This fact sheet answers the most frequently asked health questions (FAQs) about 4,4'-methyleneedianiline. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It’s important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 4,4'-methyleneedianiline occurs mainly in the workplace. Liver damage and skin irritation may occur from exposure to high levels of 4,4'-methyleneedianiline. This chemical has been found in none of the 1,445 National Priorities List sites identified by the Environmental Protection Agency (EPA).

**What is 4,4'-methyleneedianiline?**
(Pronounced meth'əl-ən' di ən'ələn)

4,4'-Methyleneedianiline is an industrial chemical that is not known to occur naturally. It is also commonly known as diaminodiphenylmethane or MDA. It occurs as a colorless to pale yellow solid and has a faint odor.

4,4'-Methyleneedianiline is used mainly for making polyurethane foams, which have a variety of uses, such as insulating materials in mailing containers. It is also used for making coating materials, glues, Spandex® fiber, dyes, and rubber.

**What happens to 4,4'-methyleneedianiline when it enters the environment?**

- 4,4'-Methyleneedianiline becomes strongly attached to soil and will not easily move into groundwater.
- It may take as long as 10 days for bacteria and microorganisms in soil to break down 4,4'-methyleneedianiline.

**How might I be exposed to 4,4'-methyleneedianiline?**

- Working in an industry that makes or uses 4,4'-methyleneedianiline.
- Touching consumer goods such as polyurethane foams that contain it.
- Living near a hazardous waste site where 4,4'-methyleneedianiline is disposed of.
- Being treated by a kidney dialysis machine. Tiny amounts are released from the polyurethane parts of the machine when it is sterilized by radiation or heat.

**How can 4,4'-methyleneedianiline affect my health?**

Limited information is available on the effects of 4,4'-methyleneedianiline on people’s health. The available
information shows that it can cause skin irritation and liver damage. People who accidentally ate bread baked from flour contaminated with 4,4'-methylenedianiline became ill with a flu-like condition, consisting of stomach and chest pains. They also exhibited jaundice, a yellowish coloring of the skin or internal organs caused by abnormal functioning of the liver.

Animals that breathed very high levels of 4,4'-methylene­dianiline showed eye damage, while animals that ate food or drank water with moderate amounts of 4,4'-methylenedianiline for months or years had liver damage and thyroid gland injuries. Exposure of the skin to high levels of the chemical also resulted in liver damage in animals.

It is not known whether 4,4'-methylenedianiline can affect the development of the fetus or the ability to fight disease in people or animals.

How likely is 4,4'-methylenedianiline to cause cancer?

The International Agency for Research on Cancer has determined that 4,4'-methylenedianiline is possibly carcino­genic to humans.

A study on people exposed to bread contaminated with 4,4'-methylenedianiline did not show an increased risk of cancer. An animal study showed cancer of the liver and thyroid after animals drank water over their lifetimes containing 4,4'-methylenedianiline.

Has the federal government made recommendations to protect human health?

The EPA requires that spills or accidental releases into the environment of 1 pound or more of 4,4'-methylenedianiline be reported to the EPA.

The Occupational Safety and Health Administration has set an occupational exposure limit of 0.081 milligrams of methylenedianiline per cubic meter of air (0.081 mg/m³) for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health recommends that workers should not breathe air containing more than 0.03 mg/m³ of 4,4'-methylenedianiline during a 10-hour workday, 40-hour workweek.

Glossary
Carcinogenicity: Ability to cause cancer.
CAS: Chemical Abstracts Service.
Milligram (mg): One thousandth of a gram.

References