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Associations of single nucleotide polymorphisms IGF1.rs7956547, GNRH2.rs3761243 and FGFR3.rs6599400 with bone tumors in Russian population

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Objectives: Bone tumors are a rather rare, but difficult in diagnostics and treatment group of oncological diseases. This investigation continues our earlier study of associations of single nucleotide polymorphisms revealed by osteosarcoma group [Mirabello et al., BMC Cancer 11:209, 2011] with bone tumors in Russian population [Naumov et al., Bull Exp Biol Med. 53(6), 2012]. The aim of present study was to detect meaningful changes in genes that are responsible for bone growth and development: insulin-like growth factor 1 (IGF1) gene, growth hormone 1 (GH1) gene, gonadotropin-releasing hormone 2 (GNRH2) gene, fibroblast growth factor 2 (FGF2) gene, fibroblast growth factor receptor 3 (FGFR3) gene, p53 binding protein homolog (MDM2) gene.
Methods: 119 patients with various bone neoplasms (osteogenic sarcoma 43, Ewing Sarcoma - 6, chondrosarcoma - 40, malignant fibrous histiocytoma - 2, fibrosarcoma - 1, bone lymphoma - 1, chordoma - 1, giant cell bone tumor 25) undergoing examination and treatment in the department of General Oncology of the Russian N.N. Blokhin Cancer Research Center were included in this study. The control group comprised 93 people without oncological diseases. Genomic DNA was extracted from leukocyte fraction of peripheral blood. The determination of polymorphisms alleles rs7921(GH1), rs7956547(IGF1), rs3761243(GNRH2), rs11737764(FGF2), rs6599400(FGFR3), rs1690916(MDM2) was performed during the reaction of mini-sequencing with following mass-spectrometry measuring of reaction products in time-of-flight mass-spectrometer AutoFlex-III (MALDI-TOF).
Results: 3 of 6 polymorphisms showed significant associations with bone neoplasms: IGF1.rs7956547 (risk allele T, OR = 3,28[1,42-7,54], p=0,003), GNRH2.rs3761243 (protective allele C, OR = 0,54[0,3-0,99], p=0,04), FGFR3.rs6599400 (rick allele A, OR = 2,15[1,06-4,34, p=0,03].
Conclusions: The studied polymorphysms are located in genes which products are responsible for growth and formation of bone, and they also are involved in tumor progression. It allows to suggest that these polymorphisms might be involved not only in the development of octeosarcoma, but also in the origin of bone tumors as a whole. Our results confirm our recent data on a larger group of patients and detect new significant associations.

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