

# **EFFECTS OF PARATHYROID HORMONE ON THE ARTERIAL BLOOD PRESSURE AND HEART RATE**

THESIS

Submitted In Partial Fulfillment Of The Master  
Degree In Physiology

*Presented By*

**SAHAR SOBHY THABET**  
*M.B., B.Ch.*

*Supervised By*

**Prof. Dr. AHMED EMAD OMER ZAKI**

*Professor Of Physiology*

*Faculty Of Medicine - Ain Shams University*

**Dr. ABD EL-RAHMAN F.A. SABH**

*Assistant Professor Of Physiology*

*Faculty Of Medicine - Ain Shams University*

**Dr. ASHRAF M.A. TOURKEY**

*Lecturer Of Physiology*

*Faculty Of Medicine - Ain Shams University*

612-44

55

**PHYSIOLOGY DEPARTMENT  
FACULTY OF MEDICINE - AIN SHAMS UNIVERSITY**

1996





## **ACKNOWLEDGMENT**

I wish to express my lasting and sincere gratitude to **Professor Dr. Fatma A. Mohamed**, Professor and Chairman of Physiology Department, Faculty of Medicine, Ain Shams University, for her continuous encouragement, wise counsel and kind help. I like to thank her for her motherly heart and great support.

I am very grateful and deeply indebted to **Prof. Dr. Ahmed Emad Omer Zaki**, Professor of Physiology, Faculty of Medicine, Ain Shams University, for suggesting and planning this study. He spared no time or effort in helping me. Without his help and support this work could not have been possible.

I am indeed grateful to **Dr. Abd El-Rahman F.A. Sabh**, Assistant Professor of Physiology, Faculty of Medicine, Ain Shams University, for his keen supervision, continuous encouragement and guidance during the whole course of this study.

I am also grateful to **Dr. Ashraf M.A. Tourkey**, Lecturer of Physiology, Faculty of Medicine, Ain Shams University, for his support, help and continuous encouragement during every step in this work.

*Acknowledgment*

I wish to express my cordial appreciation and ever lasting gratitude to **Prof. Dr. Ahmed M. Kamel**, Professor of Physiology, Faculty of Medicine, Ain Shams University, for his unfailing care, generous encouragement and stimulating remarks inspite of his obligations.

I like to express my special thanks to **Dr. Hossam A. Awad**, Assistant Professor of Physiology, Faculty of Medicine, Ain Shams University, for his great help generous co-operation , precious assistance and valuable suggestions.

Finally, I would like to extend my thanks to all my Professors and Colleagues, to all the members of Physiology Department, for their encouragement, love and continuous support.

*THE CANDIDATE*

## **To My Family**

**Who supplied me with all the confidence and  
support that I needed and who were the  
source of encouragement that strengthened  
me all the way.**



## LIST OF TABLES

Table (1): Showing the effect of PTH in a dose of 0.3  $\mu\text{g/kg}$  B.W. on systolic blood pressure.....39

Table (2): Showing the effect of PTH in a dose of 0.3  $\mu\text{g/kg}$  B.W. on diastolic blood pressure. ....40

Table (3): Showing the effect of PTH in a dose of 0.3  $\mu\text{g/kg}$  B.W. on mean arterial blood pressure.....41

Table (4): Showing the effect of PTH in a dose of 0.3  $\mu\text{g/kg}$  B.W. on heart rate.....42

Table (5): Showing the effect of PTH in a dose of 0.3  $\mu\text{g/kg}$  B.W. on pulse pressure.....43

Table(6): Showing the effect of PTH in a dose of 0.3  $\mu\text{g/kg}$  B.W. on blood pressure \* heart rate product....44

Table (7): Showing the effect of PTH in a dose of 1  $\mu\text{g/kg}$  B.W. on systolic blood pressure.....45

Table (8): Showing the effect of PTH in a dose of 1  $\mu\text{g/kg}$  B.W. on diastolic blood pressure. ....46

Table (9): Showing the effect of PTH in a dose of 1  $\mu\text{g/kg}$  B.W. on mean arterial blood pressure.....47

Table (10): Showing the effect of PTH in a dose of 1  $\mu\text{g/kg}$  B.W. on heart rate.....48

Table (11): Showing the effect of PTH in a dose of 1  $\mu\text{g/kg}$  B.W. on pulse pressure.....49

*List Of Tables*

**Table (12):** Showing the effect of PTH in a dose of 1  $\mu\text{g/kg}$  B.W. on blood pressure \* heart rate product....50

**Table (13):** Showing the effect of PTH in a dose of 3  $\mu\text{g/kg}$  B.W. on systolic blood pressure. ....51

**Table (14):** Showing the effect of PTH in a dose of 3  $\mu\text{g/kg}$  B.W. on diastolic blood pressure. ....52

**Table (15):** Showing the effect of PTH in a dose of 3  $\mu\text{g/kg}$  B.W. on mean arterial blood pressure.....53

**Table (16):** Showing the effect of PTH in a dose of 3  $\mu\text{g/kg}$  B.W. on heart rate.....54

**Table (17):** Showing the effect of PTH in a dose of 3  $\mu\text{g/kg}$  B.W. on pulse pressure.....55

**Table (18):** Showing the effect of PTH in a dose of 3  $\mu\text{g/kg}$  B.W. on blood pressure \* heart rate product....56

**Table (19):** Showing the effect of PTH in a dose of 10  $\mu\text{g/kg}$  B.W. on systolic blood pressure. ....57

**Table (20):** Showing the effect of PTH in a dose of 10  $\mu\text{g/kg}$  B.W. on diastolic blood pressure. ....58

**Table (21):** Showing the effect of PTH in a dose of 10  $\mu\text{g/kg}$  B.W. on mean arterial blood pressure.....59

**Table (22):** Showing the effect of PTH in a dose of 10  $\mu\text{g/kg}$  B.W. on heart rate.....60

<b><u>Table (23):</u></b> Showing the effect of PTH in a dose of 10 $\mu\text{g/kg}$ B.W. on pulse pressure.....	61
<b><u>Table (24):</u></b> Showing the effect of PTH in a dose of 10 $\mu\text{g/kg}$ B.W. on blood pressure * heart rate product.....	62
<b><u>Table (25):</u></b> Showing the effect of PTH in a dose of 30 $\mu\text{g/kg}$ B.W. on systolic blood pressure.....	63
<b><u>Table (26):</u></b> Showing the effect of PTH in a dose of 30 $\mu\text{g/kg}$ B.W. on diastolic blood pressure. ....	64
<b><u>Table (27):</u></b> Showing the effect of PTH in a dose of 30 $\mu\text{g/kg}$ B.W. on mean arterial blood pressure.....	65
<b><u>Table (28):</u></b> Showing the effect of PTH in a dose of 30 $\mu\text{g/kg}$ B.W. on heart rate.....	66
<b><u>Table (29):</u></b> Showing the effect of PTH in a dose of 30 $\mu\text{g/kg}$ B.W. on pulse pressure.....	67
<b><u>Table (30):</u></b> Showing the effect of PTH in a dose of 30 $\mu\text{g/kg}$ B.W. on blood pressure * heart rate product....	68
<b><u>Table (31):</u></b> Showing the maximum percentage change in blood pressure, heart rate and blood pressure * heart rate product following PTH administration. ....	69
<b><u>Table (32):</u></b> Correlation coefficients 'r' between heart rate and both arterial blood pressure and blood pressure * heart-rate product among all rats injected with PTH and also their controls at the 2nd minute after injecting PTH and saline in the test and control groups respectively. ....	70

## LIST OF FIGURES

<b><u>Figure (1):</u></b> Effect of PTH on systolic blood pressure..	71
<b><u>Figure (2):</u></b> Effect of PTH on diastolic blood pressure.	72
<b><u>Figure (3):</u></b> Effect of PTH on mean arterial blood pressure.....	73
<b><u>Figure (4):</u></b> Effect of PTH on heart rate.....	74
<b><u>Figure (5):</u></b> Effect of PTH on pulse pressure. ....	75
<b><u>Figure (6):</u></b> Effect of PTH (0.3 $\mu\text{g/kg}$ ) on blood pressure * heart rate product.....	76
<b><u>Figure (7):</u></b> Effect of PTH (1 $\mu\text{g/kg}$ ) on blood pressure * heart rate product.....	77
<b><u>Figure (8):</u></b> Effect of PTH (3 $\mu\text{g/kg}$ ) on blood pressure * heart rate product.....	78
<b><u>Figure (9):</u></b> Effect of PTH (10 $\mu\text{g/kg}$ ) on blood pressure * heart rate product.....	79
<b><u>Figure (10):</u></b> Effect of PTH (30 $\mu\text{g/kg}$ ) on blood pressure * heart rate product. ....	80
<b><u>Figure (11):</u></b> Maximum percentage decrease in systolic blood pressure.....	81
<b><u>Figure (12):</u></b> Maximum percentage decrease in diastolic blood pressure.....	82

<b><u>Figure (13):</u></b> Maximum percentage decrease in mean arterial blood pressure. ....	83
<b><u>Figure (14):</u></b> Maximum percentage increase in heart rate .....	84
<b><u>Figure (15):</u></b> Maximum percentage decrease in blood pressure * heart rate product. ....	85
<b><u>Figure (16):</u></b> Percentage change in blood pressure and heart rate after parathyroid hormone injection (0.3 µg/kg). ....	86
<b><u>Figure (17):</u></b> Percentage change in blood pressure and heart rate after parathyroid hormone injection (1 µg/kg). ....	87
<b><u>Figure (18):</u></b> Percentage change in blood pressure and heart rate after parathyroid hormone injection (3 µg/kg).. ....	88
<b><u>Figure (19):</u></b> Percentage change in blood pressure and heart rate after parathyroid hormone injection (10 µg/kg). ....	89
<b><u>Figure (20):</u></b> Percentage change in blood pressure and heart rate after parathyroid hormone injection (30 µg/kg). ....	90
<b><u>Figure (21):</u></b> Correlation between mean arterial blood pressure versus heart rate in the control group 2 minutes after injecting saline. ....	91

**Figure (22):** Correlation between mean arterial blood pressure versus heart rate in all tested groups 2 minutes after injecting PTH.....91

**Figure (23):** Correlation between blood pressure \* heart rate product versus heart rate in the control group 2 minutes after injecting saline.....92

**Figure (24):** Correlation between blood pressure \* heart rate product versus heart rate in all tested groups 2 minutes after injecting PTH.....92

## **LIST OF ABBREVIATIONS**

<b>PTH</b>	=	Parathyroid hormone.
<b>PTHrp</b>	=	Parathyroid hormone related protein.
<b>Ca<sup>2+</sup></b>	=	Calcium.
<b>cAMP</b>	=	Cyclic adenosine monophosphate.
<b>mRNA</b>	=	Messenger ribonucleic acid.
<b>MAP</b>	=	Mean arterial pressure.
<b>BP * HR</b>	=	Blood pressure * Heart rate.
<b>NS</b>	=	Not significant.
<b>r</b>	=	Correlation coefficient.
<b>P</b>	=	Probability.
<b>iv</b>	=	Intravenous.
<b>ip</b>	=	Intraperitoneal.
<b>BW</b>	=	Body weight.
<b>SHR</b>	=	Spontaneously hypertensive rats.

