

Transcriptional expressions of SCNs family correlates with overall survival in patients with breast cancer

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Abstract

Introduction: Voltage-gated sodium (Nav) channels encoded by SCNs are heteromeric protein complexes containing pore-forming α subunits together with non-pore-forming β subunits. Methods: To analyze the expression of SCNs in the samples of different types of breast cancer (BC) patients and the relationship between the expression of α and β subunits and the prognosis of BC patients, the study investigated the roles of SCNs in the prognosis of BC using ONCOMINE, UALCAN, Kaplan-Meier Plotter, GEPPIA, Metascape, LinkedOmics databases. The study analyzed significant changes of SCNs expression and prognosis in transcription level between BC and normal samples, and association of mRNA expression of distinct SCNs family members with prognosis in overall BC patients and HER2-positive/HER2-negative subgroups, respectively. Moreover, we predicted functions and pathways of the mutations in SCNs and their neighbor genes in BC patients by GO/KEGG and GSEA analysis. Results: The results showed that transcriptional and proteinic expressions of 9 SCNs were downregulated in patients with BC, including SCN1A~4A, 7A, 9A and SCN2B~4B. low expressions of 11 SCNs members were found to be significantly associated with poorer overall survival (OS) in BC patients ($P < 0.01$), including SCN2A, 3A, 5A, 7A, 9A~11A and SCN1B~4B. Moreover, prognostic value of mRNA expression of SCNs could only be seen in HER2-negative BC patients when we performed subgroup analysis. Conclusions: These results indicated that SCNs could be prognostic biomarkers for survivals of BC patients. Some medicines that regulate SCNs might provide new targets for BC treatment.

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Analysis Type by Cancer	Cancer vs. Normal													
	SCN1A	SCN2A	SCN3A	SCN4A	SCN5A	SCN7A	SCN8A	SCN9A	SCN10A	SCN11A	SCN1B	SCN2B	SCN3B	SCN4B
Bladder Cancer	2	1	7	2		1	2	1		1	7	2	5	2
Brain and CNS Cancer	4	3	4	1	7		1	6		1	7	2	5	10
Cervical Cancer	3		5			1	3	2	13		6	1	6	
Colorectal Cancer	1		2			1	2			1	3	1	1	
Esophageal Cancer	1		2			1	2			1	1	1	1	
Gastric Cancer	1		2			1	2			1	1	1	1	
Head and Neck Cancer	1	3	5	3	1	2	3	1	1	1	1	1	1	
Kidney Cancer	4	4	4			1	4	1		1	1	1	1	
Leukemia	1	2	1			1	2			1	1	1	1	
Liver Cancer	4	4	1			1	3	3			1	1	5	
Lung Cancer	1	1	2			1	1			2	2	1	1	
Lymphoma	1	2	1			1	1			2	2	1	1	
Melanoma														
Myceloma														
Other Cancer														
Ovarian Cancer														
Pancreatic Cancer														
Prostate Cancer	2		1				2	1			2	2	2	
Sarcoma														
Significant Unique Analyses	16	7	13	6	22	1	14	1	1	3	18	2	8	1
Total Unique Analyses	340	420	358	392	390	390	402	423	333	338	409	411	382	253













