Antibodies to a retina protein to be used as a kidney cancer marker

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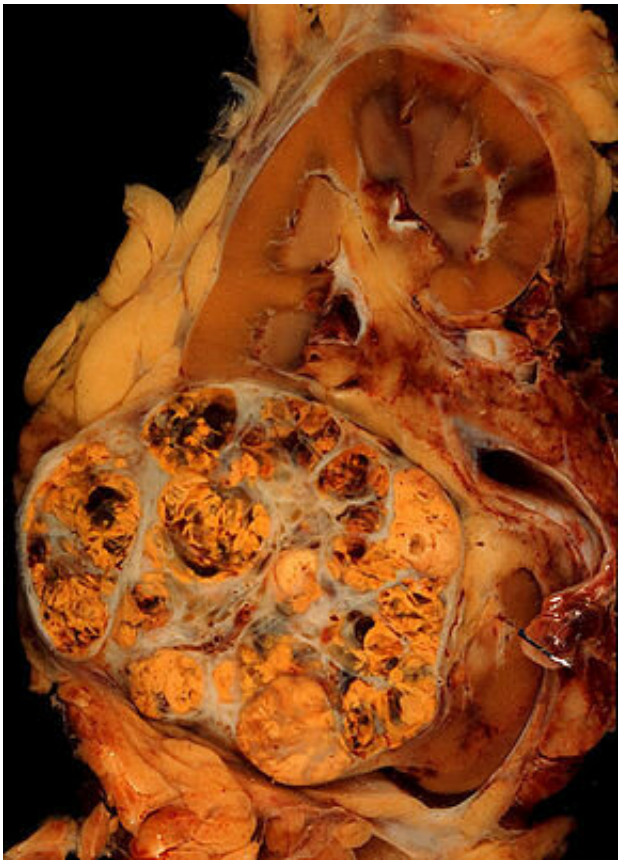

Renal cell carcinoma. Credit: Ed Uthman/Wikimedia Commons

Sechenov University researchers and German colleagues report a highly sensitive, painless method for diagnosing kidney cancer. This method is based on measuring of the immune response to arrestin-1, a retina protein that is synthesized in the cancerous cells of kidneys.

Tumors can be benign or malignant. Benign tumors can evolve into malignant ones. Around 90 to 93% of all kidney growths turn out to be malignant, and there are currently no effective methods for early diagnostics. The initial stages of kidney cancer have no signs or specific symptoms, so patients are often diagnosed with kidney cancer when it has already metastasized. At this point, the doctors make prognosis not about the possibility of recovery, but about a patient's life expectancy.

Cancerous cells have considerable deviations from healthy cells, such as abnormal division, development or protein synthesis. Proteins may be synthesized in the wrong quantities, in the wrong place, or they may be of a poor quality. Normally arrestin-1 is synthesized in the eye retina only, and its occurrence in another organ may cause intensive autoimmune response (i.e. a reaction against the body's own proteins). Researchers know that arrestin-1 is present in melanoma (malignant skin tumor). In the new study, the researchers checked the kidney tumor cells for this type of protein and measured the intensity of the immune response, a first in medical research.

The scientists wanted to find out whether it is possible to use the antibodies to arrestin-1 as well as the protein itself as a marker of cancerous kidney diseases. To do so, they dyed tissue sections, carried out blood tests, and sequenced the samples. The samples were collected from patients who suffered from malignant and benign kidney growths. The antibodies to arrestin-1 were found in the blood serum of 75 percent of patients; the protein itself was identified in 90 percent of benign tumors and in over 50 percent of cancerous ones. Increased levels of arrestin-1 were also noticed in metastasis, especially in the brain metastasis.

All subtypes of kidney tumors synthesize arrestin-1, which makes this method inefficient for differential diagnostics. However, due to its high sensitivity to benign growths, the method helps diagnose a disease on

early stages when the chances for recovery are at the highest. The diagnostic procedure is reduced to simple blood test for the antibodies to arrestin-1 instead of a biopsy that is technically complicated and painful for patients. "The discovery of arrestin-1 synthesis in cases of kidney cancer suggests the possibility of developing anti-cancer vaccines on the basis of this protein in the near future," says Andrey Zamyatnin, a co-author of the work, and the head of the Institute of Molecular Medicine at Sechenov University.

More information: Alexey V. Baldin et al, Autoantibody against arrestin-1 as a potential biomarker of renal cell carcinoma, *Biochimie* (2018). DOI: 10.1016/j.biochi.2018.10.019

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