PORTABLE BREAST CANCER SCREENING DEVICE

Andrey Aksenov (PhD, MSc, Dip)
a.aksenov@hotmail.com
Saint-Petersburg

Intellectual Systems Ltd.
Breast cancer affects more than 1 million women each year and it is estimated that 1 in 7 women will develop breast cancer over the course of her lifetime. Breast cancer death rate are higher than any other cancer except lung cancer.

Survivability rate:
- Around 80% in developed countries
- 50% in developing countries
Aim of the project: • To develop a portable and safe breast cancer scanner

Product description: • Small body with a handle  
• Under 500 grams  
• Electric impedance technology  
• Home use

Advantages: • No harmful radiation  
• Earlier detection  
• Non-invasive  
• 2-5 mm detection & 90% sensitivity  
• Easy and comfortable to use  
• Quick results  
• Low cost (250 euros recommended retailer price)
It is known that electrical properties of cancerous growth and tissue abnormalities significantly changes when compared with healthy tissues. By detecting those slight differences in electrical conductivity can be used to locate new abnormal tissues growth.

**How does it work?**

The dialectic cup with four electrodes (gold nanoparticle coating) placed on a mammary gland. The small electric current which is not detectable by a human skin is run through a breast surface. The image pattern of electrical potential is recorded from the surface of the breast and contains the information of the new possible formations in four regions.

Comparison of electrical potential values between each other and selecting the smallest between each other allows to detect the location of the new abnormal tissue formation with a high precision.
How to use

1. Lie down on the back
2. Place the scanner on your breast
3. Press the start button and wait for the signal
4. Check your results on your phone or computer
5. Send your results to GP

Together with Electrotechnical University “LETI” we created a prototype model.

Our first prototype

- Weight: 0.3 kg
- Dimensions: 100x50x50 mm
- Min. detection: 1-5 mm
- Size/noise: 3 mm/10%, 5 mm/1%
- Specificity: 90%
- Power consumption: 0.1 W
- Connectivity: Android, PC
- Distribution / Retail price: €160/€250
Global Cancer Diagnostics Market Revenue, 2014 - 2020 (USD Billion)

Source: Zion Research Analysis 2016
We are looking for

1. An investor/partner to develop a final product, market entering and collaboration in the certification of the product in Russia and EU countries.

2. An investor/partner or collaboration in developing a more advanced device with more than 60 electrodes, electrical impedance imaging techniques, and machine learning to improve sensitivity and specificity of the diagnosis in detecting breast cancer. This device can be used in clinics and home without any training.
1. We have developed non-invasive advanced optical detection of glucose in the blood (glucometer).
2. We have developed a prototype device for analysis of biochemical liquids without any reagents (e.g. fast detection of bladder stones). Can be used for pets as well.
3. A prototype of the home medical device for online a very long ECG monitoring.
4. Information systems.
5. Virus infection control.
6. Gait analysis using four infrared cameras (spine, ankle, knee and hip kinematics).
7. 3D foot scanner.
COMPANY HISTORY

We work together with Electrotechnical University “LETI” since 2002

We employ 14 people

2002
- Opening of the company.
- Creation of the first diagnosis of screening systems.
- Market research.
- R & D aimed at commercialization.

2005
- Start of mass adoption in the health care institutions, including through the state program "Children of Russia", "Our new school", "Health".
- Average sales - 100 systems per year.

2014
- Development of innovative products personalized medicine, the use of new biomarkers.
- The development of remote medical services through video conferencing device.
INNOVATIVE DIRECTIONS

Position and prospects.

Since 2014, we have expanded the area of interest, began to create a line of personalized medicine devices. Purpose: early diagnosis, including for medical self-service.

- Portable mammotester for screening diagnosis of breast tumors in women (created prototype)
- Nonchemical optical analyzer for the early diagnosis of kidney stones based on the analysis of pathological forms the Tamm-Horsvalla protein (created prototype)
- Portable compact non-invasive glucose monitor on the basis to create a unique light source with tunable range
- An automated system for screening of chronic and hereditary diseases in cats (ASIC)

Developed a theoretical basis for the creation of an optical non-reagent biochemical analyzer based on the light source with a tunable range
SCIENTIFIC BACKGROUND

An experimental sample of a light source with a tunable range and high optical performance, confirmed the theoretical background. Obtained 2 patents, published 12 articles. Analogues of today polychromatic light source with a controlled range does not.

Developed theoretical study on developing non-invasive blood glucose meter-monitor-based polychromatic light source with a controlled range.

The groundwork for the creation in the field of personal health systems for long vypolnmeniya offline analysis of various physiological parameters of the body in real time without disturbing the normal way of life of the user.

The groundwork for the development of automated systems for the study of cognitive impairment in children, including diabetics.

Results of intellectual activities

- Patents - 6;
- Articles - 20;
- Evidence of registration of computer programs - 8.
OUR PARTNERS

Research Institute of Hygiene and health care for children and adolescents at the Science Center of Children's Health, Russian Academy of Sciences, Moscow
St. Petersburg Electrotechnical University
Manufacturer of medical equipment "Company Neo" of St. Petersburg
Research Institute of Children's Infections, city of St. Petersburg
More than three thousand medical institutions of Russia
State Research Center for Preventive Medicine, Moscow
National Medical Center of Maternity and Childhood in Astana, Kazakhstan
Magazine "Spa equipment" Ural Federal District of the Russian Federation
St. Petersburg Government Health Committee
Research Institute of Obstetrics and Gynecology named D. Otta, St. Petersburg
The first St. Petersburg Medical University named after Academician Pavlov
Northwestern State Medical University named I. Mechnikov
Russian Association of Medical Information Technology, Moscow
St. Petersburg Pediatric Medical University
St. Petersburg Veterinary Academy
Meet our Team

Prof. Valentin V. Shapovalov, Dr. Tech. Sci.
Experience: biomedical engineering, over 40 years, Professor of Faculty of Information Measurement and Biotechnical Systems at LETI university, winner of the Prize of the Russian Government, the author of 18 patents, expert Techno park "Ingria" by biomedical engineering.

Dr. Konstantin Okunev, PhD
Area of responsibility: international marketing

Prof. Vladimir L. Emanuel, Dr. Med. Sci.
Experience: Medical Consultant. Medical laboratory diagnostics, over 40 years of expertise in the subject area. Head of Department of Medical Laboratory Diagnostics, Pavlov First Saint Petersburg State Medical University, Chief Expert of the Government of St. Petersburg for the laboratory diagnosis

Natalia V. Antipenko
Position in the project - marketing consultant
Area of responsibility: Commercialization and sales/ Finance and investment
Graduated: faculty of history, faculty of journalism state University (Karelia, Russia); school of journalism the city (Norway); course PR marketing the Institute of international relations of Moscow (MGIMO)

Dr. Andrey Aksenov, PhD
Experience: healthcare research and biomedical engineering.
Contacts details

Dr. Andrey Aksenov
Tel.: +7-921-879-30-17
Email: a.aksenov@hotmail.com

Director:

Prof. Valentine Shapovalov
Tel.: +7- 812-717 - 13 - 19
Email: shapovalov@incomsys.ru
THANK YOU
Breast density

Fatty  Scattered  Heterogenous  Dense

★ = cancer
Mammography: X-rays

- 10-15 minutes procedure;
- It can detect the tumour with a size 1-2 mm size (first phase of the diseases);
- Sensitivity 78%, however is not accurate for dense tissues;
- Expensive from $65 000;
- Radiation;
- Uncomfortable;
Ultrasound: Sound waves

- Long procedure 15-30 minutes procedure;
- Sensitivity 49% and there are places where the tumour cannot be detected;
- Expensive (from $30 000);
- Uncomfortable;
• Very long procedure 30-60 minutes;
• High sensitive;
• Extremely expensive from $1,000,000 and special room;
• Very expensive procedure;
• Uncomfortable;
Working principal

THE SYMMETRY BREAKDOWN OF ELECTRIC POTENTIAL DISTRIBUTION FROM THE SURFACE OF THE BREAST AND IT INDICATES NEW ABNORMAL TISSUE FORMATION.

In **healthy breast** without any formations the pattern of electric potentials on the surface of the breast is **symmetrical**.

In a breast with abnormal tissues formation the pattern of electric potentials on the surface of the breast is **not symmetrical**.