Fourth Collegium Ramazzini Statement (1995)

Oxygenated and Reformulated Gasoline (MTBE)

The Collegium Ramazzini, an independent organization dedicated to occupational health, and comprised of internationally renowned physicians and scientists from 30 countries (including the United States, Sweden, Finland, Germany, Japan, Canada, Italy, Belgium, and China), sponsors special conferences focussing on new developments that may impact public health and the environment.

On November 3, 1995, the Collegium Ramazzini held a special scientific conference in Washington, DC, where papers were submitted on the health effects of the motor gasoline additives methyl tertiary butyl ether (MTBE) and 1,3-butadiene.

MTBE is a gasoline additive used principally during winter months. It comprises 11-15% of gasoline. Because of new federal regulations, it is being used in steadily increasing amounts in the United States. In 1979, a gallon of premium gasoline sold in the United States contained about 3% of the additive MTBE in about 10% of cars. Because of the Clean Air Act, oxygenated (reformulated) gasoline is sold in 9 US cities with the worst smog problems and in 17 states. Nearly one quarter of all gasoline sold through the country contains this additive. In 1992, the annual production of MTBE was 10.86 billion pounds (approximately 72,000 barrels per day).

A major regulatory failure is that MTBE was not adequately tested for either acute or chronic toxic effects before it was added in significant quantities to gasoline. Many consumers and workers, when exposed to gasoline containing MTBE, complain of extreme headaches, vomiting, diarrhoea, fever, cough, muscle aches, sleepiness, disorientation, dizziness, and skin and eye irritation. MTBE is known to cause central nervous system (CNS) depression, tremours, ataxia, laboured breathing, chronic inflammation of nasal mucosa, eye irritation, and skin rashes.

MTBE may also increase risk of cancer, and this risk was not adequately assessed prior to introducing this product into commerce. Recent studies by Belpoggi, Soffritti and Maltoni (1995) have shown that oral exposure to MTBE causes dose-related, statistically significant increases of lymphoma and leukaemias, and of testicular Leydig cell cancers in rats. In 1992, Burleigh-Flayer *et al.* reported that inhalation exposure to MTBE caused an increase in the number of liver tumours in mice. In males there was a statistical increase in carcinomas, while in females there was a statistically significant increase in adenomas. In 1992, Chun *et al.* reported a statistically significant increase in kidney tumours in male rats after inhalation exposure. MTBE causes cancers in many organs and tissues of two species of experimental animals; these cancers are similar to those caused by exposure of comparable doses of benzene, vinyl chloride, and 1,3-butadiene, all recognized carcinogens.

There is general agreement among experts in chemical carcinogenesis that a substance which causes cancer in significant numbers of experimental animals in well-conducted assays poses a presumptive carcinogenic risk to some humans, even in the absence of confirmatory epidemiological data.

The Collegium Ramazzini concludes that exposure to MTBE in gasoline should be avoided in order to prevent needless illnesses of both consumers and workers. The Collegium Ramazzini urges that the toxicity of MTBE be fully and vigorously examined. It is not prudent to permit the wide environmental releases of a compound that may cause acute illness as well as cancer.

Fifth Collegium Ramazzini Statement (1995)

1,3-Butadiene

The Collegium Ramazzini, an independent organization dedicated to occupational health, and comprised of internationally renowned physicians and scientists from 30 countries (including the United States, Sweden, Finland, Germany, Japan, Canada, Italy, Belgium and China), sponsors special conferences focussing on new developments that may impact public health and the environment. On November 3, 1995, the Collegium Ramazzini held a special conference on 1,3-butadiene in Washington, DC, during which time a press conference was also held concerning methyl tertiary butyl ether (MTBE).

1,3-butadiene, an ingredient found in synthetic rubber, plastic, gasoline, and motor vehicle exhaust, is consumed in the United States at the rate of 4.5 billion pounds per year. In experimental studies using two

animal species, 1,3-butadiene was shown to cause cancers at levels of exposure substantially below the current permissible exposure limit (PEL) in the American workplace.

In mice, 1,3-butadiene was found to cause malignant lymphomas, cardiac haemangiosarcoma, alveolar and bronchial cancers, ovarian carcinomas, and hepatocellular neoplasms. In rats, 1,3-butadiene was found to cause pancreatic adenomas, uterine sarcomas, Zymbal gland carcinomas, mammary cancer, thyroid cancers, and testicular cancers.

Many epidemiological studies on humans now have shown that workers employed in synthetic rubber plants who are exposed to 1,3-butadiene suffer excess mortality from lymphatic and haematopoietic malignancies, including lymphosarcoma and leukaemia.

The Collegium Ramazzini concludes, on the basis of both toxicological and epidemiological data, that there is clear evidence of the carcinogenicity of 1,3-butadiene in humans. It is therefore imperative that occupational exposure to 1,3-butadiene be drastically reduced. Further, it is the opinion of the Collegium Ramazzini that exposure to 1,3-butadiene be avoided in the workplace in order to prevent needless illness and injury to working men and women.