Міністерство освіти і науки України
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ТДВ «ІНТЕРХІМ»

Сучасна фармація: реалії сьогодення та перспективи розвитку

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ОНУ
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tial complications of natural products, clinicians should explicitly elicit and document a history of natural product use by patients. In this article, we reviewed possible effects of natural products on coagulation and platelet function. Pharmacodynamic and pharmacokinetic information of commonly used herbal medicine and dietary supplements, and their interactions with anticoagulant medications were discussed. It is important for physicians and health care professionals to stay informed about commonly used natural products and their potential adverse effects, including those on coagulation and platelet function.

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WHAT GENES ARE ESSENTIAL TO BE TESTED WHEN PRESCRIBING A CHEMOTHERAPY

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According to a National Cancer Registry of Ukraine (2022) 93,877 people was diagnosed with cancer, with 39,202 deaths, with average of **3,719.42.** 25.1% of people diagnosed with cancer in 2021 lived less than a year. Disease that occurs due to uncontrolled cell growth, spreads to other parts of the body and already killed more than 9,762,000 people all over the world. Hallmarks of cancer and life-threatening alterations are important to be further discussed as they are one of the preventions of spreading this disease. [3, 4] Development and spread throughout the body, possible mechanisms, and strategies of the cruel “killer”. From Normal to Cancer, development of the tissue the most dangerous types of cancer and possible treatment solu-

tions. [4] Efficiency of the chemotherapy is closely related to possible mutations that are individual for every patient and cannot be predicted based on the statistics of any type of cancer. [4]

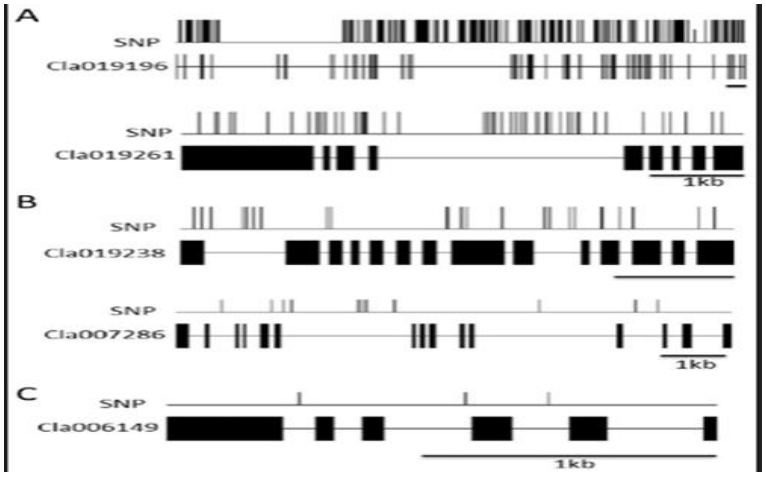

Fig.1. The picture below clearly illustrates the SNPs which helps better understand the term. [13]

Personalised medicine – second chance for those with rare mutations or certain types of diseases. Its merits in terms of improving the healthcare level and patients' outcomes. Scopes and Limitations. Pharmacogenomics aka PGx study about the role of the genome in drug response and analysis of the genetic markers to prevent mis-treatment, reduce toxicity and be able to predict the result after the patient received the treatment. [5] SNPs (Single Nucleotide Polymorphisms) – one amino acid may change the response to a chemotherapy either positively or negatively or does not change at all; however, if it does it may lead to unreturnable consequences or even death because of inefficient treatment and limited time. Drug metabolism and excre-tion are essential in ensuring the decline of the plasma drug concentration over time, drug metabolism aka biotransformation. Drug metabolism involves two classes of reactions: *Phase I Biotransformation, Phase II Biotransformation.* [8, 5].

The most abundant drug metabolizing enzymes are the Cytochrome P450 (CYP450). CYP – genes that encoding cytochrome P450 enzymes are very polymor-phic and multiple *CYP* variants were found to be clinically relevant biomarkers for the guidance of drug selection and dosing. [12] Testing the TPMT might be useful individuals with low thiopurine methyltransferase (TPMT) activity who are at risk for excessive myelosuppression or severe hematopoietic toxicity when taking thiopurine drugs and for those with hyperactive TPMT activity who have therapeutic resistance to thiopurine drugs which than may lead to hepatotoxicity. [9] Facilitated transport has an extremely important role when metabolising drugs in human body. Regulate

entry and exit of physiologically important molecules and they were divided into 2 main groups: Solute Carrier (SLC) transporters for Passive Diffusion and ATP-binding cassette (ABC) transporters for Active Transport. [10]

The first meta-analysis undertaken by (Bu et al., 2016), involved patients with the Arg399Gln mutation in the XRCC1 gene diagnosed with non-small cell lung cancer and treated with cisplatin-based therapy established that specifically the AA (Arg Arg) genotype of XRCC1 had a better overall response to cisplatin chemotherapy. This means that it could be a potential marker for determining the efficiency of treatment with platinum-based therapies. [1] UGT2B7 840A→G is a promotor variant (less protein produced) which causes decreased morphine glucuronidation (Darbari *et al*., 2007) and so morphine persists longer in the body that my lead to unchangeable consequences. There are some possible challenges when performing a genetic testing including cost, lack of specialists in this area, privacy of the patients' data to make necessary predicting for the future and make a database for statistical calculations. [11, 7, 6, 2].

While some genes influence how a patient responds to chemotherapy, there's no single one-size-fits-all genetic test for chemo prescription. Doctors consider many factors alongside any genetic information. The field is constantly evolving as new genes and mutations are discovered. This ongoing research holds promise for identifying more precise biomarkers, potentially leading to more effective and personalized chemotherapy treatments.

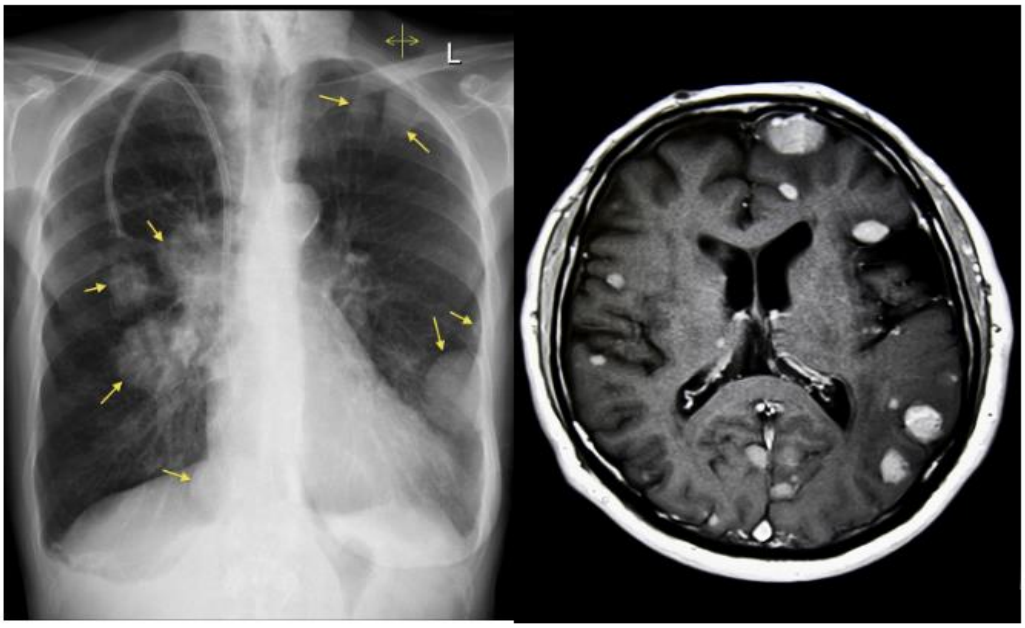

Fig.2. Demonstration of the metastases using MRI in patients diagnosed with lung and brain cancer respectively. Metastases are one of the main hallmarks of cancer. [14, 15]

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