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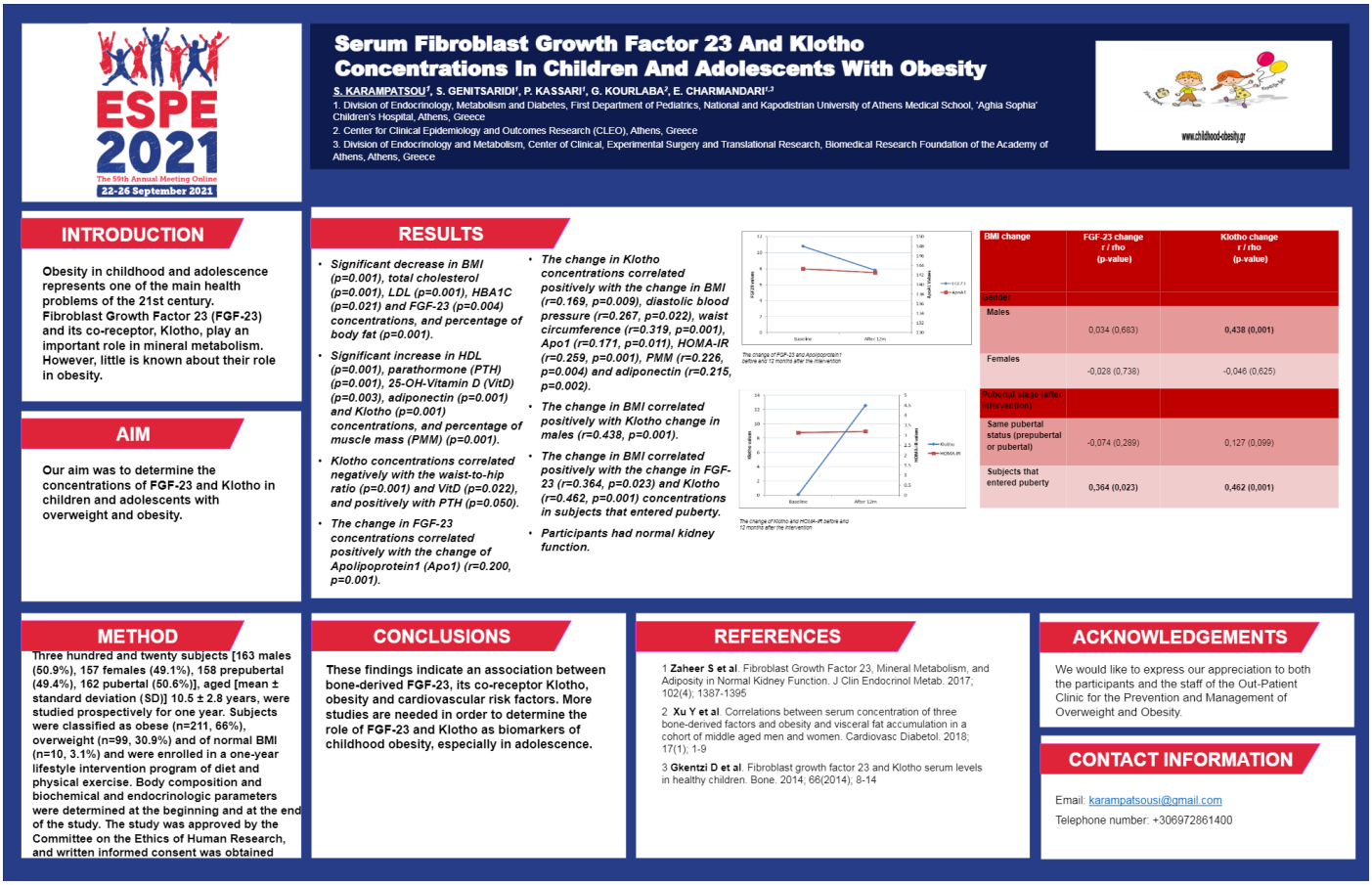
Serum Fibroblast Growth Factor 23 and Klotho concentrations in children and adolescents with obesity.

Sofia-Iliada Karampatsou [1], Sofia-Maria Genitsaridi [1], Penio Kassari [1], Georgia Kourlaba [2] & Evangelia Charmandari [1,3]



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Background: Obesity in childhood and adolescence represents one of the main health problems of the 21st century. Fibroblast Growth Factor 23 (FGF-23) and its co-receptor, Klotho, play an important role in mineral metabolism, however, little is known about their role in obesity.

Objective and Hypothesis: To determine the concentrations of FGF-23 and Klotho in children and adolescents with overweight and obesity.

Methods: Three hundred and twenty subjects [163 males (50.9%), 157 females (49.1%), 158 prepubertal (49.4%), 162 pubertal (50.6%)], aged [mean ± standard deviation (SD)] 10.5 ± 2.8 years, were studied prospectively for one year. Subjects were classified as obese (n = 211, 66%), overweight (n = 99, 30.9%) and of normal BMI (n = 10, 3.1%) and were enrolled in a one-year lifestyle intervention program of diet and physical exercise. Body composition and biochemical and endocrinologic parameters were determined at the beginning and at the end of the study. The study was approved by the Committee on the Ethics of Human Research, and written informed consent was obtained by all parents.

Results: Following one year of implementation of the lifestyle intervention program, there was a significant decrease in BMI (P = 0.001), total cholesterol (P = 0.001), low-density-lipoprotein (LDL) (P = 0.001), HBA1C (P = 0.021) and FGF-23 (P = 0.004) concentrations, and percentage of body fat (P = 0.001). In addition, there was a significant increase in high-density-lipoprotein (HDL) (P = 0.001), parathormone (PTH) (P = 0.001), 25-OH-Vitamin D (VitD) (P = 0.003), adiponectin (P = 0.001) and Klotho (P = 0.001) concentrations, and percentage of muscle mass (PMM) (P = 0.001). Klotho concentrations correlated negatively with the waist-to-hip ratio (P = 0.001) and VitD (P = 0.022), and positively with PTH (P = 0.050). The change in FGF-23 concentrations correlated positively with the change of Apolipoprotein1 (Apo1) (r = 0.200, P = 0.001), while the change in Klotho concentrations correlated positively with the change in BMI (r = 0.169, P = 0.009), diastolic blood pressure (r = 0.267, P = 0.022), waist circumference (r = 0.319, P = 0.001), Apo1 (r = 0.171, P = 0.011), HOMA-IR (r = 0.259, P = 0.001), PMM (r = 0.226, P = 0.004) and adiponectin (r = 0.215, P = 0.002). Finally, the change in BMI correlated positively with the change in FGF-23 (r = 0.364, P = 0.023) and Klotho (r = 0.462, P = 0.001) concentrations in subjects that entered puberty, while the change in BMI correlated positively with Klotho change in males (r = 0.438, P = 0.001). Participants had normal kidney function [(mean value ± SD), Urea: 29.1 ± 6.3 mg/dL; Creatinine: 0.5 ± 0.1mg/dL].

Conclusion: These findings indicate an association between bone-derived FGF-23, its co-receptor Klotho, obesity and cardiovascular risk factors. More studies are needed in order to determine the role of FGF-23 and Klotho as biomarkers of childhood obesity, especially in adolescence.