CEACAM7 emerges as a promising early detection biomarker in pancreatic cancer.

Anupam Dhasmana
The University of Texas Rio Grande Valley, anupam.dhasmana@utrgv.edu

Swati Dhasmana
The University of Texas Rio Grande Valley

Iris A. Enriquez-Perez
The University of Texas Rio Grande Valley

Sheema Khan
The University of Texas Rio Grande Valley

Murali M. Yallapu
The University of Texas Rio Grande Valley

See next page for additional authors

Name of Presenting Author: Anupam Dhasmana
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Anupam Dhasmana, Swati Dhasmana, Iris A. Enriquez-Perez, Sheema Khan, Murali M. Yallapu, *Subhash C. Chauhan
Department of Medicine and Oncology ISU, School of Medicine, University of Texas Rio Grande Valley, McAllen, TX, USA
South Texas Center of Excellence in Cancer Research, McAllen, TX, USA

Background: According to the key statistics from the American Cancer Society in 2021, Pancreatic Cancer (PanCa) impacts approximately 60,430 individuals annually in the U.S., affecting 31,950 men and 28,480 women. Diagnosis and treatment of PanCa pose significant challenges. It stands as the fourth leading cause of cancer-related deaths, boasting a mere 9% 5-year survival rate and an overall grim prognosis. Adenocarcinomas, particularly PDAC, constitute the majority (around 85-90%) of PanCa cases, contributing to its highly aggressive nature and low survival rates. The absence of an early tumor-specific biomarker for PDAC underscores the urgent need for a novel strategy to enhance the limited diagnostic options available for PanCa. Recognizing this critical situation, our research group has identified a promising oncogenic protein, Carcinoembryonic antigen-related cell adhesion molecule 7 (CEACAM7). Our studies indicate elevated CEACAM7 expression in pancreatic ductal adenocarcinoma (PDAC) tumors and its correlation with patient survival.

Methodology: The research commenced with bioinformatics screening, involving the assessment of CEACAM7 expression across various cancer types, overall survival analysis, correlation with genes, association analysis, spot prediction, and evaluation of immune cell infiltration capability in the context of pancreatic ductal adenocarcinoma (PDAC). Subsequently, guided by the insights gained from the bioinformatics approach, molecular biology techniques were employed to meticulously examine the progressive cell line panel of PDAC (HPNE, HPAF-2, SU86.86/BxPc3, and Panc-1) in terms of both mRNA and protein expression levels of CEACAM7. Confocal microscopy was utilized to recognize the intensity and localization of CEACAM7 protein expression in various cell lines. Additionally, immunohistochemistry (IHC) analysis was conducted to identify protein expressions in human tissue microarray (TMA) cores, along with relevant location and grading data.

Results: Bioinformatic results clearly cited the relevance of CEACAM7 as a potential prognostic biomarker of PDAC, followed by molecular biology approaches revealed the positioning of CEACAM7 as an early detection biomarker.

Conclusion: Our observations clearly cited that CEACAM7 can be investigated as an early detection biomarker for PDAC.

Keywords: Pancreatic cancer, PDAC, CEACAM7, Early detection biomarker, Tumor grading & Bioinformatic.