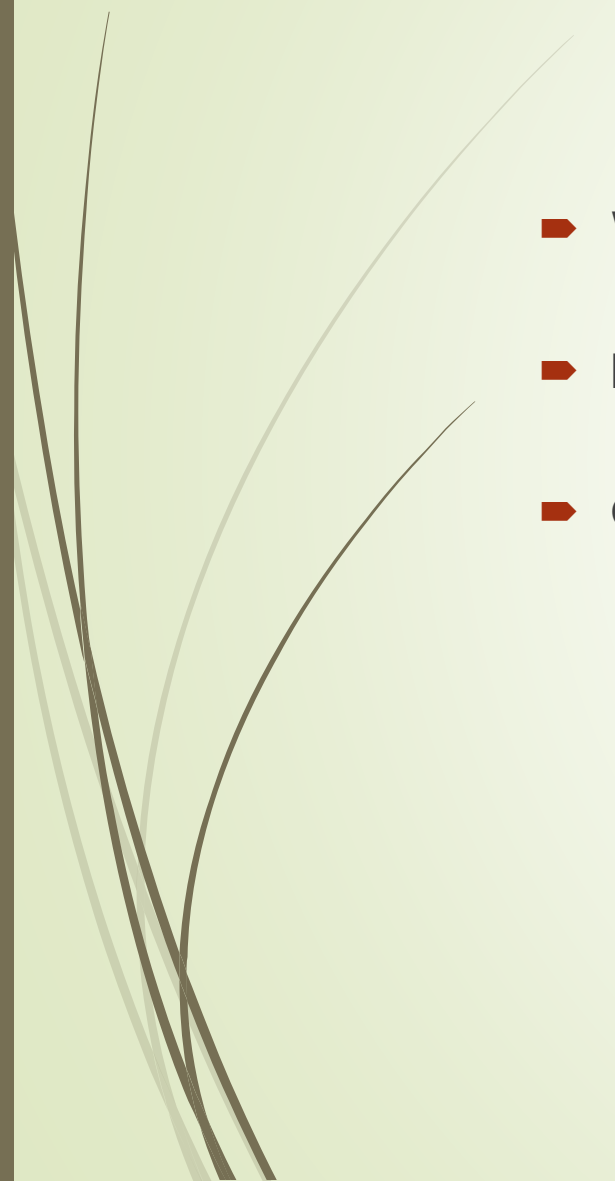
1000 mg/5 mg, 1000 mg/10 mg, 1000 mg/12.5 mg, 1000 mg/25 mg

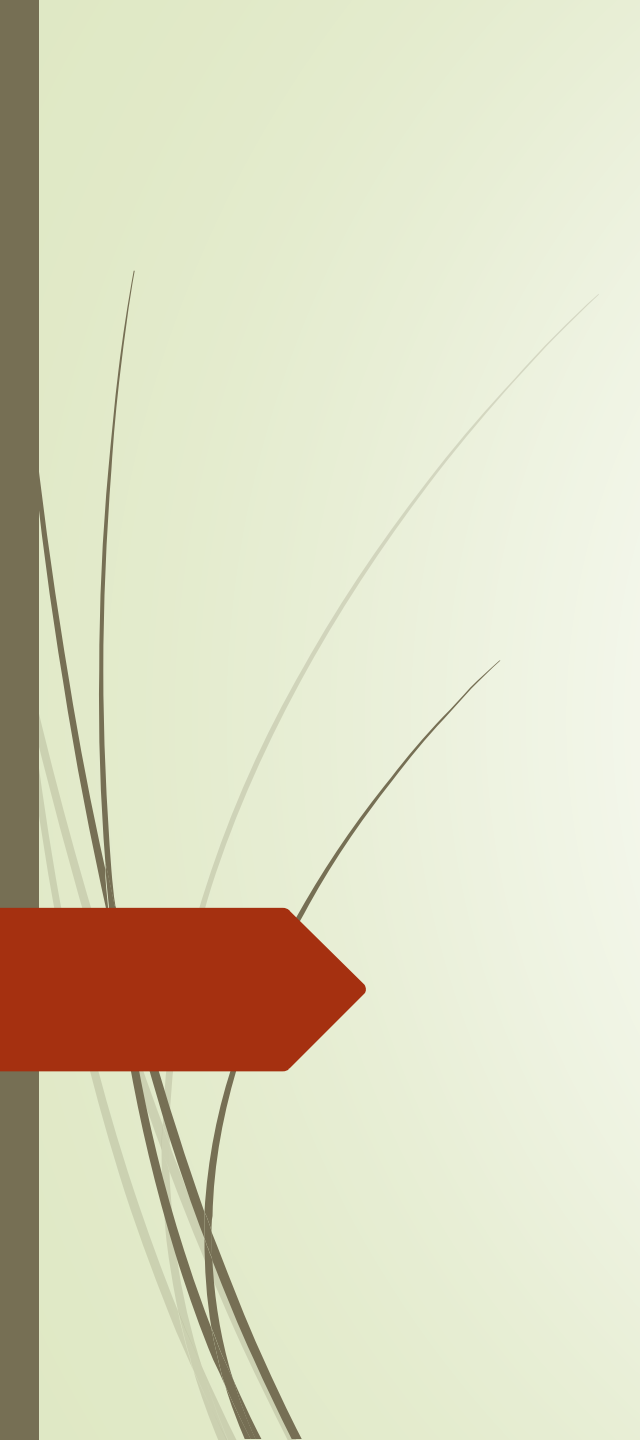
Xigduo XR (metformin and dapagliflozin)

1000 mg/2.5 mg, 500 mg/5 mg, 1000 mg/5 mg, 500 mg/10 mg, 1000 mg/10 mg



questions

- 
- 
- What should you not eat when taking metformin?
 - Is metformin bad for your heart?
 - Can metformin affect mood?



What is the main function of metformin?

What is the mechanism of metformin in the treatment of diabetes?

How does metformin inhibit glucose production?

How does metformin decrease intestinal absorption of glucose?

What should you not eat when taking metformin?

What is the benefit of taking metformin at night?

Who should not use metformin?

What is the best time of day to take metformin?

What is the bad news about metformin?



Does metformin keep you awake at night?

Why do diabetics get so angry?

Can metformin help with anxiety?

Is metformin used for mental health?

Why is metformin bad for you?

What are the side effects of metformin 500 mg?



How long does it take for metformin 500 mg to work?

Is memory loss a side effect of metformin?

What are the benefits of taking metformin



Why was metformin taken off the market?

Why do bodybuilders take metformin?

How many points does metformin lower blood sugar?



Can I take 2 metformin at the same time?

Can I stop taking metformin when my sugar back to normal?

Will metformin reduce my HbA1c?

What is a good A1C for someone with type 2 diabetes?

Is 250 mg metformin effective?

How do you get your blood sugar down fast?

What should I eat if my sugar is high?

Is 200 blood sugar normal after eating?

What should I do if my blood sugar is over 250?



What food lowers blood sugar fast

How can diabetes be cured permanently?

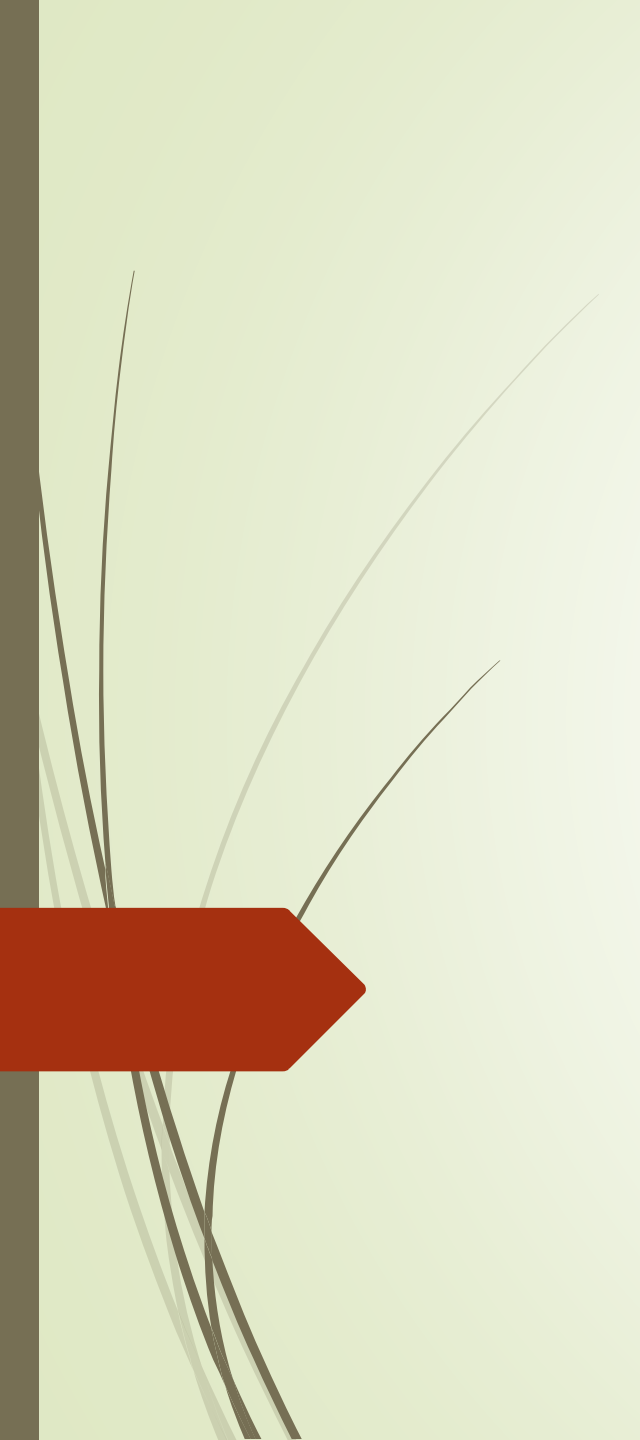
Is banana good for diabetes?

What are the worst foods for sugar?

Do bananas lower blood suger?

What drink lowers blood sugar?

How much water should a diabetic drink?



Metformin may affect the absorption of vitamin B-12. Doctors will monitor B-12 levels in people who have been taking metformin for more than 4 months.

The following factors can increase a person's risk of developing a vitamin B-12 deficiency:

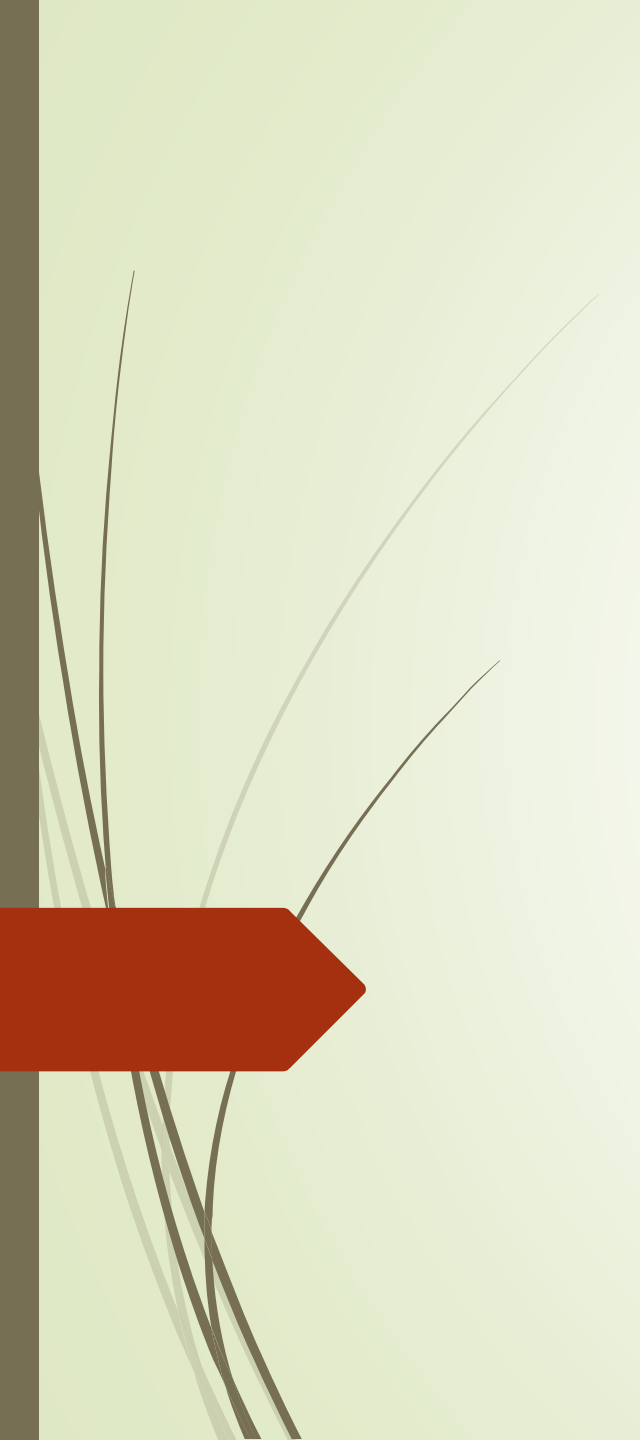
low vitamin B-12 levels at the start of treatment

low levels of calcium in the diet

low absorption of calcium

Most people who take metformin tolerate the drug well. However, about 30%^{Trusted Source} of people experience gastrointestinal side effects^{Trusted Source} a runny nose

- Other side effects of metformin include
- low blood sugar
- excessive sweating
- chest discomfort
- headache
- weakness
- In rare cases, metformin can cause lactic acidosis, a serious side effect. Lactic acidosis is the harmful buildup of lactic acid in the blood. It can lead to low blood pressure, a rapid heart rate, and even death.
- Vomiting and dehydration increase the risk of lactic acidosis in people taking metformin. A doctor may recommend temporarily stopping the medication until vomiting subsides
- urce, such as diarrhea, nausea, and vomiting.



Metformin is also not safe for people who have the following conditions:

an allergy to metformin

alcohol addiction

severe infection

heart failure

severe circulatory problems

severe breathing difficulties

Interacting medication	Description	Management
Diuretics Corticosteroids Thyroid medications Estrogen and combined oral contraceptives Phenytoin Calcium channel blockers	Combining these drugs with metformin may affect blood sugar control.	A person may need to check their blood sugar levels more frequently. They should notify their doctor of any spikes or dips in these levels.
Insulin	Combining insulin and metformin may affect blood sugar control.	A person may need to check their blood sugar levels more frequently. They should notify their doctor of any spikes or dips in these levels. The doctor will adjust the insulin dosage.
Alcohol	Drinking excessive amounts of alcohol while taking metformin increases the risk of lactic acidosis.	People taking metformin should avoid excessive alcohol intake.
Cimetidine Ranolazine Vandetanib Dolutegravir	These drugs reduce the kidneys' ability to remove metformin from the blood. This can lead to lactic acidosis.	The doctor should weigh the benefits and risks of recommending these drug combinations. A safer option may be available.
Carbonic anhydrase inhibitors (CAIs), such as topiramate or acetazolamide	Anyone taking a CAI and metformin may have an increased risk of lactic acidosis.	Doctors may regularly monitor people taking CAIs and metformin. This will help detect early signs of lactic acidosis.