[OR15-5] ⊗ Contributions by the CAG-Repeat Polymorphism of the Androgen Receptor Gene and Circulating Androgens to Muscle Size. Odense Androgen Study – A Population-Based Study of 20-29 Year-Old Danish Men.

Torben L Nielsen, Claus Hagen, Kristian Wraae, Lise Bathum, Rasmus Larsen, Egil Haug, Kim Brixen, Marianne Andersen, Dept of Endocrinology, Odense Univ Hosp & Univ of Southern Denmark, Odense, Denmark; Dept of Biochem, Pharmacol, & Genet, Odense Univ Hosp & Univ of Southern Denmark, Odense, Denmark; Inst of Math Modelling, Tech Univ of Denmark, Lyngby, Copenhagen, Denmark; The Hormone Lab, Aker Univ, Oslo, Norway

Context: The number of CAG-repeats within the CAG-repeat polymorphism of the androgen receptor gene is inversely correlated with the transcriptional activity of the receptor.
Objective: To study the effect of the CAG-repeat number and circulating androgens on muscle size, to examine the CAG-repeat number in relation to total fat mass and circulating androgens, and to identify the best hormonal marker of low muscle size amongst total testosterone, bioavailable testosterone, and dihydrotestosterone.
Design, Setting, and Participants: Population-based study of 783 Danish men aged 20-29 years, who matched the background population regarding body mass index, chronic disease, medication, physical activity, smoking, and an array of sociological and demographic parameters. Genotyping was performed in 767 men, whole body DXA in 783 men, and MRI in 406 consecutively included men.
Main Outcome Measures: Six continuous outcomes (thigh and axial muscle area, lower extremity, upper extremity, and trunk lean body mass, and total fat mass) and five binary outcomes of low muscle size defined as men with muscle size below the lower 10 percentile of each continuous outcome of muscle size.
Results: The CAG-repeat number correlated inversely with thigh and axial muscle area and with lower and upper extremity lean body mass. Except for upper extremity lean body mass, these findings remained significant in multivariate analyses controlling for circulating androgens, physical activity, smoking, alcohol intake, chronic disease, and age. The CAG-repeat number correlated positively with total fat mass adjusted for weight, but not with the concentration of any of the circulating androgens. Total testosterone and dihydrotestosterone correlated positively with all outcomes of muscle size. The prevalence of low muscle size increased exponentially with decreasing androgen levels and was tripled at total testosterone levels <12.5 nmol/l (the lower reference limit for total testosterone in 615 healthy, non-obese men of this cohort).
Conclusion: The CAG-repeat polymorphism affects body composition in young men, independently of circulating androgens and the covariates: Fewer repeats are related with increased muscle size and reduced total fat mass. The polymorphism does not affect androgen levels. Both total testosterone and dihydrotestosterone correlate with muscle size in a linear concentration-response relationship. Total testosterone is the best biomarker of low muscle size in young men.

Supported by World Anti-Doping Agency; Novo Nordisk; Pfizer; The Danish Ministry of Culture; University of Southern Denmark; Odense University Hospital.

Date: Sunday, June 3, 2007

Session Info: ORAL SESSION: BENCH TO BEDSIDE - Endocrine Genetics: Of Mice & Men (1:15 PM - 2:30 PM)

Presentation Time: 1:15 PM

Room: 716A/B

Close Window