

Searching for morphological traits, which reflect human biological condition is one of the main research topics in evolutionary biology studies. Such traits, expected to reflect health and fertility, are important in attractiveness rating and mate choice. Undoubtedly one of such markers is body adiposity. The studies, investigating the role of fat tissue amount and distribution, as markers of an individual's biological condition, in order to estimate body adiposity usually employ simple anthropometric measurements and estimators, such as body mass index (BMI), waist to hip ratio (WHR), or waist circumference. However, measuring total body adiposity, does not allow to differentiate the amount of visceral (VAT) and subcutaneous adipose tissue (SAT) accumulated in the abdominal region. Many medical research showed that those two types of fat tissue differ tremendously in terms of morphology and functions, and visceral tissue has much greater impact on an individual's health. This strong, negative relationship between VAT activity and health suggests that the VAT amount may be strongly related to an individual's biological condition. Research show various, and sometimes contradictory, results on the relationship between reproductive hormone level and immunity. This may be explained by the fact that those type of research focus on the total amount of body fat, without VAT and SAT distinction. Additionally, it is important to remember that, co called biological condition, is a resultant of body resource (e.g. available energy) investment in reproduction, immune functions and maintaining the metabolic balance (which can be measured with the level of oxidative stress) and thus should be measured integrally. Most of the previous studies focus correlation between only one aspect of a biological condition (e.g. fertility), what, according to some evolutionary hypotheses, neglects the possible higher resource allocation in one aspect of biological condition, at the cost of limiting the allocation in the other. Thus, in order to reliably evaluate a woman's biological condition, a resultant of fertility, immunity, and the ability to maintain systemic homeostasis, those three crucial functions will be analysed altogether and will be correlated with VAT amount. The effective resource allocation among fertility and immunity, accompanied by maintaining systemic balance, may be especially easy to observe when some energetic burden is imposed (e.g. infection, stress). Thus the second goal of the study is to test if the influence of vaccination on an individual differs, in dependence of VAT amount. Also, we will test if and carrier-state of latent forms of some pathogens, may influence one's health in a different way in dependence of visceral fat amount in women of a normal body weight.

Subjects: Study will be conducted in 200 healthy women aged 25-35 years, with normal weight but different VAT value, measured carefully using bioimpedance. In order to calculate the other measures of fatness (BMI, WHR, abdominal circumference), anthropological measurements will be taken. To asses immunological potential, post-vaccine response to tetanus vaccine will be measured. Female fertility will be assessed based on sex hormones levels. Oxidative stress markers will be used to assess homeostasis. Moreover, morphological blood tests will be conducted, including markers of liver and thyroid function, as well as glucose, insulin and cholesterol level.

A lot of biological, medical and epidemiological research show that the relationships between commonly used measures of body fat quantity (such as BMI, WHR or abdominal circumference) with female immunity and fertility are inconsistent. This suggests that above-mentioned measures are not enough to assess individual's condition. However, a lot of studies shows that fatness is one of the crucial features affecting health and fertility since both deficit and excess of body fat have negative consequences for functioning. Moreover, quantity and distribution of body fat affect assessment of female body attractiveness. According to medical data, visceral fat tissue is supposed to be a main factor affecting health negatively. We assume that above-mentioned inconsistency may result from different proportions between visceral and subcutaneous fat tissue. Thus, women with the same WHR value but different proportion of these two kinds of fat tissue may be characterized by different sex hormones levels, different immunological potential or different oxidative stress levels. Moreover, individual's biological condition has to be analyzed comprehensively, considering all its elements, only such methodology will allow to find reliable indicator of biological condition.