Acrylamide (AA) is an important industrial chemical used mainly in the production of polymers. It can be absorbed through the skin. AA was shown to be a germ cell clastogen that entails a genetic risk for exposed workers. The genetic risk calculation was based on mouse heritable translocation test data obtained after acute intraperitoneal (ip) exposure (Adler et al., 1994). To obtain a correction factor between ip and dermal exposure, dominant lethal and heritable translocation tests were carried out with dermal exposure of male mice to AA. In the dominant lethal test, male (102/Ei × C3H/Ei)F1 mice were exposed by dermal application to the shaved backs of 50 mg/kg AA per day on five consecutive days or to five daily ip injections of 50 mg/kg AA. One day after the end of exposure, the males were mated to untreated females of the same hybrid stock for four days and females were changed every four days for a total of five matings. Dominant lethal effects were found during matings 1–3. For ip exposure, these values were 81.7, 85.7 and 45.4%, respectively; for dermal exposure the corresponding values were 22.1, 30.6 and 16.5%, respectively. In the heritable translocation assay, male C3H/Ei mice were treated with five dermal exposures of 50 mg/kg AA and mated 1.5–8.5 days after the end of exposure to untreated female 102/Ei mice. Pregnant females were allowed to come to term and all offspring were raised to maturity. Translocation carriers among the F1 progeny were selected by a sequential fertility.
testing and cytogenetic analysis including G-band karyotyping and M-FISH. A total of 475 offspring were screened and 41 translocation carriers were identified. The observed translocation frequency after dermal exposure was 8.6% as compared to 21.9% after similar ip exposure (Adler, 1990). The calculated ratio of ip vs. dermal exposure of 0.39 can be applied to obtain a more realistic calculation of genetic risk for dermally exposed workers.