

Endocrine Block

"إن الله لا يُعطي
أصعب المعارك، إلا
لأقوى جنوده"

- Text
- Only in Females' slide
- Only in Males' slides
- Important
- Numbers
- Doctor notes
- Extra Notes



Diabetes Mellitus

By the end of this lecture, students should be able to describe:

1. Describe the consequences of insulin deficiency.
2. Outline the Glucose Tolerance Test (GTT).

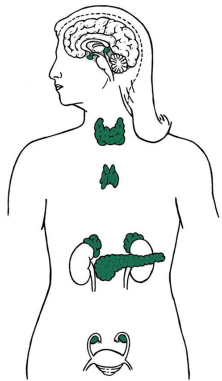
شكر وعرfan

من لا يشكر الناس لا يشكر الله..

اتمام هذا العمل تطلب جهد ووقت عظيم وجبار طوال فترة البلوك

لحظات من الشكر والتقدير والعرfan لأعضاء الفريق الكرام وللقادة الأكاديميين ولكل من بادر وساهم بإخراج وإنجاز هذا العمل وكان خير عون لنا رغم ضيق الوقت. شكرا لكم على إخلاصكم وجهدكم ووقتكم وتفانيكم في العمل (فخورين بالعمل معكم). لا تنسوهم من دعواتكم، الله يكتب أجرهم ويسهل أمرهم ويبارك لهم بوقتهم وينفع بهم ويعلمهم.

تم بحمد الله وتوفيقه وتيسيره الإنتهاء من محاضرات فريق علم وظائف الأعضاء لبلوك جهاز الغدد الصماء.. نسأل الله أن نكون قد وفقنا في تقديم الأفضل، ونعتذر عن أي تقصير...



EndocrineBlock

قادة فريق علم وظائف الأعضاء
ليلى مذكور & محمد نصر

أحب الناس إلى الله أنفعهم للناس

Diabetes Mellitus

- ▶ Diabetes is probably the most important metabolic disease.
- ▶ It affects every cell in the body and affects carbohydrate, lipid, and protein metabolism.
- ▶ Characterized by the polytriad:

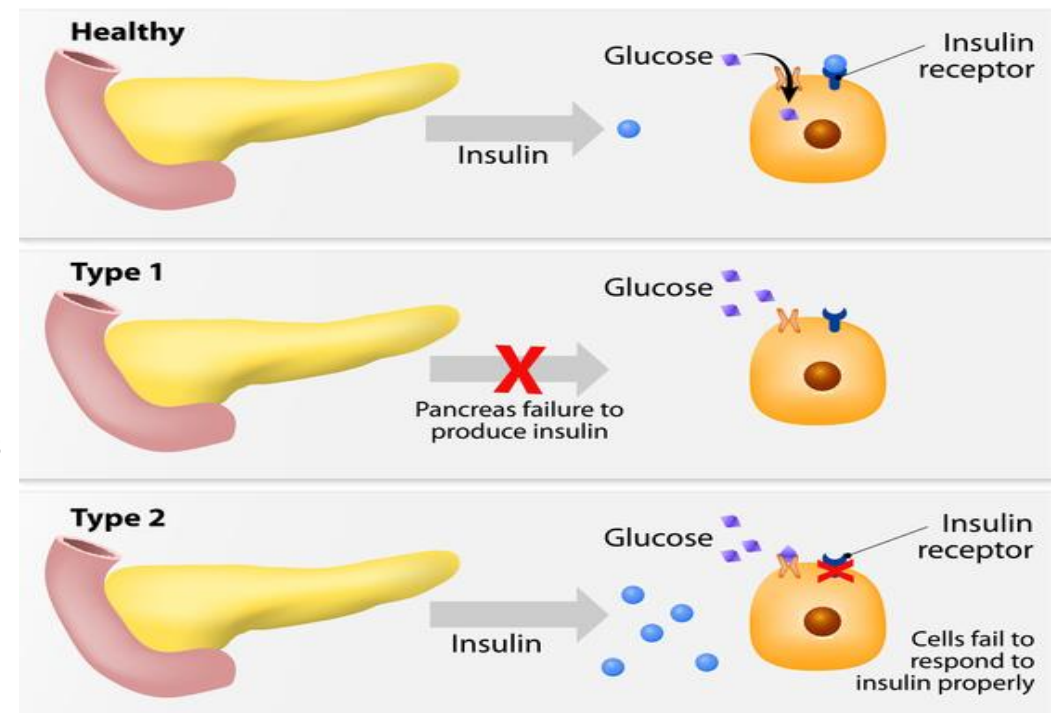
1. Polyuria (excessive urination)

Guyton: The high blood glucose causes more glucose to filter into the renal tubules than can be reabsorbed.

2. Polydipsia (excessive thirst)

Guyton: This occurs partly because glucose doesn't diffuse easily through the pores of the cell membrane, and the increased osmotic pressure in the extracellular fluids causes osmotic transfer of water out of the cells.

3. Polyphagia (excessive hunger).



Diabetes Mellitus

Types	Type 1 Diabetes (autoimmune attack)	Type 2 Diabetes	Gestational Diabetes
Other name	Insulin dependent Diabetes Mellitus	Insulin independent Diabetes Mellitus	
Affects	Children	Adults More common in some ethnic groups	During pregnancy
Onset	Juvenile onset (Specifically designating or pertaining to forms of diabetes that develop in children or young adults; especially insulin-dependent diabetes)	Late onset (about 85%)	-
Cause	Inadequate insulin secretion (Hyposecretion of insulin)	Defect in insulin action (Insulin resistance keeps blood glucose too high) The inheritance in diabetes is more in type 2 than it is in type 1, it depends on the ethnicity and overall the subject is debatable and not well understood.	-
	Leading to metabolic disturbances (hyperglycemia and glycosuria)		-

Cont.

Types	Type 1 Diabetes (autoimmune attack)	Type 2 Diabetes	Gestational Diabetes (during pregnancy)
Pathogenesis	Immune-mediated selective destruction of β cells while α cells are preserved. Therefore no insulin will be secreted \rightarrow high glucagon \rightarrow high production of glucose and ketones by liver.	-	
Complication	Osmotic diuresis & Diabetic ketoacidosis Coma could be as result of (hyperglycemia, ketoacidosis or dehydration)	<ol style="list-style-type: none"> 1. Atherosclerosis. 2. Renal failure. 3. Blindness 	
Treatment	Insulin injection	Diet or OHA (Oral Hypoglycaemic Agents) Manage by exercise and diet	

Symptoms of DM

- ▶ Hyperglycemia.
- ▶ Polyuria (excessive urination) → dehydration and soft eyeballs.
- ▶ Polydipsia (excessive thirst) → fatigue & weight loss.
- ▶ Polyphagia (excessive hunger).
- ▶ Ketoacidosis (in IDDM) (Acidosis caused by the increased production of ketone bodies, as in diabetic acidosis)
- ▶ Hyperlipidemia.
- ▶ Muscle wasting (There is depletion of muscles).
- ▶ Electrolyte depletion.

- ✓ The osmotic diuresis is caused by increased amounts glucose and ketones.
- ✓ While the diabetic ketoacidosis is caused by an increased amount of keto acids.

Long Term Complications of Uncontrolled Diabetes

- ▶ Microvascular disease, Hyperglycemia damages small blood vessels:
 1. Diabetic retinopathy → vision loss.
 2. Diabetic neuropathy → damage to nerves → most common cause of amputation in western world.
 3. Diabetic nephropathy → kidney damage → chronic renal failure.

اعتبروا السكر زي القزاز المسكر داخل الأوعية الدموية

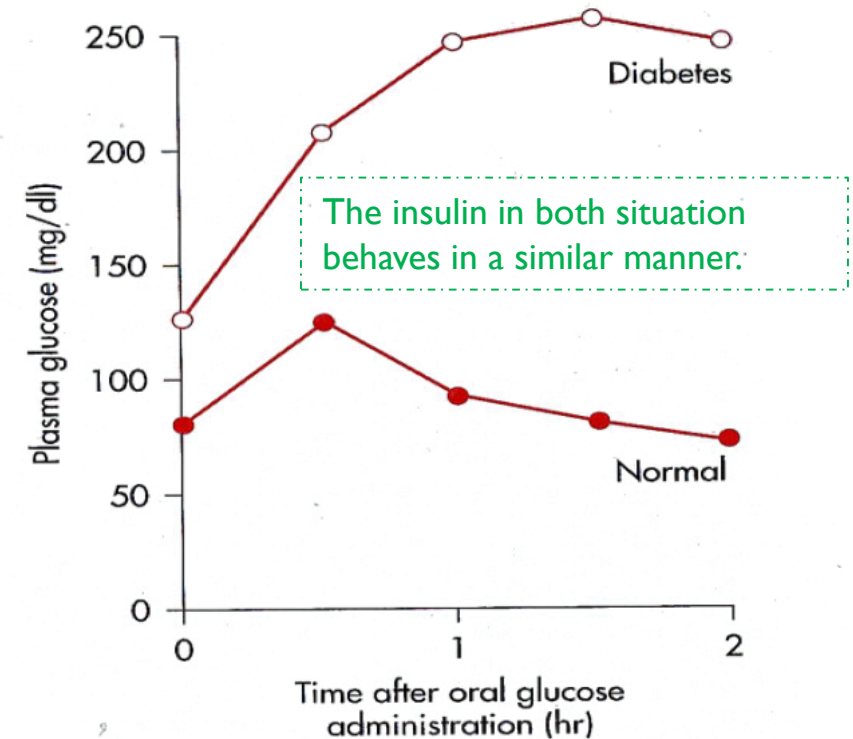
1. اذا راح للأوعية الصغيرة راح يضرها ويسبب لنا... retinopathy, neuropathy...

2. اذا راح microvascular راح يسبب لنا hyperlipidemia ويسبب لنا cardiovascular disease

وممكن تكون سبب الوفاة غالبا عشان كذا دائما مع أدوية السكر نعطي المريض ادوية للهايبرلبديميا + statins اسبرين.

Glucose Tolerance Test (GTT)

- ▶ Both the FPG (Fasting blood glucose) & OGTT (oral glucose tolerance test) tests require that the patient fast for at least 8 hours (ideally 12 hours) prior to the test.
- ▶ The oral glucose tolerance test (OGTT):
 - FPG test.
 - Blood is then taken 2 hours after drinking a special glucose solution.
- ▶ Mechanism of the GTT:
 1. Following the oral administration of a standard dose of glucose, the plasma glucose concentration normally rises but returns to the fasting level within 2 hours.
 2. If insulin activity is reduced, the plasma glucose concentration takes longer than 2 hours to return to normal and often rises above 200 mg/dl.
 3. Measurement of urine glucose allows determination of the renal threshold for glucose.



FPG: Fasting blood glucose

PPG: Postprandial Glucose

Cont.

Result	FPG mg/dL	2 hours PPG mg/dL
Normal	<100	<140
Impaired glucose tolerance	-	140-199
Diabetes	≥126	≥ 200

أهم Test نعمله عشان نعرف هل الشخص عنده قابلية للسكر أو لا (ما نسويه أبدا للشخص الي عنده أصلا سكري لأننا بنعطيه سكر ف بيأثر عليه سلبا ويتضرر).





ايش نسوي؟ أول شيء نخلي الشخص يصوم 8 ساعات، بعدها نسحب منه دم ونشوف مقياس السكر فيه. بعدها نشربه محلول عبارة عن موياس وسكر، وراح ناخذ منه دم كل ساعتين ونشوف مقياس السكر فيه ونقارن.




FPG: Fasting blood glucose

PPG: Postprandial Glucose



Summary (from slides)

Organs/tissue involved	Organ/tissue responses to insulin deficiency	Resulting condition of:		Signs and symptoms
		Blood	Urine	
	Decreased glucose uptake and utilization	Hyperglycemia	Glycosuria	Polyuria - dehydration - soft eyeballs Polydipsia Fatigue Weight loss Polyphagia
	Glycogenolysis		Osmotic diuresis	
	Protein catabolism and gluconeogenesis			
	Lipolysis and ketogenesis	Lipidemia and ketoacidosis	Ketonuria Loss of Na ⁺ , K ⁺ ; electrolyte and acid-base imbalances	Acetone breath Hyperpnea Nausea/vomiting/ abdominal pain Cardiac irregularities Central nervous system depression; coma

 = Muscle
  = Adipose tissue
  = Liver

- ✓ Insulin will Increases the Glucose uptake
→ resting muscle.
- ✓ In contradiction of the Exercising muscle
it takes up the Glucose even **without the action of the Insulin.**

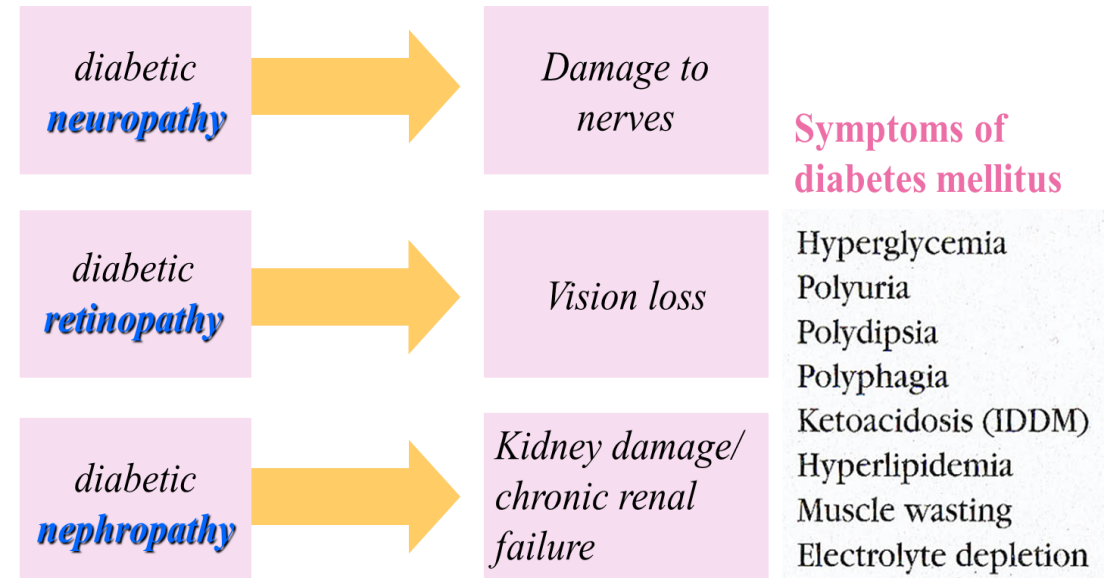
تم بحمد الله وتوفيقه وتيسيره
Best of the luck 😊

Summary

	Type 1	Type 2
Affects	Children	Adult
Cause	Inadequate insulin secretion	Defect in insulin action
Pathophysiology	immune-mediated selective destruction of β cells	Insulin resistance keeping the blood glucose high
Treatment	Insulin injection	Diet or OHA

Normal values	Impaired glucose tolerance	Impaired fasting glucose	Diabetes
FPG < 100 mg/dl		FPG=100-125	FPG \geq 126 mg/dl
2hr PPG < 140 mg/dL	2hr PPG = 140 - 199 mg/dL		2hr PPG levels \geq 200 mg/dL

Hyperglycaemia damages small blood vessels:



Diabetes' characteristic polytriad:

- **Polyuria** (excessive urination)
- **Polydipsia** (excessive thirst)
- **Polyphagia** (excessive hunger).

Thank you for checking our work!



اعمل لترسم بسمة، اعمل لتمسح دموعه، اعمل و أنت تعلم أن الله لا يضيع أجر من أحسن عملا.

قادة الفريق:

ليلى مذكور & محمد نصر

خالص الشكر لأعضاء الفريق الكرام:

عبدالرحمن الراشد

لمى التميمي

فؤاد فتحي

وجدان الزيد

قيس المهيدب

شروق الصومالي

زينة الكاف



Please check our editing file to know if there are any additions, changes or corrections.



Examine yourself



2017-2018 Dr. Manan Al Hakbany's Lecture & Notes.
2017-2018 Dr. Ahmad Alsabeeh's Lecture & Notes.
Guyton & Hall of Medical Physiology 13th Edition.
Linda S. Costanzo 5th Edition.



Helpful physiology books.



Give us your feedback 😊