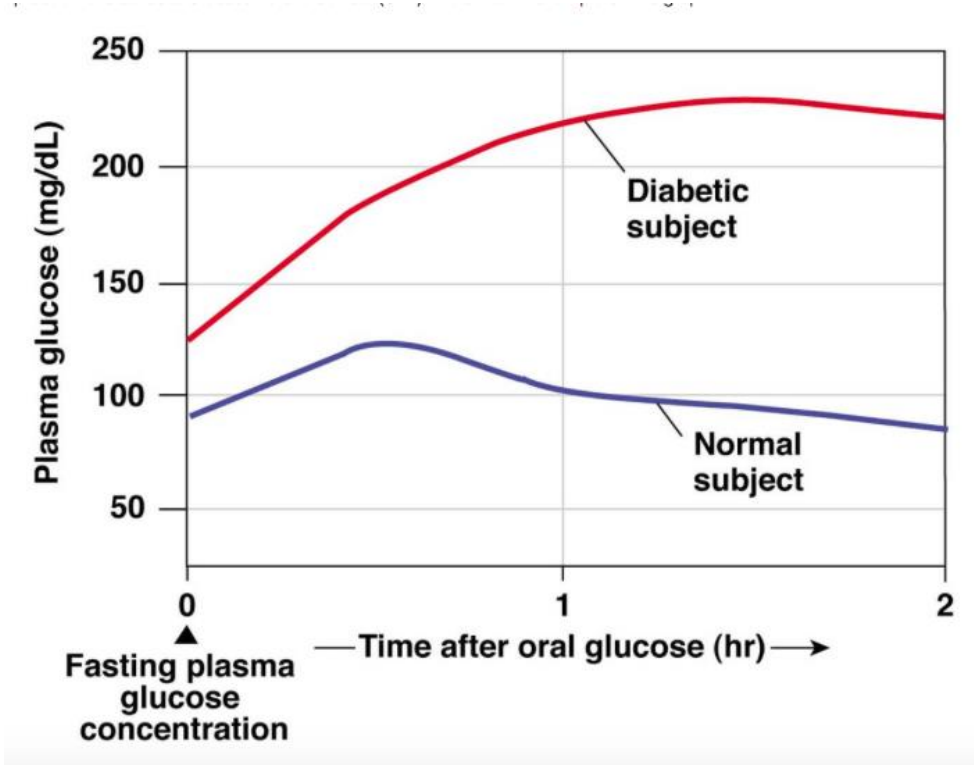
BCH 447

Oral Glucose Tolerance Test (OGTT)

Objectives:

- Use OGTT in diagnosis of diabetes mellitus.



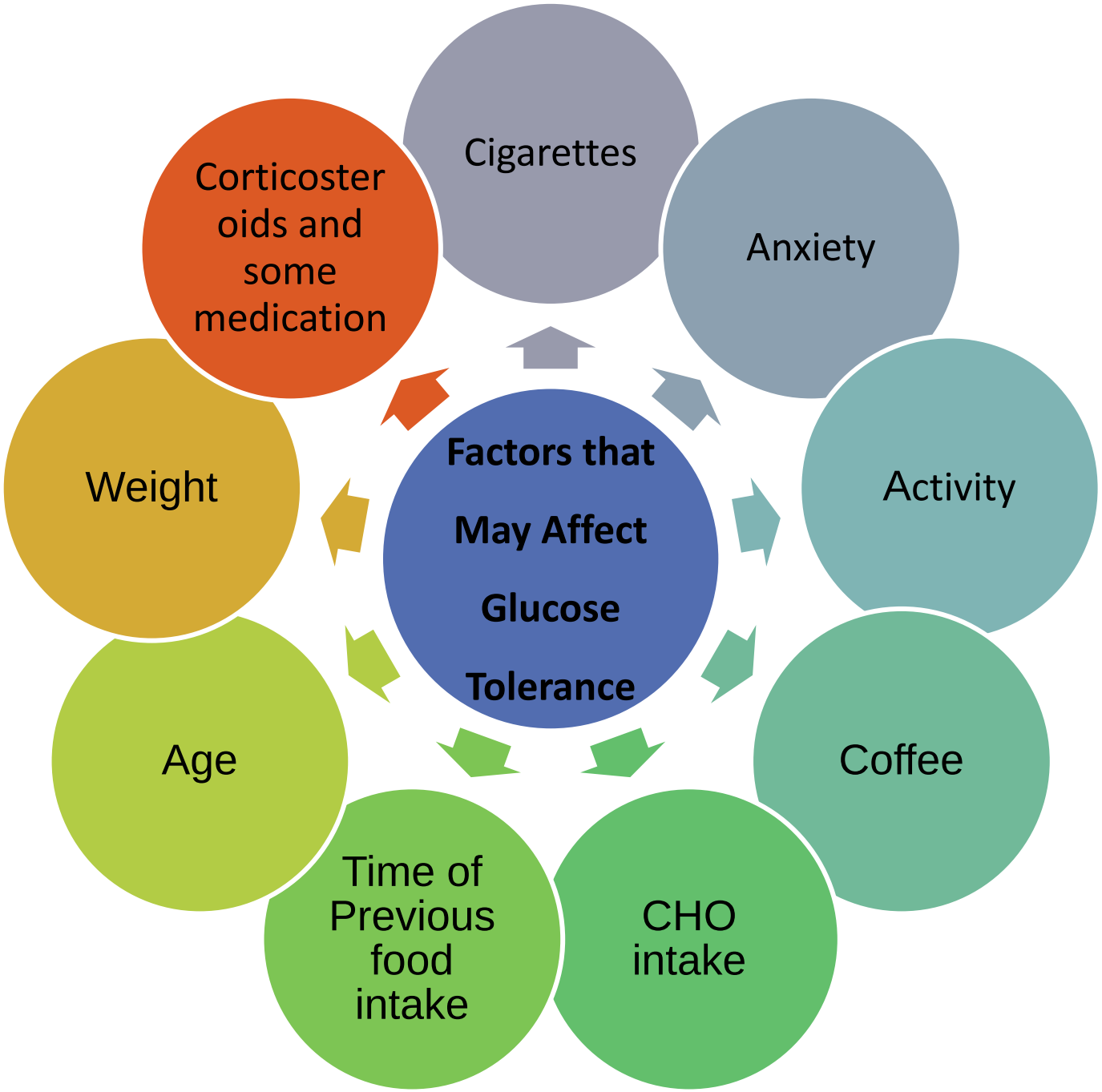
Introduction

•There are two types of glucose tolerance test (Oral and IV)

•The most common glucose tolerance test is **the oral glucose tolerance test (OGTT)**.

•The test reveals how quickly glucose is metabolized from the bloodstream for use by cells as energy source.

• Serial measurement of plasma glucose before and after glucose is given orally should provide a standard method to evaluate individuals and establish values for normal and disease states.


Factors that May Affect Glucose Tolerance
Cigarettes
Anxiety
Activity
Coffee
CHO intake
Time of Previous food intake
Age
Weight
Corticosteroids and some medication

How does stress, caffeine and steroids affect OGTT ?

Stress:

When the body is under stress, the adrenal glands trigger the release of glucose stored in various organs, which often leads to elevated levels of glucose in the bloodstream.

Caffeine:

caffeine intake can acutely lower insulin sensitivity and increase glucose concentrations

Corticosteroid:

These drugs have also been called "glucocorticoids" because of their effects on glucose metabolism: Increases in blood glucose are common among people taking prednisone and other steroids.

How is the test performed?

- When an OGTT is ordered, the following conditions should be met:

(1) Omit medications known to affect glucose tolerance.

(2) Perform the test in the morning after 3 days of unrestricted diet and activity.

(3) Perform the test after a 10-16 hours fast **(12 hour is best).**

-**Oral dose :** For adults, the recommended load is 75g and for children, 1.75 g/kg,

- Plasma glucose should be measured **fasting** then every 30 min for 2h **after** an oral glucose load

- Note: the time of collection is different, it is depend on the situation.

This test is recommended for :

- Generally most healthcare providers recommend that all pregnant women should be screened for ***gestational diabetes***.

- Experts recommend this test to pregnant women who are between 24 and 28 weeks of pregnancy .

- This test is also recommended for anyone suspected of developing adult **diabetes**.

OGTT side effect:

- Some people feel sweaty, light-headed, or may even feel short of breath or faint after drinking the glucose.

- However, serious side effects of this test are very uncommon.

Normal and abnormal results :

Normal :

Fasting: 60 -128 mg/dL **1 hour:** less than 200 mg/dL **2 hours:** less than 140mg/dL

-Higher-than-normal levels of glucose may mean you have **prediabetes , diabetes (type 2)**, or **gestational diabetes**.

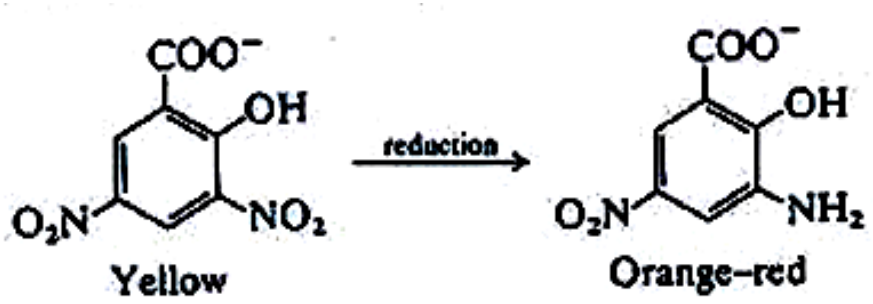
Or impaired glucose tolerance.
It means you are at increased risk for developing diabetes.

Principle:

- Several reagents can be used to assay reducing sugars such as 3, 5 dinitrosalicylic acid in one of the compounds.

- In alkaline solution it is reduced to 3-amino-5- nitro salicylic acid, which is orange-red.

- Absorbance is determined at 540 nm.



Method:

	Plasma	Standard	dH2O	DNS reagent
Test (a1) (Fasting plasma)	0.1	-	-	2 ml
Test (a2) (Fasting plasma)	0.1	-	-	2 ml
Test (b1) Two- hour	0.1	-	-	2 ml
Test (b2) Two- hour	0.1	-	-	2 ml
Standard (1)	-	0.1	-	2 ml
Standard (2)	-	0.1	-	2 ml
Blank	-	-	0.1	2 ml

↓

Mix the contents of each tube and cover each tube by Aluminum foil

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Boiling water bath for 5 minutes

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cool the tubes for 1-3 min

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Read absorbance at 540 nm

- RESULT:

Tubes	Absorbance at 540 nm
Test (a1)	
Test (a2)	
Test (b1)	
Test (b2)	
Standard (1)	
Standard (2)	

Calculations:

- Conc. Of Std. = 0.1 g/dl.

- Sample A = Fasting plasma glucose

- Sample B = Two hour plasma glucose

- Amount of glucose in plasma = $\frac{\text{Mean Abs Test}}{\text{Mean Abs Std.}}$ X conc. of Std = **Z** g/dl

- Z g/dl X 1000 = **Y mg/dl**

Calculate the glucose in fasting and two hrs plasma glucose ..

Then discuss your results ..