
**Ain Shams University
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**The role of vitamin D_r and calcium in
mediating insulin secretion in
experimental animals.**

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To ...
My Family



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

صَدَقَ اللَّهُ الْعَظِيمُ

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كلية النبات
قسم الكيمياء الحيوية والتغذية

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List of abbreviation

ALP	Alkaline phosphatase .
CaBP	Calcium binding protein .
CaR	Calcium receptor
DBP	Vitamin D binding protein .
FBS	Fast blood suger .
FFA	Free fatty acid .
GTT	Glucose tolerance test .
HP	Hypertensive patient .
LPD	Low phosphate diet .
LXRs	Liver x receptors .
MBI	Body mass index .
µg	Microgram
ml	milli liter
mRNA	Messenger ribonucleic acid .
ng	Nanogram
NHES	National Health and Examination Survey .
NIDDM	Non insulin dependent diabetes mellitus .
PTH	Parathyroid hormone .
PTX	Parathyroidectomy .
RNA	Ribonucleic acid .
T₂DM	Type 2 diabetes mellitus .
U.S.A	United State of American .

UVβ	Ultraviolet β radiation .
VDR	Vitamin D receptor .
VLDL	Very low denisty lipoprotein .

Abstract

The present work was performed to study the influence of dietary vitamin D_r deficiency and supplementation with vitamin D_r / high calcium in mediating insulin secretion in male albino rats .

Sixty five male albino rats (Sprague Dawley Strain) were randomly allocated in groups of thirteen rats each to five diets , which they ate continuously for 40 days . The groups were put on the following diets throughout the experimental period, (G₁) received the basal diet for 3 weeks then, received corn oil orally at a dose of 0.5 ml / rat three times weekly for 3 weeks; (G₂) received vitamin D_r deficient diet containing normal calcium (0.1 %) and phosphorus (0.3 %) for 3 weeks then supplemented with oral vitamin D_r at a dose of 1 µg / rat three times weekly for 3 weeks ; (G₃) received vitamin D_r deficient diet for 3 weeks then received corn oil orally at a dose of 0.5ml / rat three times for one week and continued to receive vitamin D_r deficient diet without any supplementation for 3 weeks ; (G₄) received vitamin D_r deficient diet for 3 weeks then , received corn oil orally at a dose of 0.5 ml / rat three times for one week after that , supplemented with oral vitamin D_r at a dose of 1 µg / day / rat for 3 weeks ; (G₅) received vitamin D_r deficient diet for 3 weeks then received corn oil orally at a dose of 0.5 ml / rat three times for one week after that supplemented with high calcium diet for 3 weeks .

Fasting blood samples were taken on the day 40 for the determination of serum magnesium ; insulin ; calcium ;

phosphorus; activity of ALP ; total cholesterol ; total triacylglycerols ; PTH ; T₄ and plasma glucose .

The supplementation with either vitamin D_r or calcium in groups receiving vitamin D_r deficient diet, improved insulin secretion, in addition there were significant increase in the concentrations of serum insulin; magnesium and calcium as well as a significant decrease in serum phosphorus; alkaline phosphatase (ALP) activity; cholesterol; triacylglycerol ; parathyroid hormone (PTH); thyroxine (T₄) and fasting plasma glucose when compared with vitamin D_r deficient group (G_r) .

It was concluded that, vitamin D_r or high calcium diet plays a biochemical role in improving glucose clearance and insulin secretion, even the glucose tolerance test, was concluded in G₄ followed by G_r and finally G₀.