Detecting lung cancer early

May 16 2011

A person's blood reveals whether he or she has lung cancer: this has been demonstrated by researchers at the University of Bonn. In collaboration with colleagues at the Cologne University Hospital, they are developing a blood test for smokers which could save human lives in the future, since the earlier a lung tumor is detected, the better the chances of survival are. The study has just been published in the journal *Clinical Cancer Research*.

Scientists working with Professor Dr. Joachim L. Schultze have identified over 480 molecules whose concentration in the blood changes when a person develops lung cancer. These molecules are present in the blood cells either in increased or decreased quantities. "In lung cancer patients, typical patterns which can be detected with a measuring program thus emerge", explains Prof. Schultze. The molecules are nucleic acids which form in the body when certain genes are transcribed.

The changes in the blood also occur if the tumor is still in a very early stage. In lung cancer, there are four different stages, explains Prof. Schultze: "The prognosis for patients in stage 3 and 4 is still very poor even today; even with the most modern therapies, the point of death can only be postponed." Lung cancer in stage 1, on the other hand, can be treated surgically and it can even be cured in many cases. "Today, however, a tumor is seldom detected so early, namely in only about 15% of all cases. If a simple screening blood test would increase this percentage, a large proportion of lung cancer patients could survive", says Prof. Schultze. By contrast, to date, over 80% of all lung cancer patients die within two years after diagnosis, since the tumor is already

too far advanced.

Screening for lung cancer: A result within a day

In the future, a lung cancer screening test may become part of routine practice: The doctor takes a blood sample from his/her patient, and within 24 hours, he knows with a high degree of certainty whether the patient has lung cancer or not – even if the patient does not yet have any symptoms.

For many years, the team working with Prof. Joachim Schultze has investigated the blood of over 200 smokers. About half of them had lung cancer; the others were either entirely healthy or suffered from another lung disease. "It was important to us that a subsequent test not only be able to differentiate lung cancer patients from healthy subjects, but also from persons with chronic lung diseases." The researchers then examined the research subjects' blood using biochips for certain nucleic acids and in doing so, they found the typical patterns.

The researchers are presently planning an analogous but much larger study with ten times as many patients, in order to confirm the results. If the present results prove to be true in such a study, there would no longer be anything standing in the way of developing the blood test to the point of being ready to be put on the market.

More information: T. Zander, A. Hofmann, A. Staratschek-Jox, S. Classen, S. Debey-Pascher, D. Eggle, S. Ansén, M. Hahn, M. Beyer, R.K. Thomas, B. Gathof, C. Mauch, K.-S. Delank, W. Engel-Riedel, H.-E. Wichmann, E. Stoelben, J.L. Schultze, J. Wolf: Blood-based gene expression signatures in non-small cell lung cancer, *Clinical Cancer Research*, 2011.

Provided by University of Bonn