


# Current Research of the MA Science Advisory Board: March Meeting Nano Petition





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This guide includes resources gathered for review by the MA Science Advisory Board for the purpose of making recommendations to the MA Administrative Council

**Last Updated:** Mar 14, 2022 1:56 PM | **Type:** General Purpose  | **URL:** <https://guides.turi.org/c.php?g=786665> 

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<a href="#">November Meeting Nano Petition</a>		<a href="#">January 2021 Pulmonary Toxicity of MWCNT</a>					
<a href="#">February 2022 Pulmonary Toxicity of MWCNT</a>		<a href="#">March Meeting Nano Petition</a>					



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### Information from TURI



We agreed that the March meeting would continue to focus on Multi-Walled Carbon Nanotubes, all effects other than Pulmonary Toxicity. Please see the February meeting minutes below for board review. TURI will add threshold information here as well.

Members have signed up for focus areas as follows:

**Carcinogenicity:** Robin, Denise, Chris

**Genotoxicity/Mechanistic:** Wendy, Christy

**Neurotoxicity/Cardiac effects/Translocation:** Christy

**Environmental:** Helen, Lisa



- MWCNT GreenScreen July 2021
- Aschberger 2019: Grouping MWCNT to read across genotox case study
- DRAFT SAB Meeting Minutes for Board Review
- TURI 2022: Threshold Determination Background

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### Environmental Effects



Nel 2009 (in the genotoxicity and mechanism box) may also be helpful for this endpoint.



- MWCNT Environmental Effects Literature Review
- Peterson 2011: Release Pathways, Fate, and Ecological Risks of CNT
- Jang 2018: Effects of MWCNT Toxicity and Bioaccumulation of lead in Daphnia magna
- Yi 2019: MWCNT Toxicity of Triphenyltin to Marine Copepod Tigriopus japonicus

### Information from Stakeholders



Materials submission deadline for this meeting is 3/14.



- Petition for Nanomaterials
- PEER Supplement to petition
- CWA Supplement to petition
- Cambridge PH Supplement to petition

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### Carcinogenicity



Additionally, the 2020-2024 IARC Priority Monographs can be accessed here.



- MWCNT Carcinogenicity Literature Review
- Grosse 2014: Carcinogenicity of...carbon nanotubes
- WHO 2017: Some nanomaterials and nanofibers
- Fukushima 2018: Carcinogenicity of MWCNT: Issue on Hazard Assessment
- Kasai 2015: Thirteen-week study of toxicity of MWCNT inhalation exposure in rats
- Kasai 2016: Lung Carcinogenicity of Inhaled MWCNT in Rats
- Kasai 2019: LTE Thinking on Occupational Exposure Assessment of MWCNT Carcinogenicity
- Sargent 2014: Promotion of Lung Adenocarcinoma Inhalation Exposure to MWCNT
- Atsushi 2019: Carcinogenicity of MWCNT in transgenic rasH2 mice
- Numano 2019: MWCNT-7 induces development of

- De Marchi 2019: Toxicity evaluation carboxylated CNT to tubeworm
- Yan 2018: Influence of MWCNT toxicity 17β-estradiol zebrafish
- Hartono 2018: Probing the toxicity mechanism of MWCNT on bacteria
- Coll 2016: Probabilistic Environmental Risk Assessment of Five Nanomaterials
- Ming 2018: Toxicity of CNT to white rot fungus
- Stanley 2016: Sublethal Effects of MWCNTs on Daphnia Magna
- Falinski 2019: Establishing structure-property-hazard relationships for MWCNTs: aggregation, surface charge, and oxidative stress on embryonic zebrafish mortality
- Mouchet 2016: International standardized procedures in vivo evaluation MWCNT water
- Sun 2013: Comprehensive probabilistic modelling of emissions of nanomaterials
- Hu 2018: Characterization of toxicity of nanoscale fragments WWTP
- Cordeiro 2020: MWCNT's functionalized with pyrene-PEG via π-π interactions: toxicological assessment in zebrafish embryos
- Zhao 2021: Reproductive toxicity and chronic effects of MWCNT exposure to Xenopus tropicalis
- Tavabe 2020: Toxicity effects of MWCNTs nanomaterial on the common carp
- Andre 2018: Protein oxidation in fish fed MWCNT
- Gorrochateui 2017: Diet-sourced CNT induce lipid alterations in tissues of zebrafish

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pleural mesothelioma in rats

- Rahman 2017: MWCNT induced genotoxic pulmonary carcinogenesis
- Saleh 2020: Carcinogenicity study of thick, straight, thin, and tangled MWCNT
- Luanpitpong 2016: Induction of cancer-associated cells dictates its tumorigenicity
- Lu 2019: Long term pulmonary exposure to MWCNT promotes breast cancer
- Chernova 2017: Long-fiber CNTs replicate asbestos-induced mesothelioma with disruption of th tumor suppressor gene
- Takagi 2012: Dose-dependent mesothelioma induction by intraperitoneal administration of MWCNT

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



### Genotoxicity and Mechanistic Studies

Below, please see the studies that most relate to genotoxicity and mechanisms for MWCNT. The Fraser study may be especially helpful and Dong and Ma, 2015 was also noted as particularly helpful.

- MWCNT Genotoxicity and Mechanistic Literature Review
- Fraser 2020: Physiochemical Characteristics and Genotox of CNT
- Dong 2015: Advances in mechanisms and signaling pathways of CNT toxicity
- Lindberg 2009: Genotoxicity of Nanomaterials
- Shvedova 2016: Integrated Analysis of Dysregulated ncRNA and mRNA Expression Profiles in Humans Exposed to Carbon Nanotubes
- Snyder-Talkington 2019: Differential gene regulation

## Neurotoxicity Studies

































This section focuses on cardiac studies, studies obviously focused on translocation, and neurotoxicity studies.

-  Aragon 2017: Serum-bone bioactivity caused by pulmonary MWCNTs induces neuroinflammation via BBB 
-  Cao 2019: Pharmacological and toxicological aspects of CNTs to vascular system: A review 
-  Heusinkveld 2016: Neurodegenerative and neurological disorders by small inhaled particles 
-  Mostovenko 2021: CNT exposure triggers a cerebral peptidomic response: barrier compromise, neuroinflammation, and hyperexcited state 
-  Visalli 2017: In vitro assessment of neurotoxicity and neuroinflammation of MWCNTs 
-  Ruenraroengsak 2016: Translocation of Functionalized MWCNT Human Alveolar 
-  Poulsen 2015: Changes in cholesterol homeostasis and acute phase response link pulmonary exposure to MWCNT to risk of cardiovascular disease 
-  Mandler 2018: Microvascular Dysfunction MWCNT Exposure Mediated by Thrombospondin-1 Receptor CD47 
-  Chen 2015: Subchronic toxicity and cardio responses after exposure to MWCNT 
-  Zheng 2018: Effects of inhaled MWCNT on blood pressure and cardiac function 
-  Kuijpers 2018: Cardiovascular effects among workers exposed to MWCNT 













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following MWCNT exposure 

-  Zhao 2016: MicroRNA-Mediated Insulin Signaling Pathway Regulates the Tox of MWCNT in Nematode Caenorhabditis elegans 
-  Scala 2021: MWCNT elicit DNA changes in long-term pulmonary exposure 
-  Mostovenko 2021: Nanotube Exposure Triggers 
-  Bhattacharya 2013: Mechanisms of carbon nanotube-induced toxicity: Focus on pulmonary inflammation 
-  Beard 2018: Exposure and Sputum and Blood Biomarkers of Early Effect US Workers 
-  Yuvaraj 2016: Tox assessment of CNTs on erythrocyte morphology and lymphocytes in vitro 
-  Requardt 2019: Surface defects reduce CNT toxicity in vitro 
-  Davis 2018: MWCNT signaling pathways cholesterol transport inflammatory markers in mice 
-  Esposito 2015: Exploring Possible Mechanisms of Action QSAR Models 
-  Yanamala 2013: Molecular Modeling in Structural Nanotoxicology 
-  Khaliullin 2015: In vitro toxic effects of different CNTs 
-  Ghosh 2017: Changes in DNA induced by MWCNT exposure 
-  Kermanizadeh 2015: Nanomaterial translocation - biokinetics and fate in organs 
-  Hussain 2012: Interactions of Nanomaterials with the Immune System 
-  Palomaki 2011: CNT and Asbestos Activate NLRP3 Inflammasome 
-  Nel 2009: Biophysiochemical interactions at the nano-bio interface 



-  Keshaven 2019: Nano-bio interactions- a neutrophil-centric  ▾
-  Nahle 2020: Genes expression profiling non-functionalized MWCNT shows three mechanisms of toxicity  ▾
-  Catalan 2016: In vitro and in vivo genotoxic effects of straight vs tangled MWCNT  ▾
-  Garcia-Rodriguez 2019: The Comet Assay a Tool to Detect the Genotoxic Potential of Nanomaterials  ▾
-  Duke 2018: Mechanisms of Carbon Nanotube Induced Pulmonary Fibrosis  ▾
-  Sun 2015: NADPH Oxidase Dependent NLRP3 Inflammasome Activation  ▾

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