

Using bioimpedance to detect skin cancer/melanoma

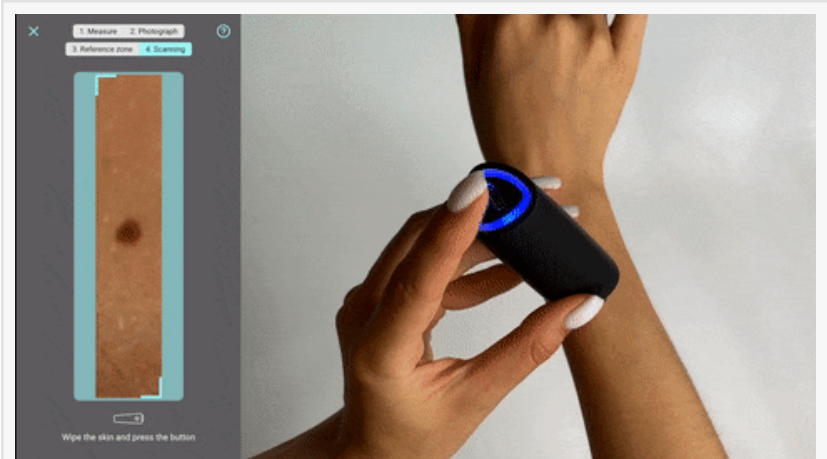
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Bioimpedance analysis (BIA) is a well-known technique for measuring human biological tissues using electric current. It makes it possible to assess a wide range of physiological and morphological parameters of the body without using complex technical devices and without exposing a person to dangerous radiation. Bioimpedance analysis is carried out by measuring the active and reactive resistance of the whole body or separate parts of the body, in our case, moles on the skin, using different frequencies. Based on the data obtained, the characteristics of the tissue composition, cell mass and fluid volume are measured.

The bioimpedance was originally used to accurately measure the administration of drugs in intensive care units, and today bioimpedance analysis is used in various areas of medical practice: endocrinology; dietetics; oncology; physiotherapy; surgery.

Obtaining BIA data gives a doctor a large amount of information, and also indicates the need for additional studies and adjustment of treatment tactics. To better understand the benefits of bioimpedance and appreciate its therapeutic value, let's look at the history of this study.

Applying technology for the early detection of skin cancer/melanoma, we will once again raise



Early diagnosis of skin cancer at the price of a smart watch



NOTA mole tracker at a Christmas price of \$199. Worldwide shipping

the question of the possible impact of bioimpedance at the cellular level. In 2004, scientists from Germany tracked the mechanism of cell shape change during self-destruction (apoptosis).

[The bioimpedance method](#) was used for this study. During the change in the structure of the cell in apoptosis (programmed cell suicide), bioimpedance clearly tracked all the processes inside, while not interfering with the life cycle of the cell.

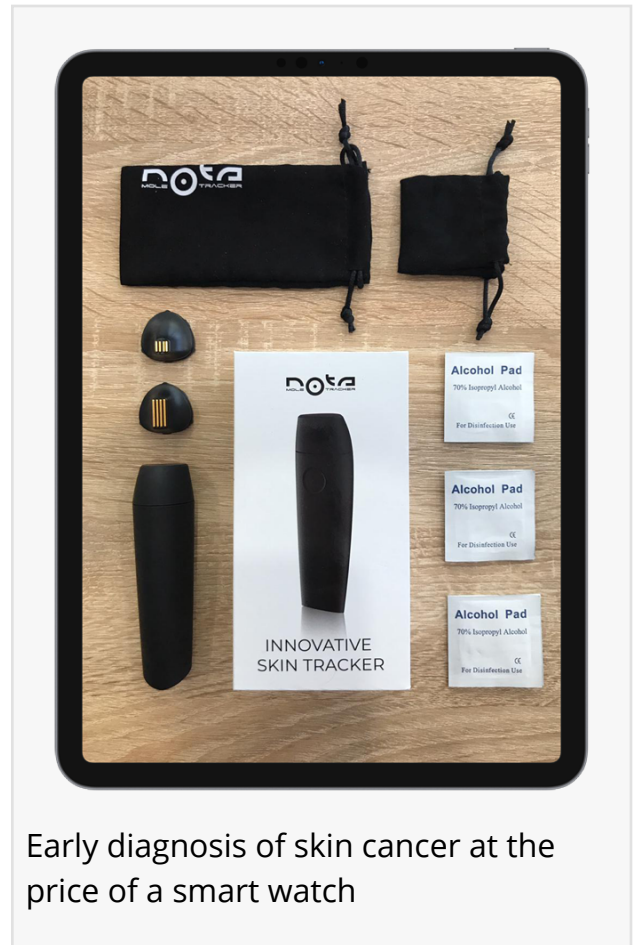
That is, this work clearly demonstrates that the bioimpedance method helps to diagnose, but at the same time does not impact the integrity of the internal environment of the body. This technology differs from others in the reliability and accuracy of measurements, as well as the absence of harmful radiation. Today, bioimpedance is one of the methods routinely used in Health Centers around the world. Bioimpedance is prescribed even during pregnancy, it is safe for children. Many people do not notice, but in everyday life we constantly encounter impedance.

Vivid examples are household appliances - smart scales, fitness bracelets; specialized equipment, for example, for diagnosing stroke, assessing the risk of developing cardiovascular diseases and fluid in tissues, as well as the [NOTA mole tracker](#) device. This is a portable device and application for mapping and examining moles at home.

The technique has been successfully used in oncology for the early detection of skin cancer as it proved its effectiveness and safety in the diagnosis of body composition. Bioimpedance is based on the electrical resistance of tissues. Current can flow around or pass through the cells in the human body.

Our cell membranes are essentially little capacitors that depend on the frequency of the alternating current. Thus, the resistivity of any human tissue can change under the influence of pathological changes. The bioimpedance-based device reads these indicators and shows the result.

If there are lesions in the skin or in a mole compared to the norm, tumors or other pathological processes, the device will help to quantify and identify these changes. NOTA mole tracker, as an example, can evaluate the effectiveness of the diagnostic method.



Early diagnosis of skin cancer at the price of a smart watch

NOTA is based on the bioimpedance method, which measures the resistance (impedance) of cells under the influence of a weak electrical impulse. The impact lasts 5 seconds, and the impulse penetrates through the skin only for 2 mm. NOTA uses measurement components that comply with the IEC 60601-1 Medical electrical equipment standard for medical devices. It regulates the parameters of the signal, the maximum allowable voltage, which is safe for humans.

To evaluate all the advantages of the device, it is necessary to analyze how it helps to distinguish a healthy mole from one that can degenerate into cancer. The device measures the bioimpedance (complex resistance) of the skin at several frequencies.

To get the result for one mole, you need to perform 2 measurements:

- one on a healthy area of the skin, as close as possible to the suspicious area;
- the second measurement directly on the suspicious area of the skin.

Algorithms analyze the difference between two measurements and show if the difference is considered insignificant, then the mole is considered safe. If the difference exceeds the calculated thresholds, then the mole is considered dangerous. How does the device show the results? The app will show that the measured mole is 'Green' if it considers the mole to be safe. And the application will show "Red" if it thinks that the mole is dangerous and you should consult a doctor.

It is worth noting that the device does not replace the work of a doctor, it does not prescribe treatment and does not carry it out, however, it shows the beginning of the pathological process in a mole (nevus) in time.

[Main benefits of the NOTA:](#)

- the device detects the difference between a healthy area of the skin and a suspicious one;
- due to the high sensitivity of NOTA detects even the slightest deviations;
- the device will help to refer a person to a doctor in time based on pathological changes in a mole;
- safe for the skin, the device does not injure tissues;
- completely safe during pregnancy, lactation and for children;
- has no restrictions for people with chronic diseases;
- can be used at any age.

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