

EXPERIMENTAL STUDIES ON THE EFFECTS OF TRANSPORTATION  
STRESS AND DEXAMETHASONE INDUCED STRESS ON THE  
WHITE BLOOD CELLS COUNT IN SHEEPS

KELVIN TEOH CHIN ERH

DEPARTMENT OF BIOLOGICAL SCIENCE  
FACULTY OF SCIENCE AND TECHNOLOGY  
UNIVERSITI PUTRA MALAYSIA TERENGGANU  
TERENGGANU

1999/2000



cln: 796

1100024418

LP 9 FST 1 2000



1100024418

Experimental studies on the effects of transportation stress and dexamethasone induced stress on the white blood cells count in sheeps / Kelvin Teoh Chin Erh.



1100024418

PERPUSTAKAAN  
KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA  
(KUSTEM)

Pengarang Kelvin Teoh Chin Erh		No. Panggilan Cln 796 LP 9 FST	
Judul			
Tarikh	Waktu Pemulangan	Nombor Ahli	Tanda Tangan
20/2/06	10.20 pm	9787	2000

LP  
9  
FST  
1  
2000

**EXPERIMENTAL STUDIES ON THE EFFECTS OF  
TRANSPORTATION STRESS AND DEXAMETHASONE  
INDUCED STRESS ON THE WHITE BLOOD CELLS  
COUNT IN SHEEPS**

**KELVIN TEOH CHIN ERH**

**DEPARTMENT OF BIOLOGICAL SCIENCES  
FACULTY OF SCIENCE AND TECHNOLOGY  
KOLEJ UNIVERSITI TERENGGANU  
CAWANGAN UNIVERSITI PUTRA MALAYSIA  
TERENGGANU  
1999/2000**

**1100024418**

**EXPERIMENTAL STUDIES ON THE EFFECTS OF TRANSPORTATION  
STRESS AND DEXAMETHASONE INDUCED STRESS ON THE WHITE  
BLOOD CELLS COUNT IN SHEEPS**

**BY**

**KELVIN TEOH CHIN ERH**

**A Project Report submitted to the**

**Faculty of Science and Technology**

**in partial fulfilment for the**

**Degree of Bachelor of Science (Hons.) Biology**

**DEPARTMENT OF BIOLOGICAL SCIENCES SCIENCE UNIT**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**KOLEJ UNIVERSITI TERENGGANU**

**UNIVERSITI PUTRA MALAYSIA TERENGGANU**

**TERENGGANU**

**1999/2000**

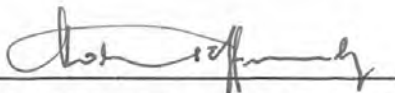
**JABATAN SAINS BIOLOGI  
FAKULTI SAINS DAN TEKNOLOGI  
KOLEJ UNIVERSITI TERENGGANU  
CAWANGAN UNIVERSITI PUTRA MALAYSIA TERENGGANU**

**BORANG PENGESAHAN DAN KELULUSAN LAPORAN AKHIR PROJEK**

Nama Pelajar : Kelvin Teoh Chin Erh  
No. Matrik : UK 849  
Penyelia Pertama : Dr. Mohd Effendy Abdul Wahid.  
Penyelia Kedua : Prof. Madya Dr. Mohd Zambri Saad  
Tajuk Projek : Experimental studies on the effects of transportation stress and dexamethasone induced stress on the white blood cells count in sheeps

Dengan ini disahkan bahawa saya telah menyemak laporan projek ini dan

- i. Semua pembetulan yang disarankan oleh pemeriksa-pemeriksa telah dibuat
- ii. Laporan ini telah mengikut format yang diberikan dalam panduan BIO 4999 (Projek) Jabatan Sains Biologi, Fakulti Sains Dan Teknologi, 2000.



(Tandatangan Penyelia Pertama)

\_\_\_\_\_

(Tandatangan Penyelia Kedua)

Tarikh: 16 April 2000

Tarikh : \_\_\_\_\_



## ACKNOWLEDGEMENT

First of all, I would like to express my sincere appreciations and thanks to both my first supervisor, Dr. Effendy Abdul Wahid <sup>1</sup>, and my second supervisor Assoc. Prof. Dr. Mohd Zambri Saad <sup>2</sup>, who devoted a lot of their time in assisting me, guiding me and also giving me constructive suggestions and criticisms. Their sacrifices and assistance in helping me finish this study will always be remembered.

I would also like to thank Dr. Anum Man, Mr. Mohd. Jamil Samad, Dr. Md. Sabri Mohd. Yusoff, Mr. Ismail Mohd Shairi, Dr. Yuslan Sanuddin, Dr. Kamaruddin Mat Isa, Tn. Haji Mohd Nah Manap and Mr. R. Kumar for their time, help, constructive suggestions and also advices during my stay at the Faculty of Veterinary Medicine and Animal Science, UPM Serdang.

- 
1. Lecturer, Faculty of Science and Technology, College University of Terengganu, a branch of University Putra Malaysia, Serdang.
  2. Lecturer, Faculty Of Veterinary Medicine and Animal Science, University Putra Malaysia, Serdang.

## CONTENTS

	<b>Page</b>
ACKNOWLEDGEMENTS	v
CONTENTS	vi
LIST OF FIGURES	viii
LISTS OF TABLES	ix
ABSTRACT	x
ABSTRAK	xii
1.0 INTRODUCTION	1
2.0 OBJECTIVES	4
3.0 LITERATURE REVIEW	5
4.0 MATERIALS AND METHODS	12
4.1 Animals	12
4.2 Blood Collection	12
4.3 Experimental Design	
4.3.1 Experiment 1: Transportation Stress	12
4.3.2 Experiment 2: Dexamethasone Induced Stress	13
4.4 Summary of Working Procedures	14
4.5 Hematological Analyses	15
4.6 Statistical Analysis	15



## LIST OF FIGURES

Page

	Title	Page
5.0	RESULTS	
5.1	Experiment 1 : Transportation Induced Stress	16
5.2	Experiment 2 : Dexamethasone Induced Stress	21
5.3	Dexamethasone and Transportation Induced Stress	27
6.0	DISCUSSIONS	
6.1	Transportation Induced Stress	33
6.2	Dexamethasone Induced Stress	35
6.3	The Difference Between The Changes in Transportation and Dexamethasone Induced Stress	37
7.0	CONCLUSION	38
8.0	REFERENCE	39
9.0	APPENDICES	43

## LIST OF FIGURES

<b>Figure</b>	<b>Title</b>	<b>Page</b>
1	Changes in the Mean Value of White Blood Cells (WBC) in sheep due to transportation stress	17
2	Changes in the Mean Value of White Blood Cells (WBC) in sheep due to Dexamethasone Induced Stress	23
3	Changes in the Mean Value of Neutrophils in Both Transportation and Dexamethasone Induced Stress	28
4	Changes in the Mean Value of Lymphocytes in Both Transportation and Dexamethasone Induced Stress	29
5	Changes in the Mean Value of Monocytes in Both Transportation and Dexamethasone Induced Stress	30
6	Changes in the Mean Value of Eosinophils in Both Transportation and Dexamethasone Induced Stress	31
7	Changes in the Mean Value of Basophils in Both Transportation and Dexamethasone Induced Stress	32

## LIST OF TABLES

<b>Table</b>	<b>Title</b>	<b>Page</b>
1	Total Neutrophils count in transportation stressed sheep	18
2	Total Lymphocytes count in transportation stressed sheep	18
3	Total Monocytes count in transportation stressed sheep	19
4	Total Eosinophils count in transportation stressed sheep	19
5	Total Basophils count in transportation stressed sheep	20
6	Total Neutrophils count in dexamethasone induce stress sheep	24
7	Total Lymphocytes count in dexamethasone induce stress sheep	24
8	Total Monocytes count in dexamethasone induce stress sheep	25
9	Total Eosinophils count in dexamethasone induce stress sheep	25
10	Total Basophils count in dexamethasone induce stress sheep	26



## ABSTRACT

Transportation stress and the synthetic glucocorticoid, dexamethasone, has been used to stimulate stress-induced immuno-suppression. Considerable differences exist in the literature concerning the effects of dexamethasone on the bovine immune system response.

The study was designed to find out the actual effect of both transportation and dexamethasone induced stress on the bovine immune system and also their relation and similarity. Two groups of 8 goats were used. One group was transported from a rearing farm in Kluang, Johor and was transported for 4 hours to a grazing field behind the Faculty of Veterinary Medicine and Animal Science in UPM Serdang. The other group were too transported from Kluang but were left undisturbed for 6 months before the experiment on the effect of dexamethasone induced stress were carried out.

In transport induced stress sheep, leukocyte counts drop to below normal value from day 3 and return back to slightly normal only on day 30. However, lymphocytes returned back to normal value on day 14 but its counts continue to increase. All leukocytes counts showed significance ( $P \leq 0.05$ ) decrease as compared to pre-treatment value.

As for dexamethasone induced stress, leukocyte counts drop starting from day 3 and only return back to normal after 32 days. It reached the lowest count on day 10,

which is on the second week after the administration of dexamethasone. Although all types of leukocytes count showed decrease in numbers, only, lymphocytes, basophils and eosinophils showed decrease in significance number ( $P \leq 0.05$ ).

The data shows that both transportation and dexamethasone induced stress causes the leukocyte counts to reach the lowest count on the second week after transport and administration of dexamethasone and the sheep's leukocyte counts only return to normal after 4 weeks. These data suggest that the immunosuppressive effect of dexamethasone is dependant upon the dose of dexamethason administered and the time of evaluation post drug administration. The study points out the importance of considering these variables when interpreting the effects of dexamethasone on the bovine immune response.

## ABSTRAK

Tekanan yang disebabkan oleh pengangkutan dan glukokortikoid sintetik, dexamethason telah digunakan untuk mencetuskan tekanan. Perbezaan yang banyak telah wujud dalam maklumat yang berkaitan dengan kesan dexamethasone dalam tindakbalas sistem imun bovin.

Kajian ini direka untuk mengkaji kesan yang sebenar tekanan pengangkutan dan cetusan tekanan oleh dexamethasone ke atas sistem imun bovin serta untuk mengetahui hubungan dan persamaan antara dua kes itu. Dua kumpulan kambing bebiri dengan lapan ekor setiap kumpulan telah digunakan. Satu kumpulan telah diangkut dari kebun penternakan di Kluang, Johor dan telah diangkut dengan lori ke padang ragut di belakang Fakulti Kedokteran Veterinar dan Sains Penternakan di Universiti Putra Malaysia Serdang yang mengambil masa selama 4 jam. Kumpulan yang satu lagi juga diangkut dari ladang yang sama tetapi telah dibiarkan selama 6 bulan tanpa gangguan sebelum eksperimen terhadap kesan cetusan tekanan oleh dexamethasone dijalankan.

Dalam bebiri yang mengalami tekanan pengangkutan, mulai dari hari ke-3, jumlah leukosit jatuh kepada nilai dibawah normal dan hanya kembali kepada nilai yang agak normal pada hari ke-30. Walaubagaimanapun, limfosit kembali kepada nilai normal pada hari ke-14 tetapi nilainya tetap terus meningkat. Jumlah leukosit menunjukkan penurunan yang signifikan ( $P \leq 0.05$ ) berbanding dengan nilai sebelum rawatan dikenakan.



Bagi tekanan yang disebabkan oleh dexamethasone, jumlah leukosit jatuh sejak dari hari ke-3 dan hanya kembali kepada keadaan normal selepas hari ke-32. Ia jatuh kepada nilai terendah pada hari ke 10, iaitu pada minggu kedua selepas dikenakan rawatan dexamethasone. Walaupun semua jenis leukosit menunjukkan penurunan dalam bilangan, tetapi hanya limfosit, basophil, dan eosinophil menunjukkan penurunan bilangan yang signifikan ( $P \leq 0.05$ )

Keputusan ini menunjukkan kedua-dua tekanan pengangkutan dan tekanan yang disebabkan oleh dexamethasone telah menunjukkan pengiraan leukosit yang menurun dan nilai terendah ialah pada minggu kedua selepas rawatan dan jumlah leukosit kambing bebiri hanya akan kembali kepada keadaan normal selepas minggu keempat. Data ini mencadangkan bahawa kesan penahanan-imuno adalah bergantung kepada dos dexamethasone yang telah dilaksanakan. Kajian ini menunjukkan pentingnya menimbang pembolehubah-pembolehubah ini apabila mentafsir kesan-kesan dexamethasone ke atas tindak balas imun bovin.