Development of a CD4+ Neoantigen Vaccine in the Panc02 Tumor Model

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Pancreatic adenocarcinoma(PDA) is one of the most malignant tumors, with an estimated 50,000 diagnoses and deaths per year. Current therapies have little effect on PDA due to the tumor's large stromal component composed of T regulatory cells, macrophages, and cancer associated fibroblasts that block standard therapy and the immune system. Immunotherapy has greatly improved the outlook for most cancers through cancer specific, personalized vaccines, however, CD4+ neoantigen vaccines has been overlooked due to the CD4+ T cell's essential but indirect antitumor activity. This project developed a CD4+ neoantigen vaccine in the Panc02 tumor model to analyze synergistic impact on a CD8+ neoantigen vaccine. Employing the IFN? EliSpot cell assay technique, 8 CD4+ neoantigens were determined. Results indicated an increase in activation of CD8+ T cells when a single CD8+ neoantigen is used, but not when employed alongside a pool of CD8+ neoantigens. Analysis of current neoantigen prediction software was conducted, indicating new facets of neoantigen proteins to be explored. This project demonstrates that a CD4+ vaccine is feasible in the Panc02 tumor model and can improve anti-tumor T cell activity. Further research and in vivo tumor studies will indicate translation to human pancreatic cancer models.

Awards Won:
Third Award of $1,000
American Committee for the Weizmann Institute of Science: All-expense paid four week trip and scholarship to the Bessie Lawrence International Summer Science Institute