МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ
КАФЕДРА ІНОЗЕМНИХ МОВ
ЛІНГВІСТИЧНИЙ НАВЧАЛЬНО-МЕТОДИЧНИЙ ЦЕНТР

МАТЕРІАЛИ
X ВСЕУКРАЇНСЬКОЇ НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ СТУДЕНТІВ, АСПІРАНТІВ ТА ВИКЛАДАЧІВ ЛІНГВІСТИЧНОГО НАВЧАЛЬНО-МЕТОДИЧНОГО ЦЕНТРУ КАФЕДРИ ІНОЗЕМНИХ МОВ

"WITH FOREIGN LANGUAGES TO MUTUAL UNDERSTANDING, BETTER TECHNOLOGIES AND ECOLOGICALLY SAFER ENVIRONMENT"

(Суми, 24 березня 2016 року)
The tenth all Ukrainian scientific practical student`s, postgraduate's and teacher's conference

The following method of studying the homogeneity of pathological biomineral can help to determine the mechanism of depositing of calcificates in the walls of vessels, and that will be a step forward to finding an effective method of diagnosis and treatment of vascular calcification

SINGLE NUCLEOTIDE POLYMORPHISM DETERMINATION BY PCR METHOD IN ORDER TO OPTIMIZE THE DOSING OF ORAL ANTICOAGULANTS

Ye.A. Garbuzova – Sumy State University, group LS-404
N.G. Horobchenko – EL Adviser

The polymerase chain reaction (PCR) is a technology in molecular biology used to amplify a single copy or a few copies of a piece of DNA across several orders of magnitude, generating thousands to millions of copies of a particular DNA sequence. Nowadays scientists widely use PCR method to identify single nucleotide polymorphisms (SNP). SNP is a variation in a single nucleotide that occurs at a specific position in the genome, where each variation is present to some appreciable degree within a population. Such variations may fall within coding sequences of genes, non-coding regions of genes, or in the intergenic regions, and in this way they may influence the qualitative or quantitative characteristics of the mature proteins. SNPs in the DNA sequences of humans can affect how humans develop diseases and respond to pathogens, chemicals, drugs, vaccines, and other agents. SNPs are also critical for personalized medicine.

Each year, millions of people take warfarin and other coumarins, which together form the group of oral anticoagulants. Although these vitamin K antagonists are remarkably effective at preventing cardioembolic stroke, myocardial infarction, and venous thrombosis, they double the incidence of hemorrhage. The hemorrhage risk is greatest during the first weeks to months of therapy. To reduce this risk, experts advocate prescribing the anticipated therapeutic dose to patients who are beginning warfarin, but until now there was no accurate way to estimate that dose. By using pharmacogenetics-based warfarin therapy, clinicians can now

estimate the therapeutic warfarin dose by genotyping their patients for single nucleotide polymorphisms that affect warfarin metabolism or sensitivity. The objective of pharmacogenetics-based coumarin therapy is to improve the safety and the effectiveness of anticoagulant therapy.

The main place among the many genes that are related to the action and metabolism of oral anticoagulants takes vitamin K epoxide reductase complex subunit 1 (VKORC1), which is the molecular target of coumarin-based anticoagulants. VKORC1 is a key enzyme in recycling reduced vitamin K, plays an essential role in post-translational modification and activation of vitamin K-dependent coagulation factors. Since the cloning of VKORC1 in 2004, frequent VKORC1 single nucleotide polymorphisms and haplotypes have been consistently associated with warfarin dose required to therapeutic anticoagulation. Specifically, 5 SNPs define 2 major haplotypes in Europeans rs719616114 (T381C); rs9923231 (G-1639A); rs9934438 (C1173T); rs8050894 (G1542C) and rs2359612 (C 2255T). Haplotype A carrying the minor alleles was associated with lower mRNA expression and lower warfarin maintenance dose, compared with the major allele haplotype B. The mean therapeutic doses of warfarin per day differed significantly based on SNPs (and its corresponding haplotype): 2.7-3.4 mg for haplotype A/A, 4.3-4.9 mg for genotype haplotype A/B, and 6.0-6.2 day for haplotype B/B.

Thus, the introduction of the determination of single nucleotide polymorphism of vitamin K epoxide reductase complex subunit 1 by polymerase chain reaction into the routine practice will optimize the selection of a dose of oral anticoagulants for patients who need it, and will significantly increase the effectiveness of treatment and reduce the risk of bleeding complications.