

A SKIN CANCER IMAGING CLIP

When examining moles on the skin for cancer risk, dermatologists most often evaluate them using a dermatoscope, a device with built-in illumination that magnifies the affected area. In particular, they pay attention to the asymmetry of the infiltration, differences in color, or uneven edges. Moreover, dermatologists also try to observe the deeper structures of the infiltration. These measures are important due to the fact that the probability of curing skin cancer depends on the thickness of the tumor. If the size of the infiltration does not exceed 1 mm, a surgical removal of the lesion provides the chance of completely curing the patient. However, the use of a dermatoscope does not allow to precisely measure this thickness and the internal structure of the infiltration. An interesting solution to this problem was proposed by researchers from the University of Silesia in Katowice and the Silesian Medical University. They designed a special clip which provides support in the diagnosis of skin cancer, including malignant melanoma. The method of examination proposed by them is non-invasive and safe even for places affected by lesions. The clip can also be used to monitor the progress of treatment both in hospital and at home. The project's authors are Assoc. Prof. Eng. Robert Koprowski and Prof. Eng. Zygmunt Wróbel from the University of Silesia and DPharm. Sławomir Wilczyński and Professor of Medicine Barbara Błońska-Fajfrowska from the Silesian Medical University in Katowice.

COMPOUNDS FOR ANTI-CANCER THERAPIES

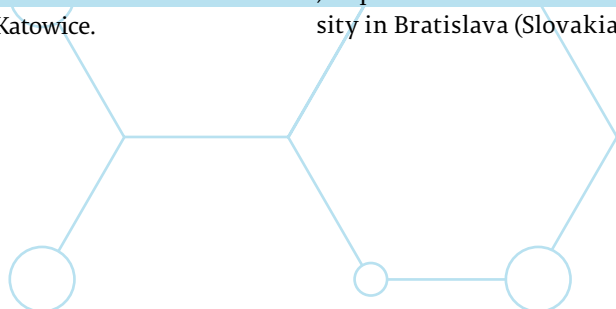
Unsuccessful therapies and undesirable side effects which reduce the effectiveness of drugs and lower the quality of patients' lives are still the biggest challenges faced by the pharmaceutical industry in the search of new active substances used in the pharmacological fight against cancer. Cytostatic drugs are an interesting example of such compounds. However, they are characterized by low selectivity, which means that they are able to damage not only cancer cells, but also healthy ones, which results, among others, in the occurrence of the above-mentioned adverse effects. In addition, some types of cancer are resistant to these substances, and this in turn reduces their applicability. Therefore, researchers developed new derivatives with an integrated naphthalene ring for the production of anticancer agents which would show high selectivity towards normal cells. The patented compounds could be used as active substances especially in drugs effective in the treatment of colorectal cancer, particularly tumors with mutations of the TP53 gene. The authors of the solution are researchers associated with the University of Silesia in Katowice: Assoc. Prof. Anna Mrozek-Wilczkiewicz, Dr. Katarzyna Malarz, Prof. Robert Musioł, MSc. Ewelina Spaczyńska, MSc. Klaudia Krzykała, and Prof. Josef Jampilek from the Comenius University in Bratislava (Slovakia).

FASTER DIAGNOSIS OF ALZHEIMER'S DISEASE

Quinoline derivatives belong to the group of chemical compounds with a particularly broad spectrum of application. Due to their unique properties, they can be used in antimicrobial drugs for the treatment of bacterial and parasitic infections or malaria. They also have anticancer properties. Moreover, they are able to capture metal ions, and can therefore be used in analytical techniques for marking these ions in various materials. Thanks to their fluorescent properties, some of them help to diagnose Alzheimer's disease. In dentistry, quinoline derivatives facilitate the imaging of carious lesions by dyeing them.

Chemists from the Faculty of Science and Technology at the University of Silesia developed a new derivative of para-iminostyrylquinoline and indicated its application. The compound is to be primarily used for the detection of metal ions, especially zinc ions, in human or animal cells. This will allow for a quicker diagnosis of various diseases associated with disturbed cellular levels of this element. Examples of such applications include the diagnosis of Alzheimer's disease or disorders of the immune system as well as studies related to fertility enhancement.

The authors of this invention are: Assoc. Prof. Anna Mrozek-Wilczkiewicz, Dr. Katarzyna Malarz, Prof. Robert Musioł, and Dr. Barbara Czaplńska.



MEMBRANES FOR REMOVING TRACE AMOUNTS OF HEAVY METALS

Researchers from the University of Silesia developed a method to produce special membranes designed primarily to remove trace amounts of heavy metals from aqueous solutions. Moreover, these membranes can be used to mark ions of toxic metals, such as lead, chromium, or arsenic, by spectroscopic methods.

The patented and environmentally friendly membranes are the result of combining the excellent properties of cellulose, a fibrous material, with the advantages of silica. Thus obtained membranes are mechanically and chemically stable and can be used in acidic, neutral, and basic environments depending on the adsorbed ion's type. Appropriate chemical modification of the silica's surface improves its adsorption properties and allows for a selective adsorption of certain ions. The method of obtaining these membranes is quick, simple, and does not require significant funds.

The authors of the invention are chemists associated with the Faculty of Science and Technology at the University of Silesia: Prof. Rafał Sitko and MSc. Ewa Łukojko.

FUNGICIDES AS SAVIORS OF THE WORLD'S CULTURAL HERITAGE

Scientists from the University of Silesia in Katowice developed active substances that can be used to save the most valuable book collections (incunables, manuscripts, old prints) and archives as well as various surfaces e.g. of paintings or posters. Fungal colonies, which have taken a liking to cellulose and the microclimate of library nooks and crannies, pose a particular threat to these invaluable works of art and literature. Although conservators protect valuable objects by e.g. disinfection, many pathogens become resistant to known antimicrobial compounds over time, and subsequent studies have repeatedly demonstrated the harmful effects of various preparations on books and human beings as well. Some of the chemical compounds used hitherto have carcinogenic and narcotic properties. Moreover, they may also cause allergies. The solution developed by the scientists has the potential of contributing to the health protection of persons who disinfect book collections and archives.

The authors of the new solution are Dr. Agnieszka Bangrowska from the Faculty of Humanities at the University of Silesia and Prof. Robert Musioł from the Faculty of Science and Technology of the University of Silesia.



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