



## **Method for diagnosing breast cancer**

### **Background**

The human body harbors a vast number of symbiotic, commensal and pathogenic bacteria in the bodily cavities and the body surface. The ensemble of these microbes is referred as the microbiota and its collective genome as the microbiome. Recent advances pointed out that changes in the composition of the microbiome and certain bacterial metabolites crucially impact on the metabolic, behavioral, cardiovascular or immune function of the host and have pivotal role in diseases that were previously not associated with bacteria.

Researchers at the University of Debrecen have examined the effect of secondary bile acids on breast cancer. Secondary bile acids can be produced just by the gut microbiome, which means they can implicate the activity of the gut microbiome.

### **Technology**

Our researchers convinced that a secondary bile acid – lithocholic acid (LCA) – and an amino acid-derivative – cadaverine (CAD) - have cytostatic properties in physiological concentration in-vitro:

- turns back the epithelial–mesenchymal transition,
- modulate cancer cell metabolism and hence, the ration of cancer stem cells,
- helps in the anticancer immunoreaction,
- increases the oxidative stress.

They showed that the LCA and CAD decreases the aggressiveness and the metastatic effect of the tumor in mouse model.

When the researchers were examining the DNA of breast cancer patients' stool, they found that the amount of the baiH DNA (the enzyme responsible for LCA biosynthesis) and LdcA and CadA (enzymes responsible for CAD biosynthesis) decreased. In line with that, in early stage breast cancer CadA protein was lost in the feces of the patients as compared to healthy individuals.

### **Stage of development**

Currently the researchers are examining 4-5 bacterial metabolites, which have similar effects as the LCA or CAD. They have to check out the correlation between these metabolites and cancer thus they can increase the number of markers. In parallel, the researchers plan to perform metatranscriptomic analysis to assess changes to the bacterial enzymatic machinery in breast cancer. The final goal is to create a tumor marker assay based on the found genes.

### **Benefits**

Compared to the present tumor markers this invention would have the following benefits:

- Easily accessible sample (stool), unlike blood.
- It seems like that, tumors' have different reaction on different metabolites; this suggests that it is possible to create much more specific tumor markers than the present ones.
- This system could recognize the tumor in early stage.
- Cheap, affordable method.

### **IP status**

PCT patent application has been filed.

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