In recent years the introduction of screening programs for colon cancer (CRC) resulted in increased number of diagnosed CRC cases both in women and men worldwide. Advanced post-operative therapies improve patients' survival but once cancer cells escape from their primary location, metastasis appears and the prognosis is poor and survival is dramatically shortened. Moreover, it remains difficult to predict clinically latent versus invasive tumors and qualify patients for more aggressive and damaging adjuvant therapy. Understanding how cancer cells spread and finding the biomarkers of worse prognosis are critical to tumor staging, molecular type and therapeutic choice in CRC patients. This project is aimed at verifying if neuromedin U (NMU), small peptide secreted by CRC cells and NMU receptors (NMUR1 and NMUR2) are behind the increased invasiveness of colon cancer cells and if they can be used as new prognostic factors of the disease.

NMU was shown before as prognostic factor in endometrial, lungs and breast cancer but its role was not explored before in colon cancer. Our data collected during previous project revealed that NMU is intensively secreted by CRC cells. Interestingly, NMU receptors which enable cells to respond to NMU are expressed on cancer cells but also on other cells surrounding the tumour. In that way CRC cells induce themselves to be more invasive but also have a potential to educate the neighbouring cells to create cancer friendly environment. On the basis of our encouraging *in vitro* observations, here, we will verify our results by analyses of NMU and NMUR1, NMUR2 expression in human colon cancer tissues. In addition we will analyse tumours and cancer cells spread in mice *in vivo* by implantation of CRC cells with different levels of NMU and NMU receptors followed by organs analysis.

As the assessment of NMU receptors expression level could improve CRC prognosis estimation and as the receptors are not equally produced by all CRC cells, NMUR1 and NMUR2 visualisation in living cells is essential. Because available antibodies are not selective enough we will assay a new tool useful in NMU receptors visualisation In the molecular part of the project . In collaboration with chemists we will synthesise fluorescently labelled peptides which bind selectively to NMUR1 or NMUR2.

In the last part of the project we will verify our observation of more frequent cancer spread to the lymph nodes in patients with high NMUR1 expression in cancer tissue. We will analyse the reaction of lymphatic endothelial cells on NMU treatment and try to show if NMU accelerate or enable cancer spread through lymph nodes.

By this project implementation we hope to show that assessment of the NMU and NMU receptors in the CRC tissue can help, together with other already known factors, in colon cancer type identification and further therapeutic decisions.