

Project Title: Development of T cell receptor repertoire-based machine learning model for colorectal cancer diagnosis

PI: Professor YANG Guan of CityUHK

Co-Is: Professor LIU Kai and Professor MA Chen of CityUHK

Project Abstract/Proposal Summary:

There exists an urgent need to improve colorectal cancer (CRC) diagnosis due to limitations in current diagnostic approaches. Systematic characterization of the human T cell receptor (TCR) repertoire, coupled with advanced computational methods, provides a promising opportunity to develop more accurate and less invasive diagnostic strategies for this major malignancy. In our preliminary studies, we conducted a reanalysis of TCR β repertoires in both healthy individuals and CRC patients, pinpointing distinct V β and J β gene patterns that exhibited significant variances between the two groups. Thus, we hypothesize that TCR repertoire-based machine learning model holds promise for precise CRC diagnosis. In this proposal, we will: 1) establish a TCR repertoire-based diagnostic model for CRC using machine learning algorithms and 2) identify the most significant features contributing to accurate diagnosis. Our project will lead to the development of novel diagnostic method for CRC diagnosis.

