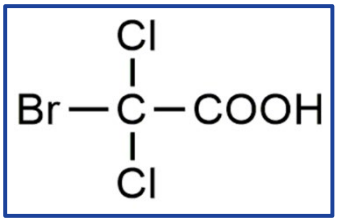
SUMMARY

Background: Bromodichloroacetic acid occurs as a byproduct of water disinfection. Although little is known about the effects of bromodichloroacetic acid in humans, other disinfection by products have been associated with alterations in reproductive function or fetal development. The effects of exposure to bromodichloroacetic acid in drinking water in male and female rats and mice were studied to identify potential toxicity or cancer-related outcomes.



Methods: Groups of 66 male and 66 female rats and mice were given drinking water containing 250, 500, or 1,000 milligrams (mg) of bromodichloroacetic acid per liter (L) for 2 years. Control animals received 0 mg/L (tap water with no chemical added). Additional 2-week and 3-month studies were conducted to set appropriate doses, assess organ weight changes and reproductive toxicity, and identify target organs for subsequent studies. Tests were conducted to evaluate the potential for bromodichloroacetic acid to cause DNA damage. At the end of the study, tissues from more than 40 sites from every animal were examined for signs of disease.

Results: Groups of female rats and male mice receiving 500 or 1,000 mg/L of bromodichloroacetic acid had lower survival rates than the control groups. Body weights were reduced in male and female rats and mice, and water consumption was decreased in male and female rats. Female rats receiving bromodichloroacetic acid had increased incidences of neoplasms (which can include benign or malignant growths) of the mammary gland. Male rats receiving bromodichloroacetic acid had increased rates of malignant neoplasms of the lining of tissues and a variety of skin neoplasms. There were a few occurrences of uncommon neoplasms of the oral cavity, large intestine, and mammary gland in male rats exposed to bromodichloroacetic acid and of uncommon brain neoplasms in exposed male and female rats. Incidences of malignant liver neoplasms were seen in male and female mice exposed to bromodichloroacetic acid. Exposed male mice had increased incidences of neoplasms of the Harderian gland (a gland in the eye). Other effects observed included noncancerous tissue abnormalities in the mammary gland and spleen of female rats, bone marrow and liver of male and female rats, liver of male and female mice, and testis and epididymis (a tube behind the testes) of male mice. Tests to evaluate the potential for bromodichloroacetic acid to damage DNA produced inconclusive results.

Conclusions: *The NTP four-point scale rates the level of evidence that a substance has the ability to cause cancer in laboratory animals. Under the conditions of these 2-year drinking water studies, there was clear evidence that bromodichloroacetic acid exposure has the ability to cause malignant neoplasms of the lining of tissues and skin cancer in male rats, mammary gland cancer in female rats, liver cancer and Harderian gland cancer in male mice, and liver cancer in female mice; some evidence that it has the ability to cause neoplasms underneath the skin in male rats; and equivocal (uncertain) evidence that it has the ability to cause brain cancer, oral cancer, and neoplasms in the large intestine and mammary gland of male rats and brain cancer in female rats. In addition, bromodichloroacetic acid exposure caused increased incidences of noncancerous tissue abnormalities in the bone marrow and liver of male and female rats, spleen of female rats, liver of male and female mice, and testis and epididymis of male mice.*