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The effect of creatine on the developing rat foetus

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DECLARATION

I, Frans Hendrik Badenhorst, declare that this dissertation is my own work. It is being submitted for the degree of Master of Science in Medicine in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University

_____

FH Badenhorst

_____ day of _____ , 2005

To my father Frans, mother Annalie and brothers Mias, Francois, Darius and Andre, whose support and encouragement lifted me when times were hard.

And to Antonei, whose love carried me when I was tired and inspired me to be the best I can be.

ABSTRACT

Creatine is one of the most frequently or generally used ergogenic substances. It is used by professional and amateur athletes and the "man on the street". Creatine is involved in energy production and protein synthesis in muscle. Although studies have been carried out on the effect of creatine on adults, no study has yet determined whether creatine would have an influence on the developing rat foetus if taken by a female during pregnancy.

The aim of this study was thus to determine whether creatine had an effect on the developing foetus.

Dams were divided into two groups, which were injected between days 7-13 and on days 9 and 11 only of intra-uterine development respectively. Each group was subdivided into a control and two experimental groups. Experimental group one received a low dose of creatine (53.5mg/250g body weight); the other experimental group received a high dose of creatine (107mg/250g body weight). The control group received an equal volume (1ml) of the vehicle (saline) in which the creatine was constituted. Dams were sacrificed on day 20 of development. The foetuses were removed and their weight and length taken. Foetuses were examined for abnormalities. Two foetuses from each litter underwent skeletal staining. Tissue was excised from the remaining foetuses and processed for histology for histological investigation.

Creatine positively affected the growth of the foetuses of dams injected between days 7-13, while foetuses of dams injected only on days 9 and 11 in the B-group showed reduced growth. Creatine also had a slightly negative effect on the histological structure of the liver, but enhanced skeletal muscle growth, endocrine cell formation (pancreas) and skeletal formation.

From the results obtained it is hypothesized that creatine and insulin together may play a positive role from implantation to birth, while creatine given at certain stages of organogenesis delayed development of the foetus.

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TABLE OF CONTENTS

	Page
DECLARATION	ii
DEDICATION	iii
ABSTRACT	iv
ACKNOWLEDGEMENTS	v
TABLE OF CONTENTS	vi
LIST OF FIGURES	x
LIST OF TABLES	xiii
1.0 INTRODUCTION	1
2.0 SYNTHESIS AND METABOLIC FUNCTION OF CREATINE	4
2.1 Endogenous synthesis	4
2.2 Main production sites and transport of creatine in the body	5
2.3 Placental crossing of creatine	7
2.4 Metabolic functions	8
3.0 EFFECTS OF CREATINE SUPPLEMENTATION ON BODY MASS AND COMPOSITION	9
4.0 REPORTED SIDE EFFECTS	10
5.0 MEDICAL USES OF CREATINE	11
5.1 Heart disease	11
5.2 Tumour growth inhibition	12
5.3 Creatine synthesis deficiencies	13
6.0 AIM OF STUDY	13

7.0 MATERIALS AND METHODS 14
7.1 Rationale for the use of Sprague-Dawley rats 14
7.2 Rat breeding and maintenance 15
7.3 Determination of pregnancy 15
7.4 Experimental groups 16
7.5 Dosage of creatine 17
7.5.1 Rationale for the dosages used 18
7.5.2 Route of administration 19
7.5.3 Organogenesis on selected days of rat embryo/foetus development with particular reference to specific organs and structures 20
7.6 Sacrificing of animals 20
7.7 Collection and processing of foetuses 20
7.7.1 Preparation of foetuses for light microscopy 21
7.7.2 Skeletal staining using Alizarin red S and Alcian Blue 23
7.7.3 Immunocytochemistry (ICC) 23
7.7.3.1 Immunocytochemical controls 26
7.8 Statistical methodology 26
7.9 Photography 27

8.0 RESULTS 28
8.1 General 28
8.2 Surviving foetuses vs. absorbed foetuses 28
8.3 Subcutaneous haemorrhaging and underdevelopment of foetuses 29
8.4 Macroscopic abnormalities in groups A and B 30
8.4.1 Control group A 30
8.4.2 Experimental group A1 31
8.4.3 Experimental group A2 31
8.4.4 Control group B 32
8.4.5 Experimental group B1 32
8.4.6 Experimental group B2 33

8.5 Statistical analysis 33
8.5.1 Weight and length averages 33
8.5.2 Length statistics 34
8.5.3 Weight statistics 35
8.6 Histological study of particular organs 36
8.6.1 Kidney 36
8.6.2 Skeletal muscle 37
8.6.3 Pancreas 38
8.6.4 Liver 39
8.7 Skeletal development 40
8.7.1 Desmocranium of the rat foetus 40
8.7.2 Cartilage development in the nose 41
8.7.3 Presence and/or absence of cartilage 42
8.7.4 Vertebrae 43
8.7.5 Rudimentary ribs 44

9.0 DISCUSSION 62
9.1 Statistical analysis of length and weight of foetuses from the different control and experimental groups 62
9.1.1 Length 62
9.1.2 Weight 65
9.2 Surviving vs. absorbed embryos 69
9.3 Macroscopic abnormalities 72
9.3.1 Subcutaneous haemorrhaging 72
9.3.2 Underdeveloped foetuses 76
9.4 The effect of creatine on histological structures 77
9.4.1 Kidneys 77
9.4.2 Skeletal muscle 78
9.4.3 Pancreas 79
9.4.4 Liver 81

9.5 Skeletal development 82

10.0 CONCLUSION 87

11.0 REFERENCES 89

APPENDIX A 100
APPENDIX B 105
APPENDIX C 111
APPENDIX D 112
APPENDIX E 116

LIST OF FIGURES

Figure	Page
1. Biosynthesis of creatine	5
2. Number of surviving foetuses vs. absorbed foetuses in control and experimental groups	29
3. Control foetus (group A) displaying no subcutaneous haemorrhaging. Discolouration in abdominal region is due to normal development of the liver. Experimental foetus (group A2) displays haematoma covering most of the body	45
4 Subcutaneous haemorrhaging in percentage of foetuses from control and experimental groups	30
5. Excessive haemorrhaging in the cranial region of embryo from experimental group B1	45
6. Crystal-like structures spread over dorsum and abdomen of foetus in control group A	45
7. Subcutaneous haemorrhaging in temporal region of foetus from experimental group A1	46
8. Comparison of subcutaneous haemorrhaging between foetuses from control group A and experimental group A2	46
9. Abnormal subcutaneous haemorrhaging in cranial region of foetus from experimental group A2	46
10. Crystal-like structures inside abdomen of foetus in A2 exp. group	46
11. Comparison of foetuses from control group B vs. experimental group B1	46
12. Abdominal and temporal subcutaneous haemorrhaging in foetus from experimental group B1	46
13. Underdeveloped foetus from experimental group B1 compared to foetus from control group at the same age	47
14. Absence of temporal artery in foetus from experimental group B2	47

15. Average weight of foetuses in experimental groups 34
16. Average length of foetuses in experimental groups 34
17a. Representative section of cortex and medulla of kidney from a foetus in control group A 47
17b. Representative section of kidney from foetus in exp. group A2 48
18. Representative section of skeletal muscle (control group A) 48
19. Representative section of skeletal muscle (control group B) 48
20. Representative section of skeletal muscle (exp. group A1) 49
21. Representative section of skeletal muscle (exp. group A2) 49
22. Representative section of skeletal muscle (exp. group B1) 50
23. Representative section of skeletal muscle (exp. group B2) 50
24. Representative section of pancreas from foetus in control group displaying absorption control 51
25. Representative section of pancreas (negative control) from foetus in control group A 51
26. Section of pancreas from adult female rat that was used as positive control 52
27. Section of pancreas from foetus in control group A showing immuno-localization of ?-cells 52
28. Immunolocalization of ? cells from section of pancreas (foetus) in control group A 52
29. ? cell localization in pancreas of foetus from e xperimental group A2 53
30. ? cell localization in pancreas of foetus from experimental group A2 53
31. ?-cell localization in pancreas of foetus from experimental group A2 (lower magnification) 53
32. ? cell localization in pancreas of foetus from experimental group B1 54
33. ? cell localization in pancreas of foetus from experimental group B1 54
34. ? cell localization in pancreas of foetus from experimental group B2 54
35. ? cell localization in pancreas of foetus from experimental group B2 54
36. Representative section of liver (control group A) 55
37. Representative section of liver (experimental group A1) 55

38. Representative section of liver (experimental group A2) 55
39. Representative section of liver (experimental group B1) 56
40. Representative section of liver (experimental group B2) 56
41. Foetus from control group that displays typical less well developed desmocranium 57
42. Foetus from experimental group displaying well developed desmo-cranium 57
43. Foetus displaying immature bone development from experimental group B1 57
44. Foetus from A2 experimental group displaying prominent presence of cartilage in the ribs 58
45. Foetus from control group A displaying no cartilage 58
46. Dorsal view of vertebral column of foetus in experimental group A2: (vertebral pedicles almost fused) 59
47. Dorsal view of vertebral column of foetus in control group A: (vertebral pedicles widely separated) 59
48. Osteogenic cell clusters developing at T14 level 60
49. Foetus from A1 experimental group A1 developing rudimentary rib (right) and extra rib (left) 60
50. Foetus from A1 experimental group displaying derangement of ribs 61

LIST OF TABLES

Table **Page**

1. Groups in each column that were not statistically significant or were statistically significantly different pertaining to length 35
2. Groups in each column that were not statistically significant or were statistically significantly different pertaining to weight 36
3. Summary of bone and cartilage development in control and experimental foetuses 42