Development of colorectal cancer kit detection

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Credit: University of Luxembourg

Biologists from the University of Luxembourg together with researchers from the Integrated Biobank of Luxembourg (IBBL) and oncologists from the Centre Hospitalier Emile Mayrisch (CHEM) are in the process of developing a kit which could facilitate the detection of colorectal cancer at early stage and help clinicians choose the best treatment.

"Up to 30 percent of stage II colorectal cancer patients relapse within five years. Deciding on whether or not to treat these patients with adjuvant chemotherapy is one the most challenging questions for clinical

oncologists. Indeed, only 5 percent of chemotherapy-treated patients see positive benefits. On the contrary, too many patients suffer from side effects and increasing resistance. That is why, attention has been given to the protein family Myosin and especially the protein MYO5B as the concentration of MYO5B decreases as the disease progresses", explains Dr. Elisabeth Letellier, principal investigator at the University of Luxembourg.

After having identified Myosin as potential biomarker for colorectal cancer at the beginning of 2018 to classify patients into "high" and "low" risk group at early stages, researchers from the Molecular Disease Mechanisms group at the Life Sciences Research Unit (LSRU) of the University of Luxembourg have decided to go a step further by developing a kit to determine individual risk for relapse and allow the segregation of patients that will benefit from chemotherapy, from patients that do not require these treatments and can instead be treated with other less arduous and costly methods. "Tackling this kind of challenging interdisciplinary and inter-institutional projects needs a close exchange and collaboration between many partners. The rapidly developing Luxembourgish research landscape is now very well equipped to meet these requirements", states Prof. Serge Haan, head of the Molecular Disease Mechanisms group.

Funded by the Luxembourg National Research Fund (FNR) with a budget of 397 000 euros for the period 2018-2020, the project "Prognostic gene classifier in stage II for colorectal cancer" called "MyoRPROG" is intended to carry out both the clinical and analytical validation of the biomarker as well as develop a prototype kit for preliminary clinical use.

For this purpose, the University of Luxembourg is working hand in hand with the Integrated Biobank of Luxembourg (IBBL) and the Centre Hospitalier Emile Mayrisch (CHEM).

As experts in analytical validation and clinical verification, researchers from the IBBL are currently studying the biomarker to analyze its robustness, stability, sensibility and specificity. "This is especially important when you want to translate an identified biomarker into a clinical test", says Monica Marchese, who leads the Biomarker Validation service at IBBL.

As decision-makers who have to take complex treatment decisions in front of patients, oncologists from the CHEM give their expertise, share their experience and express their needs. They also play a key role in the elaboration of a high-quality tissue collection from colon cancer patients in Luxembourg. "Establishing such a valuable collection both helps us to contribute to this important scientific effort locally, links basic science to our clinical practice, and should ultimately translate into better treating our patients", adds Dr. Stefan Rauh, oncologist at CHEM.

In parallel, bioinformaticians at the University of Luxembourg are reviewing and normalizing a lot of raw data to determine the type of biomarker. "The biomarker could be either prognostic, in this case we know that there will be a relapse or predictive, and in this case we know that the patient will react positively to chemotherapy. Of course, we hope to have a predictive one, however a reliable prognostic marker would already be an important finding for CRC patients as they are currently lacking", claims Eric Koncina, bioinformatician who is working on the project.

The next stage of the project is to test the biomarker on a high number of clinical samples before finding potential industrial partners.

"Current biomarker options are either too expensive, not reliable enough or not approved by the Food and Drug Administration (FDA), thus there is a clear market need to develop a robust and specific biomarker", adds Elisabeth.

The biomarker market is expected to grow exponentially in the coming years with a market estimated at 2.2 million euros in 2030 (Source: Markets and Markets, Allied Market Research, Grand View Research). Thus the potential is huge and MyoRPROG represents a novel option with clear benefit to prevent relapse.

In this context, the University of Luxembourg gathered 50 participants on 19 November 2019 to present the first results and future development of the project and thank the partners for their involvement.

Provided by University of Luxembourg