



## ortho-Toluidine

### Key Points



#### ortho-Toluidine

- *Known to be a human carcinogen*
- Used primarily to make rubber chemicals, herbicides, and textile dyes
- Highest exposure occurs in the workplace, by skin contact or inhalation, but also found in tobacco smoke and some medical products
- Exposure causes urinary bladder cancer in humans

#### Report on Carcinogens Status

*Known to be a human carcinogen*

#### What is ortho-toluidine?

ortho-Toluidine is a synthetic chemical produced in other countries and imported into the U.S. by several companies in high volumes. It is a light yellow liquid that becomes reddish brown upon exposure to air and light.

#### How is ortho-toluidine used?

ortho-Toluidine is primarily used to make rubber chemicals, herbicides, dyes, and pigments. It is also used in some medical products.

#### How are people exposed to ortho-toluidine?

People are mainly exposed through the workplace, by skin contact or inhalation, when manufacturing or using ortho-toluidine to make rubber chemicals, pesticides, or dyes.

People can also be exposed to ortho-toluidine outside of the workplace, through tobacco smoke, the local medical anesthetic prilocaine, products that contain ortho-toluidine-based dyes, or the environment.

Environmental contamination occurs when ortho-toluidine is released into air, land, or water, through its production and use.

#### What evidence is there that ortho-toluidine causes cancer?

##### Human Studies

The association between urinary bladder cancer and exposure to ortho-toluidine has been studied in rubber chemical workers and dye workers. These studies show that ortho-toluidine exposure causes urinary bladder cancer in humans.

##### Animal Studies

Similar to humans, rats developed urinary bladder tumors after ingesting ortho-toluidine. Exposure to ortho-toluidine also caused tumors of the connective tissue; subcutaneous tissue, or

deepest layer of the skin; mesothelium, or tissue that surrounds certain organs and forms the lining of certain body cavities. Mice that were exposed to ortho-toluidine developed tumors in blood vessels and the liver.

##### Mechanistic Studies

Cancer formation may be related to ortho-toluidine being metabolized and transformed in the body to become more bioactive and toxic. ortho-Toluidine, primarily via its metabolites, may also cause DNA damage, chromosomal damage, and mutations that lead to cancer. Importantly, these studies provide evidence that the mechanisms by which ortho-toluidine cause cancer in rodents are likely to occur in exposed humans.

#### What are some things I can do to reduce exposure to ortho-toluidine?

Workers and employers should practice good occupational health behaviors, which may include wearing protective clothing, respirators, and gloves. Work places should be well-ventilated, and the time workers are exposed to ortho-toluidine should be reduced. Quit smoking and avoid secondhand smoke. When possible, limit exposure to products containing ortho-toluidine.

#### Where do I go for more information?

National Toxicology Program  
<http://ntp.niehs.nih.gov/go/37898>

National Institute for Occupational Safety and Health  
<http://www.cdc.gov/niosh/topics/ot/workers.html>

Occupational Safety and Health Administration  
<https://www.osha.gov/chemicaldata/chemResult.html?recNo=757>



The Report on Carcinogens, Thirteenth Edition, is prepared by the National Toxicology Program, an interagency group coordinated by the U.S. Department of Health and Human Services. The report identifies agents, substances, mixtures, or exposures in two categories: *known to be a human carcinogen* and *reasonably anticipated to be a human carcinogen*. **The full Report on Carcinogens is available at <http://ntp.niehs.nih.gov/go/roc13>.**