

**Radek Kucera, Ph.D. Associate Professor**

**Biography (max 150 words; structure recommendations: the highest education level, professional focus, awards received, number of articles, citations, H-index)**

Radek Kucera graduated from Charles University, Faculty of Pharmacy in Hradec Kralove in 1991 with the dissertation on the topic “Determination of digoxin using radioimmunoanalytic methods”. He took a Ph.D. degree in 2011 at Charles University, Faculty of Medicine in Pilsen with the doctoral thesis: “Insuline like and other growth factors and tumors”. In January 2017 he finalized and defended his habilitation work on the topic “Insulin like growth factor I in theory and clinical practice” and took the degree of associate professor. Nowadays, he works as a vice head of the Department of Immunochemistry Diagnostics and teaches biochemistry at the Faculty of Medicine in Pilsen. He participates in research regarding hormones, growth factors and tumor markers. He is an author of more than 60 articles in medical journals with more than 190 citations in available literature, H-index 9.



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**Title**

Reference ranges of IGF-1, an example how to establish reference ranges of age and gender dependent biomarker

**Authors (Underline the main author, superscript after author name, superscript before workplace name)**

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**Abstract (max 250 words)**

IGF1 is responsible for regulation of growth, metabolism, and differentiation of human cells. IGFBP3 is the most abundant of the carrier proteins for IGF1 in the blood. IGF1/IGFBP3 molar ratio is an indicator of IGF1 bioavailability. We decided to create a file of reference ranges of IGF1, IGFBP3 and IGF1/IGFBP3 ratio for the adult Czech population across the age spectrum. We selected a group of 1022 healthy subjects, 467 males and 555 females (ages 20–98 years) from several regions in the Czech Republic. Serum levels of IGF1 and IGFBP3 were measured and the IGF1/IGFBP3 ratio was calculated. Subjects were divided into seven age-groups. Changes in the levels of observed analytes in each decade across the age spectrum were evaluated. All three parameters decreased in parallel with decrease in age:  $p < 0.0001$ ,  $r = -0.64$ ,  $-0.35$  and  $-0.54$ , respectively. The dynamics of the decline was different between males and females. Linear regression models with age as independent variable fitted by gender were tested. Non-parametric reference interval curves (medians and 2.5<sup>th</sup>–97.5<sup>th</sup> percentiles) as function of age by gender were also tested. Linear regression models seem to be the more robust model as non-parametric approach. In conclusion, authors recommend using of a linear regression model based on reference values for IGF1, IGFBP3 and IGF1/IGFBP3 ratio and using of different reference ranges for age and genders.