

Contents

PREFACE	5
LIST OF PAPERS	6
LIST OF ABBREVIATIONS	7
SUMMARY	8
DANSK SAMMENDRAG (SUMMARY IN DANISH)	10
1. BACKGROUND	12
1.1 Growth and body composition in childhood	12
1.1.1 Growth phases.....	12
1.1.2 Sex differences in growth and pubertal development	13
1.1.3 Dietary intake, growth and body composition in childhood.	15
1.2 Hormones potentially influencing on growth and body composition in childhood	16
1.2.1 Insulin-like growth factor I	16
1.2.2 Leptin	16
1.2.3 Ghrelin	17
1.2.4 Insulin	18
1.2.5 Adiponectin.....	19
1.2.6 Osteocalcin.....	19
1.2.7 Parathyroid hormone.....	19
1.3 Assessing body composition, bone size and bone mass in childhood	20
1.3.1 Dual-energy X-ray absorptiometry	20
1.3.2 Body composition	21
1.3.3 Bone size and bone mineralization	22
1.4 Seasonal variations in growth	23
1.5 Dietary school meal interventions, growth and body composition	23
1.6 Related results from OPUS School Meal Study	24
2. RESEARCH QUESTIONS	29
3. METHODOLOGY	30
3.1 Study design	30
3.2 Recruitment	31

3.3 Dietary intervention.....	32
3.4 Clinical examinations	33
3.4.1 Simple anthropometry.....	33
3.4.2 Body composition and fat distribution.....	33
3.4.3 Blood sampling.....	35
3.5 Background information, physical activity and diet.....	35
3.6 Statistical methods.....	36
4. RESULTS (PAPERS I-IV)	37
Paper I.....	41
Paper II.....	57
Paper III.....	81
Paper IV.....	109
5. DISCUSSION	127
5.1 Paper I.....	127
5.2 Paper II+III.....	131
5.3 Paper IV.....	134
5.4 General discussion.....	137
6. CONCLUSIONS	139
7. PERSPECTIVES	141
8. ACKNOWLEDGEMENTS	143
9. OTHER PUBLICATIONS IN THE PHD PERIOD	144
10. REFERENCES	147
11 APPENDIX A. STUDY DESIGN PAPER.....
12 APPENDIX B. MEASURES OF ANDROID FAT MASS.....
13 APPENDIX C. ADDITIONAL RESULTS TO PAPER II.....
14 APPENDIX D. ADDITIONAL RESULTS TO PAPER III.....