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Potential antigen targets profiling for colorectal cancer immunotherapy

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Background: Adoptive chimeric antigen receptor T (CAR-T) cells and immune checkpoint inhibitors have been proven to be the promising therapies for the treatment of solid tumors in recent years. However, the cell surface antigen expression plays a vital role in both of these immunotherapies. In this study, we investigated the expression of 6 cancer associated antigens(epithelial cell adhesion molecule (EpCAM); carcinoembryonic antigen[CEA]; epidermal growth factor receptor[EGFR; mesothelin:mucin 1][MUC1]; epidermal growth factor receptor 2[HER2] and 4 immune microenvironment associated markers[CD3 ; programmed death 1(PD1)]; programmed death-ligand 1 (PDL1) ; forkhead box P3(FOXP3) in colorectal cancer.

Methods: All available formalin-fixed, paraffin-embedded tumor slides from 113 colorectal patients were reviewed. Intensity and distribution for each antigen were assessed by immunohistochemistry.

Results: Positive expression of EpCAM, CEA, EGFR, Mesothelin, MUC1 and HER2 were demonstrated in 100%, 99%, 96%, 68%, 67% and 37% of colorectal cancer respectively. As for immune microenvironment, CD3, PD1, PDL1 and FOXP3 were positive in 100%, 73%, 71%, 97% colorectal cancer cases. More than 90% cases had 75% distribution of EpCAM-positive cells and CEA-positive cells. More than 50% cases had 50% distribution of CD3-positive cells, in which almost 40% CD3 positive cells were also FOXP3 positive. However, the PD1 and PDL1 expression were very low in colorectal cancer.

Conclusion: EpCAM and CEA expression were very high in colorectal cancer, which could be the potential promising targets for colorectal cancer CAR T cell therapy. Although PD1 and PDL1 expression were low in colorectal cancer microenvironment, it could be another strategy by targeting regulatory T cells (FOXP3 positive) to relieve the immunosuppression and enhance the antitumor function of the immune system for colorectal cancer patients.

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