First extensive description of the human secreted miRNome

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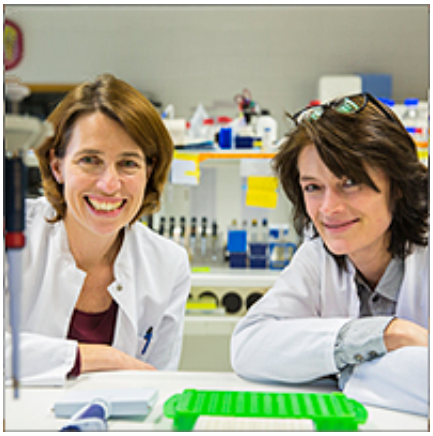

University of Luxembourg researchers Dr Christiane Margue (left) and Stephanie Kreis Credit: Frank Meiers (cheese.lu) Fondation Cancer 2015

In an elaborate study, biologists of the University of Luxembourg have found out that small molecules named microRNAs are, against many hopes, not yet suitable for early diagnosis of skin cancer, as well as supposedly for other types of cancer, in blood samples. For the first time they analysed all microRNAs in the serum of healthy people and thus provided a first complete image of the human "miRNome" in blood samples, in reference to the better-known "genome". The researchers were even explicitly complimented by their reviewers for the rigorous work – a rare occasion.

In order to detect cancer early, researchers all around the globe are

looking for molecules that might point to the emergence of a disease in blood samples early on. Promising among these so-called biomarkers are microRNAs, molecules that act as universal switches inside the body. According to Dr. Stephanie Kreis, principal lecturer of the research group "Signal Transduction" of the Life Sciences Research Unit at the University of Luxembourg, 'microRNAs might be exceptional markers, because they are very stable and hence easily traceable, as well as tissue specific'. In tissue samples these 'molecule snippets' can indeed act as a measure for early recognition of cancer - but is this also applicable to the more feasible blood sample?

Previous studies have been contradictory, since in most cases only two to three healthy people were used as a control group – way too few considering the fact that this type of molecule varies strongly among single individuals, partially between men and women, and some even depending on time of day. So, not every variation can be interpreted as an indication to a disease. The researchers in Luxembourg wanted to get to the bottom of it. In the study, which Stephanie Kreis conducted primarily with Christiane Margue, Susanne Reinsbach and Demetra Philippidou, they analysed 1100 particular microRNAs in around 100 blood samples.

'We put a lot of energy, time and money into the technical optimisation of the microRNA measuring and more or less reinvented quality control with every step', emphasises Dr. Stephanie Kreis. Even a new bioinformatic procedure was developed by the researchers in order to reject unstable microRNAs. Thus, after roughly two years of work, the first world-wide reference on the majority of microRNAs in the blood of healthy people was generated. Now we know which of these interesting molecules occur in similar quantities and which ones vary naturally between individuals.

'We were also able to find out that some molecules were wrongly praised

as potential biomarkers in other studies, since their variation occurs naturally and not due to a disease', says Dr. Kreis. Although there are interesting deviations that point to skin cancer - the type of cancer that was subject of this study - these are reliable indicators in the blood only in the final stage of the disease, when the patients already know they are sick. In a couple of years, however, when the methods of verification will be more precise, microRNAs will probably play a major role in the early diagnosis of cancer and other diseases. The foundation for further studies has now been laid by the University of Luxembourg.

More information: "Comparison of a healthy miRNome with melanoma patient miRNomes: are microRNAs suitable serum biomarkers for cancer?" *Oncotarget* 2015, www.impactjournals.com/oncotar … h[]=3661&path[]=7597

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