

## 13.18. Somatosensory Neurotoxicity: Agents and Assessment Methodology\*

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The somatosensory system is comprised of a variety of sensory receptors located in the skin, muscle tendons, and visceral organs that are innervated by myelinated and nonmyelinated axons of the peripheral nervous system. These peripheral sensory nerve fibers in turn communicate somatosensory information to spinal reflex pathways and to the ascending sensory tracts and integration centers of the central nervous system. The consequences of somatosensory toxicity may appear as abnormal paresthesia, tingling or burning sensations, or deficits in sensitivity to touch, vibration, pain, temperature, or position sense. The evaluation of somatosensory function may be accomplished through a variety of behavioral and neurophysiological procedures. Somatosensory toxicity may follow exposure to industrial chemicals, natural toxins, or therapeutic agents. For example, somatosensory neurotoxicity may be an important dose-limiting side effect for several chemotherapeutic drugs. This chapter provides an overview of the anatomy and physiology of the somatosensory system, behavioral and neurophysiological assessment techniques, and selected chemicals or chemical classes that can produce somatosensory toxicity.

ATSDR, Agency for Toxic Substances and Disease Registry; ddC, 2',3'-dideoxycytidine; ddl, 2',3'-dideoxyinosine; IDPN, p,pt-iminodipropionitrile; MOL, method of limits; NTE, neuropathy target enzyme; OPIDN, organophosphate-induced delayed neuropathy; PEST, parameter estimation by sequential testing; RMS, root mean square; SEP, somatosensory evoked response; TCDD, 2,3,7,8-tetrachlorobenzo-p-dioxin; TET, triethyl tin; TOCP, triorthocresyl phosphate; TST, temperature sensitivity tester; UDR, up-<down rule; UDTR, up-<down transformed rule

### 13.18.1. Introduction

Impairment in somatosensory system function may be a consequence of exposure to environmental, industrial, or agricultural agents, as well as some classes of therapeutic drugs. For example, [Anger \(1990\)](#) reported tactile disorders to be a possible consequence of exposure to 77 of 750 industrial chemicals identified as neurotoxic. This chapter is an updated version of a comprehensive work on this topic by Dr.