

# B-13

## Transcriptome alterations in pancreatic neuroendocrine tumors among those living with adverse social determinants of health

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### BACKGROUND

There are disparities in survival among patients with pancreatic neuroendocrine tumors (pNET) based on race and adverse social determinants of health (SDOH) (rurality, unmarried). The biologic mechanism of these factors is unknown.

### METHODS

At our institution, we constructed a cohort of patients (Table 1) who underwent surgical resection for Grade 1 or 2 pNETs (2006 and 2022). We identified black patients (self-identified race) and matched them to white patients (by age, sex, and tumor grade). Formalin-fixed, paraffin-embedded (FFPE) pNET specimens were sequenced by Illumina NextSeq550. We created a linear regression of differentially-expressed genes (DEGs) predicting each adverse neighborhood level SDOH based on patient billing address census data and controlling for race, BMI, smoking, and year of surgery. Gene Set Enrichment Analyses were then completed to determine if these DEGs were enriched in known biologic pathways (significant normalized enrichment scores (NES) p value: <0.05, q-value: <0.05).

### RESULTS

A total of 24 patients were analyzed (11 Black, 13 White). At the time of surgery, the median (interquartile range) age was 62 years (51-69), 16 (67%) were female, and 18 (75%) had grade 1 disease. The median tumor size was 2.7 cm (1.5-4.1) and the median Area Deprivation Index (ADI) was 60th percentile. A total of 145 DEGs were identified across 5 adverse SDOH domains. Compared to controls, those living in lower-income neighborhoods demonstrated significant suppression of immune-related biologic processes such as lymphocyte and leukocyte activation; this was accompanied by significant activation of metabolic processes such as small molecule and organic acid metabolic processing. Those living in areas with lower educational attainment had enhanced activation of cellular metabolism and processing, and cellular communication. Those living in areas with higher uninsured rates had increased expression of cellular metal ion homeostasis pathway. Those living in areas with higher ADI displayed activation of catabolic processes including fatty acid oxidation accompanied by noticeable suppression of lymphocyte activation.

**Table 1: Demographics of patients with pancreatic neuroendocrine tumors (pNETs)**

	<b>Overall</b>	<b>Black (n=11)</b>	<b>White (n=13)</b>
<b>Tumor size (median, IQR, cm)</b>	2.7 [1.5-4.1]	3 [1.5-4.3]	2 [1.5-4]
<b>Neighborhood level metrics (median, IQR)</b>			
<b>National ADI (percentile)</b>	60 [51-78]	78 [68-93]	55 [49-62]
<b>Uninsurance rate</b>	14.7% [11.8-18.9]	18.1%[13.0-19.5]	13.6% [11.0-15.6]
<b>Income</b>	\$48,170 [37,648-57,018]	\$35,446 [32,332-51,980]	\$49,427 [45,864-57,500]
<b>High School Graduation Rate</b>	88.5% [84.1-96.6]	87.0% [77.2-95.4]	90.0%[85.3-96.3]

## **CONCLUSIONS**

Significant biologic changes were seen in pNET gene expression of patients living in neighborhoods characterized by adverse SDOH. The pathways most effected centered on suppressed immune response and heightened catabolism.

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