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**Difference in RANKL serum levels is potential marker of Charcot's arthropathy.** Bruhn-Olszewska B.<sup>1</sup>, Korzon-Burakowska A.<sup>2</sup>, Jakóbkiewicz-Banecka J.<sup>1</sup>, Węgrzyn G.<sup>1</sup> <sup>1</sup>Department of Molecular Biology, University of Gdańsk, Gdańsk, Poland, <sup>2</sup>Department of Diabetology and Hypertension, Medical University of Gdańsk, Gdańsk, Poland

**Introduction:** Neuropathy is one of the most serious complications of Diabetes. One of the symptoms is the development of the insensitive foot, what increases the risk of ulceration. Disease known as Charcot's arthropathy (or Charcot's Neuroarthropathy - CN) is a major complication of diabetes and may occur in every third patient with diabetic neuropathy. Recent research has demonstrated that disorders of function of OPG/RANKL/RANK axis in osteoporosis. Importance of these cytokines in bone development and homeostasis prompted us to analyze their role in Charcot's arthropathy. Our previous analysis of the OPG gene polymorphisms revealed their association with increased risk of CN. Here we report additional analysis of RANKL and RANK genes polymorphisms, together with determination of RANKL protein levels in blood serum. **Methods:** Our study was performed on a group of 237 individuals from Poland, with 34 patients suffering only from diabetes without neuropathy, 44 were diagnosed with neuropathy and 64 suffered from acute Charcot's arthropathy. Peripheral blood samples from patients were used for biochemical analysis (ELISA) and DNA extraction. We have analyzed single nucleotide polymorphisms (SNPs) occurrence in RANK/RANKL genes in patients suffering from Charcot's arthropathy and diabetes using RFLP and minisequencing. We have focused on two polymorphisms in RANK gene (rs35211496 C/T and rs1805034 C/T) and three polymorphisms in RANKL gene (rs9525641 C/T, rs9533156 C/T and rs9533155 G/C), all of them were previously associated with bone disorders. RANKL protein concentration in the blood serum was determined with ELISA. **Results:** Our analysis showed no significant correlation between studied RANKL gene polymorphisms. However, biochemical analysis showed increased levels of RANKL protein in blood serum in patients with Neuropathy but not in patients with Charcot's arthropathy. Interestingly analysis of OPG serum levels showed increased levels of the protein in both groups. Therefore decreased level of RANKL accompanied by increased level of OPG in blood serum, might be important marker of Charcot's arthropathy. Although studied polymorphisms were located in the promoter region of RANKL gene, we cannot exclude possible changes in gene expression levels at this stage. **Conclusion:** Analysis of OPG and RANKL serum levels can possibly be used in diagnosis of Charcot's arthropathy. Lack of genetic markers justifies further analysis in this direction.