Background Pancreatic ductal adenocarcinoma (PDAC) is refractory to immunotherapy due in part to cellular cross-talk with cancer associated fibroblasts (CAFs). These interactions shape the microenvironment in a manner that is profoundly immunosuppressive. Our group is identifying novel targets in the PDAC stroma that can be manipulated to enhance immunotherapy efficacy. We hypothesize dysregulation of the serine protease, CD26/DPP4 in PDAC contributes to the limited efficacy of immunotherapy. Further, we posit targeting CD26 enzymatic activity using inhibitors that are FDA-approved for adult patients with Type 2 Diabetes Mellitus can enhance the efficacy of immunotherapy in PDAC.

Methods Primary CAFs isolated from patient PDAC resection specimens under an IRB-approved protocol, were subject to NanoString analysis. CD26 protein expression was measured in primary and immortalized CAFs and PDAC cells by immunoblot, flow cytometry and immunofluorescence, while ELISA detected soluble CD26. For in vivo efficacy, luciferase-expressing KPC-tumor cells were implanted orthotopically in the pancreas of immune-competent C57BL/6 mice. Bioluminescence imaging (BLI) confirmed established tumors and mice were randomized to sitagliptin (75 mg/kg in drinking water, CD26/DPP4 inhibitor), anti-PD-L1 Ab (200 µg 2x/week), or both combined for 3 weeks. Controls received vehicle or isotype control Ab. BLI utilized to track tumor progression and tissues harvested for analysis at study endpoint (day 18 of treatment).

Results NanoString analysis identified CD26/DPP4 as significantly upregulated in RNA transcripts from primary CAFs vs. fibroblasts from normal pancreas (figure 1). We confirmed abundant CD26 expression on patient-derived CAFs and immortalized CAF cell lines, however, lower CD26 expression was observed on human PDAC cell lines (HPACC, PANC-1) by immunoblot, flow cytometry and immunofluorescence (figure 5).
Conclusions  Our results are the first to describe CD26 expression on PDAC-derived CAFs and indicate that sitagliptin augments anti-tumor activity of anti-PD-L1 in PDAC tumor-bearing mice. Our ongoing work will provide insight into specific immune cell populations responsible for efficacy of immunotherapy in murine models of PDAC, and the role of CD26 in various cellular compartments within the PDAC microenvironment.

REFERENCES


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