



## Blood-Based Biomarker Solutions for Cancer Therapy-Associated Neurotoxicities

Cancer therapy-associated neurotoxicities can exert debilitating effects on patients and negatively impact the course of cancer treatment. There is a critical need for accurate biomarker tests that could predict the onset as well as assess the severity of neurotoxicities. In addition, such tests could potentially provide real-time feedback to clinicians during treatment to proactively adjust or fine-tune cancer therapy regimen and for supportive care for patients who experience acute or long-term toxicities. Recent data from a number of clinical studies have shown that blood-based Simoa® biomarker assays (NfL, etc.) are promising as **predictive** and **quantitative** biomarkers for cancer therapy-associated neurotoxicities.

This Publication Brief summarizes published studies in two key areas: (1) chemo-induced neurotoxicities, both for peripheral neuropathy (CIPN) and CNS neurotoxicity; (2) neurotoxicities associated with other cancer therapies such as CAR T-cell therapy, immunotherapy and targeted therapy. We look forward to adding new publications in this critically important area.

Focus	Article	Authors	Journal
<b>Chemo-Induced Peripheral Neuropathy (CIPN)</b>			
Review	Neurofilament light chain as a biomarker of chemotherapy-induced peripheral neuropathy	N. Anderson et al.	Trends in Pharmacological Sciences. 2024
Preclinical (mouse)	Characterization of novel SARM1 inhibitors for the treatment of chemotherapy-induced peripheral neuropathy	J. Chen et al.	Biomedicines. 2024
Breast cancer	Blood biomarkers for neuroaxonal injury and astrocytic activation in chemotherapy-induced peripheral neuropathy	J. Adra et al.	Acta Oncol. 2024
Breast cancer, Gastro-intestinal, Lymphoma	Plasma neurofilament light chain levels in chemotherapy-induced peripheral neurotoxicity according to type of anticancer drug	R. Velasco et al.	Eur J Neurol. 2024
Melanoma, Sarcoma, Merkel cell carcinoma	A prospective feasibility trial exploring novel biomarkers for neurotoxicity after isolated limb perfusion	A. Corderfelt Keiller et al.	Perfusion. 2023
Breast cancer	Studies to assess the utility of serum neurofilament light chain as a biomarker in chemotherapy-induced peripheral neuropathy	G. Cavaletti et al.	Cancers. 2023
Ovarian cancer	Neurofilament light chain as a biomarker of axonal damage in sensory neurons and paclitaxel-induced peripheral neuropathy in patients with ovarian cancer	C. Mortensen et al.	Pain. 2023
Breast cancer	Serum neurofilament levels correlate with electrodiagnostic evidence of axonal loss in paclitaxel-induced peripheral neurotoxicity	R. Velasco et al.	Journal of Neurology. 2023



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NSCLC	Neurofilament light as a predictive biomarker of unresolved chemotherapy-induced peripheral neuropathy in subjects receiving paclitaxel and carboplatin	B. Burgess et al.	Scientific Reports. 2022
Gynecological cancers	Blood neurofilament light chain as a biomarker for monitoring and predicting paclitaxel-induced peripheral neuropathy in patients with gynecological cancers	S.H. Kim et al.	Front. Oncol. 2022
Breast cancer	Prospectively assessing serum neurofilament light chain levels as a biomarker of paclitaxel-induced peripheral neurotoxicity in breast cancer patients	S. Karteri et al.	Journal of the Peripheral Nervous System. 2022
Breast cancer, Ovarian cancer	Neurofilament proteins as a potential biomarker in chemotherapy-induced polyneuropathy	P. Huehnchen et al.	JCI Insight. 2022
Breast cancer	Serum neurofilament light chain levels as biomarker of paclitaxel-induced cognitive impairment in patients with breast cancer: a prospective study	A. Argyriou et al.	Supportive Care in Cancer. 2022
Preclinical (rodent)	Pharmacological SARM1 inhibition protects axon structure and function in paclitaxel-induced peripheral neuropathy	T. Bosanac et al.	Brain. 2021
Breast cancer	Neuroinflammation and its association with cognition, neuronal markers and peripheral Inflammation after chemotherapy for breast cancer	G. Schroyen et al.	Cancers. 2021
Preclinical (rodent)	Assessment of neurofilament light protein as a serum biomarker in rodent models of toxic-induced peripheral neuropathy	G. Fumagalli et al.	Neuromethods (vol. 172). 2021
Preclinical (rodent)	Neurofilament light chain: a specific serum biomarker of axonal damage severity in rat models of chemotherapy-induced peripheral neurotoxicity	C. Meregalli et al.	Archives of Toxicology. 2020
Colorectal cancer	Serum neurofilament light chain levels as a biomarker of neuroaxonal injury and severity of oxaliplatin-induced peripheral neuropathy	S.H. Kim et al.	Scientific Reports. 2020
Preclinical (rodent)	Neurofilament light chain as disease biomarker in a rodent model of chemotherapy induced peripheral neuropathy	C. Meregallia et al.	Experimental Neurology. 2018
<b>Other Cancer Therapy-Associated Neurotoxicities</b>			
CAR T-cell therapy, Immunotherapy	Neurofilament light chain in serum of cancer patients with acute neurological complications	A. Gottiparthi et al.	CNS Oncol. 2024
Immunotherapy	Concentrations of S100B and neurofilament light chain in blood as biomarkers for checkpoint inhibitor-induced CNS inflammation	S. Bjursten et al.	EBioMedicine. 2024
Targeted therapy	Neurofilaments as serum biomarkers of brentuximabvedotin-induced peripheral neurotoxicity in CD30+ lymphoma patients: A prospective single-center study	E. Domingo Domenech et al.	Blood. 2023



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CAR T-cell therapy	Assessment of pretreatment and posttreatment evolution of neurofilament light chain levels in patients who develop immune effector cell–associated neurotoxicity syndrome	O. Butt et al.	JAMA Oncology. 2022
CAR T-cell therapy	Neurofilament light chain serum levels correlate with the severity of neurotoxicity after CAR T-cell treatment	F. Schoeberl et al.	Blood Advances. 2022
<b>Drug-Induced Neurotoxicities (General)</b>			
Preclinical (mouse)	Plasma neurofilament light chain as a potential biomarker of neurodegeneration in murine brain	T. Sano et al.	Toxicology Research. 2023
Spinal Muscular Atrophy, Huntington's disease (preclinical)	Neurofilament light chain: A translational safety biomarker for drug-induced peripheral neurotoxicity	D. Theil et al.	Toxicologic Pathology. 2023
Preclinical (rodent)	Blood neurofilament light chain as a potential biomarker for central and peripheral nervous toxicity in rats	T. Sano et al.	Toxicological Sciences. 2021

