



# Differential gene expression in pancreatic neuroendocrine tumors by adverse social determinant of health status

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## Background

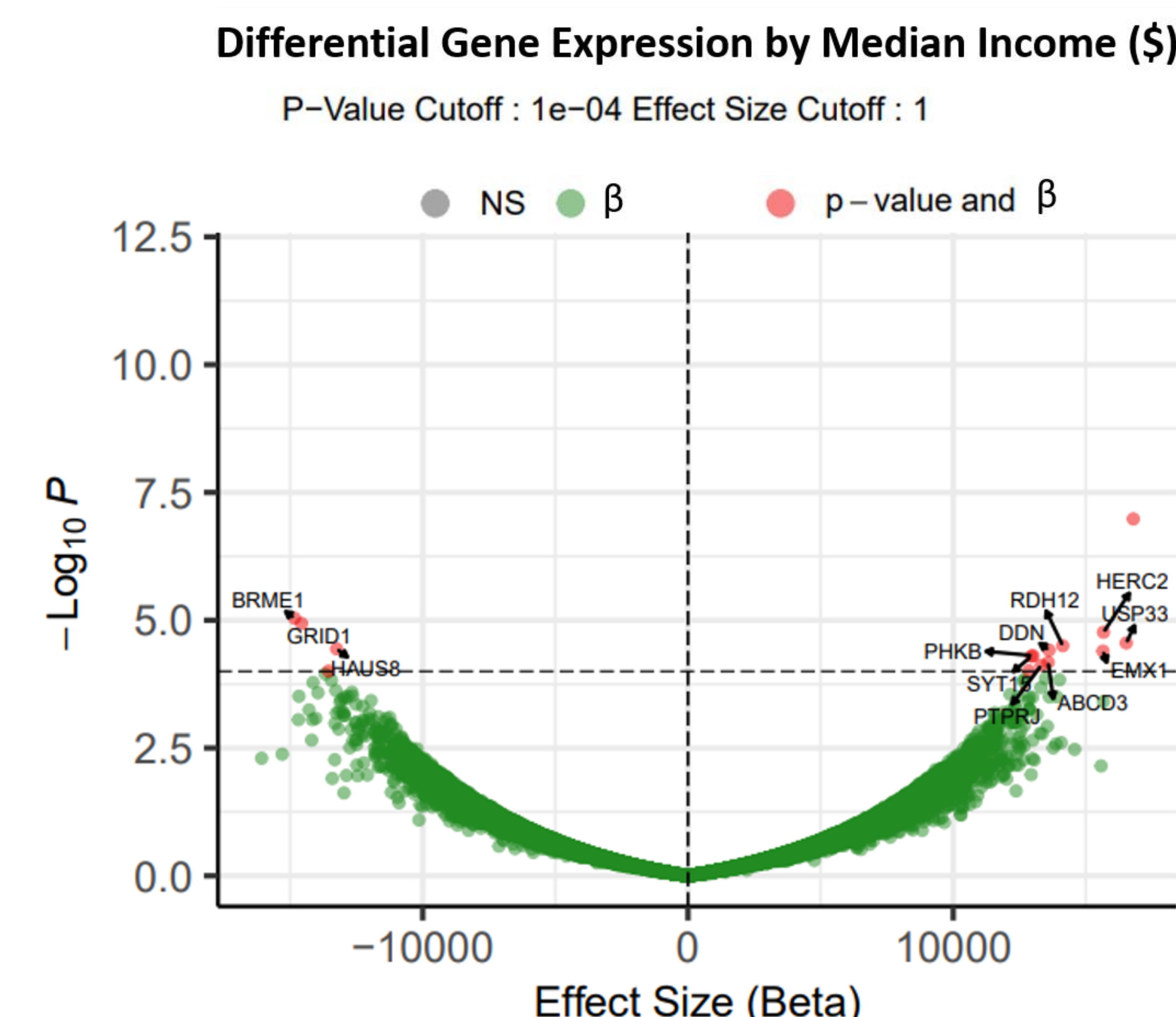
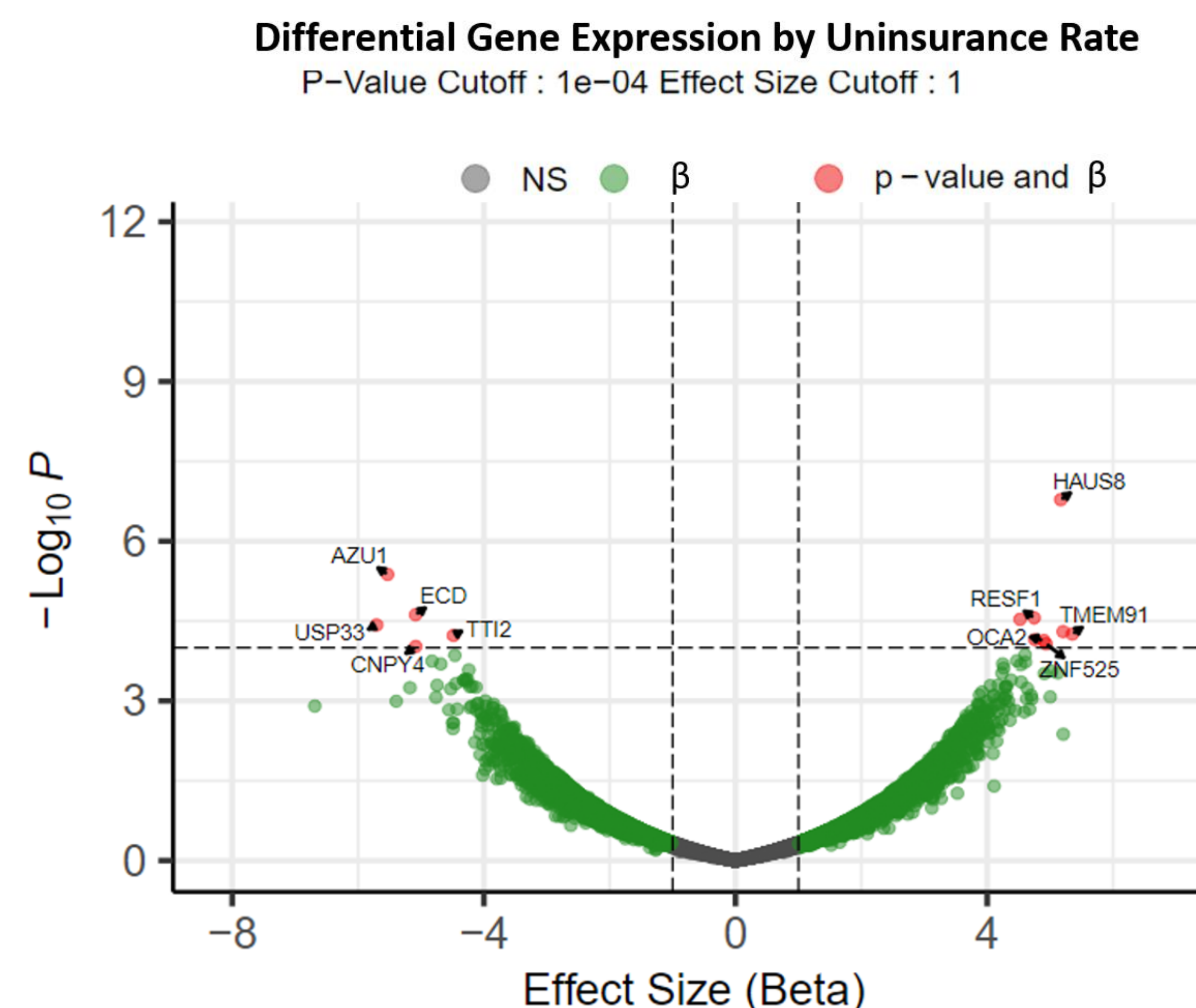
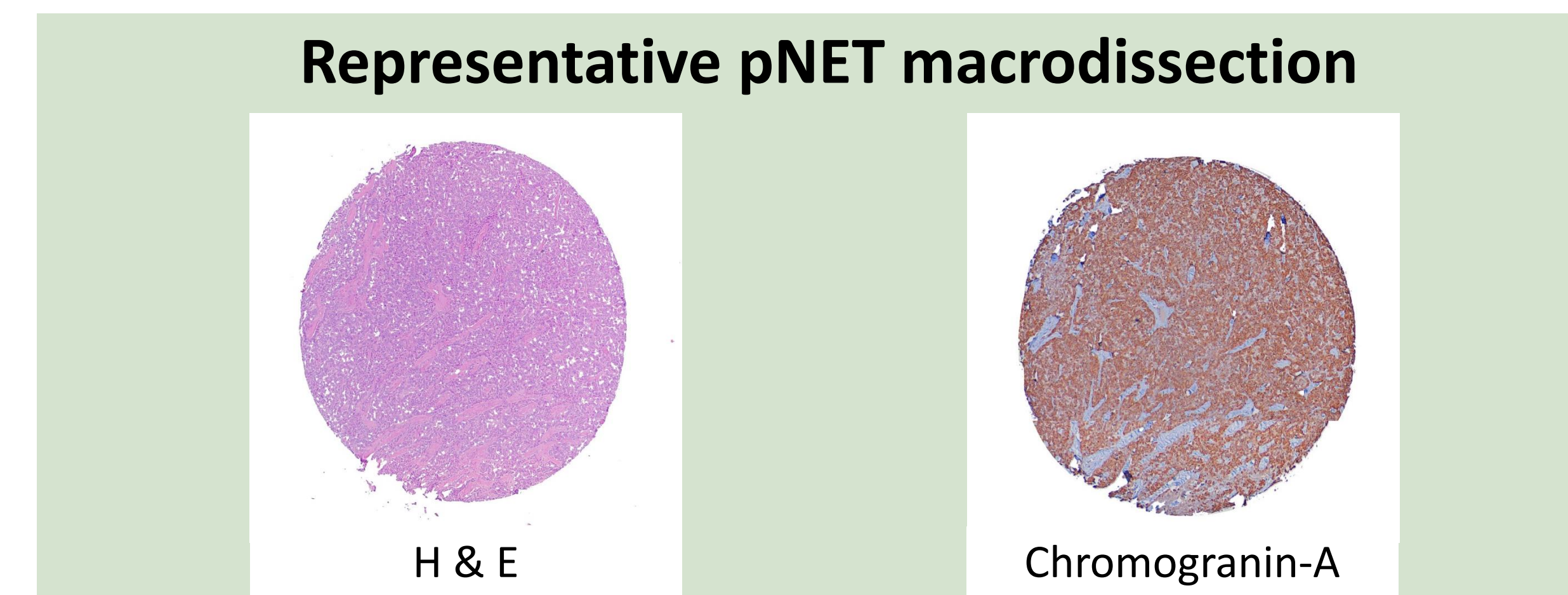
- There are known health outcome disparities among patients with pancreatic neuroendocrine tumors (pNET) of minority race and among those living with adverse social determinants of health (SDOH).
- The potential biologic mechanism of the factors underlying these disparities is unknown.
- Hypothesis:** differential gene expression will be driven by exposure to adverse SDOH
- AIM:** examine the association of pNET tumoral gene expression with exposure to adverse SDOH.

Demographic	AA (n=21, 54%)	White (n=18, 46%)	Total (n=39)
Female Sex	13 (62%)	10 (56%)	23 (59%)
Grade (G1)	11 (52%)	7 (39%)	18 (47%)
Median Neighborhood Income	\$33,700 [\$24,430-58,098]	\$52,792 [\$40,037-73,326]	\$46,875 [\$29,189-67,932]
Neighborhood Lacking Health Insurance	20.70% [9.80-24.30%]	16.25% [10.60-21.38%]	17.70% [9.80-23.05%]
Neighborhood HS Graduation Rate	85.09% [71.93-88.12%]	89.15% [82.10-94.00%]	87.29 % [78.96-93.26%]

## Methods

- Retrospective review of surgically resected nonfunctional G1, G2, sporadic pNETs (2006-2022)
- Single institution NCI center in the Deep South
- Patient demographics, tumor characteristics, social determinants of health collected
- Specimens matched 1:1 by age, grade, sex and self-reported race (White: Black)
- FFPE specimens' RNA sequenced, Single End 30 million reads/sample
- Significance was determined by  $p$  value  $< 1 \times 10^{-4}$ .
- Linear regression models used to examine association between neighborhood level factors and transcription.
- Regressing  $\beta$  values for each gene on neighborhood level factors while adjusting for race, smoking, BMI and batch effect.

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total = 25691 variables

Association of Gene Expression and adverse SDOH				
SDOH	Gene	$\beta$	p-value	SE
Median Income (\$)	BRME1	-14,836.19	9.13E-06	3343.84
	GRID1	-14,569.55	1.16E-05	3322.67
	HERC2	15,666.89	1.72E-05	3644.53
	USP33*	16,525.17	2.79E-05	3943.66
	HAUS8	-13,246.83	3.63E-05	3207.47
	DDN	13,615.17	3.85E-05	3307.81
High School Graduation Rate (%)	PHKB	13,009.69	4.93E-05	3205.319
	GPER1	-0.08	4.41E-06	0.02
	PNCK	-0.07	1.10E-05	0.02
	STEAP2	0.07	1.91E-05	0.02
	PTPRH	-0.06	5.49E-05	0.02
Uninsured Rate (%)	GORAB	0.06	5.44E-05	0.02
	HAUS8	5.17	1.66E-07	0.99
	AZU1	-5.53	4.22E-06	1.20
	ECD	-5.09	2.41E-05	1.20
	TMEM91	-5.35	5.56E-05	1.33
	TTI2	-4.48	5.90E-05	1.12

Most strongly DEGs shown. p value calculated with two way t test.

## Results

- After QC, n=39 (AA: 21 and White: 19 patients) included
- 95 DEGs between those living in adverse SDOH communities compared to those who were not.
- Differential expression was seen in tumor suppression (USP33), cell cycle (ECD), and inflammatory (GIMAP) biologic pathways for patients living in low income, low educational attainment, and low insurance access neighborhoods compared to controls.

## Conclusion

- Significant biologic changes are seen in the pNET transcriptome of those living in neighborhoods characterized by adverse SDOH.