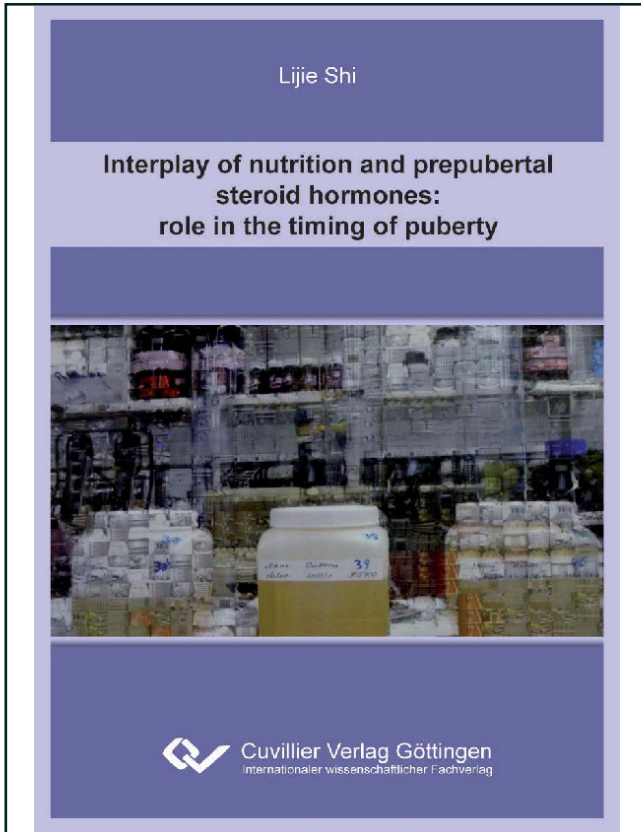




Lijie Shi (Autor)

Interplay of nutrition and prepubertal steroid hormones: role in the timing of puberty



<https://cuvillier.de/de/shop/publications/579>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany

Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

Table of contents

LIST OF TABLES AND FIGURES	I
LIST OF ABBREVIATIONS	III
1. INTRODUCTION	1
2. THEORETICAL BACKGROUND	3
2.1 Adrenocortical hormones	3
2.1.1 Biosynthesis.....	3
2.1.2 Development during growth	5
2.1.3 Abnormal adrenal androgen secretion	5
2.1.4 Regulation of adrenal androgen secretion	6
2.1.5 Dietary factors and adrenal androgen secretion.....	8
2.1.6 Metabolism of adrenocortical hormones	8
2.2 Estrogens and testosterone in children	10
2.3 Methodological considerations – measurement and assessment of steroid hormones	12
2.3.1 Assessment of urinary glucocorticoids and adrenal androgens	12
2.3.2 Measurement challenge of estrogen determination in prepubertal children.....	12
2.3.2 Renal handling of steroid hormone metabolites	13
2.4 Puberty	14
2.4.1 Definition of pubertal timing.....	14
2.4.2 Hypothalamic signals and pubertal onset.....	16
2.4.3 Nutritional status and pubertal onset.....	17
2.4.4 Peripheral signals and pubertal onset	18
3. RESEARCH QUESTIONS	20
4. GENERAL METHODOLOGY	22
4.1 Study population and design	22
4.1.1 Population and design of the DONALD Study.....	22
4.1.2 DONALD subpopulations of the current thesis.....	23

4.2 Dietary assessment	24
4.3 Anthropometric assessment.....	24
4.4 Pubertal stage assessment.....	25
4.4.1 Somatic growth-related pubertal markers – ATO and APHV	25
4.4.2 Sexual maturation-related pubertal markers – Tanner stages and Menarche/voice break.....	26
4.5 Urinary measurements	27
4.5.1 24-h urine samples.....	27
4.5.2 Short description of glucocorticoid, adrenal androgen, and estrogen measurements	27
4.5.3 Influence of storage duration.....	29
4.6 Parental information and children’s birth data.....	29
4.7 Statistical analyses	30
4.8 Preliminary methodological work – Urine volume dependency of renally excreted glucocorticoid and adrenal androgen metabolites in healthy children.....	32
4.8.1 Summary.....	32
4.8.2 Introduction	32
4.8.3 Methods	33
4.8.4 Results	34
4.8.5 Discussion.....	36
5. STUDIES.....	40
5.1 Study I – Body fat and animal protein intake in addition to steroidogenic enzymes affect adrenarchal androgen secretion.....	40
5.1.1 Summary.....	40
5.1.2 Introduction	40
5.1.3 Methods	41
5.1.4 Results	44
5.1.5 Discussion.....	49
5.2 Study II – Prepubertal adrenarchal androgens and animal protein intake independently and differentially influence pubertal timing..	52
5.2.1 Summary.....	52
5.2.2 Introduction	52

5.2.3 Methods	54
5.2.4 Results	56
5.2.5 Discussion.....	63
5.3 Study III – Prepubertal glucocorticoid status and pubertal timing	65
5.3.1 Summary	65
5.3.2 Introduction	66
5.3.3 Methods	67
5.3.4 Results	68
5.3.5 Discussion.....	72
5.4 Study IV – Prepubertal urinary estrogen excretion and its relationship with pubertal timing	75
5.4.1 Summary	75
5.4.2 Introduction	76
5.4.3 Methods	76
5.4.4 Results	79
5.4.5 Discussion.....	85
5.5 Summarized results of Studies II-IV	88
6. GENERAL DISCUSSION.....	90
6.1 Methodological strengths and limitations	90
6.2 Interpretation and implication of study results	93
6.2.1 Nutritional status and adrenarche	93
6.2.2 Prepubertal steroid hormones and pubertal timing.....	95
6.3 Conclusions and Perspectives	97
7. REFERENCES	99

LIST OF PUBLICATIONS AND PRESENTATIONS

DANKSAGUNG