Diffrence of acrylamide-inducing genotoxicity and adduct formation
between child and adult rats

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Acrylamide (AA), a chemical in the fried or baked foods, induces
mutagenic/carcinogenic activities to human. AA is relatively highly contained in foods
that child like such as snacks and cereals, and baby foods. Therefore, it is important to
elucidate the difference of genotoxicity of AA to child and adult.

We treated young (3 weeks) or adult (7 weeks) male rats (gpt-delta transgenic F344
or SD rats) with AA at the concentration of 20-80 or 50-200 mg/l of for 28days,
followed by examined the genotoxicity in blood, liver and testis using comet,
micronucleus and gpt mutation assays. We also analyzed the levels of DNA adducts
(N7-GA-Guanine) derived from glycidamide (GA), which is a metabolite of AA, in
liver, testis, mammary gland and thyroid gland.

It was observed the dose-related increases of micronuclei in peripheral blood of AA
treated mice. DNA damage in liver was significantly induced by AA (at middle and
high doses) treatment. However, gpt mutations were not confirmed in tissue samples of
AA-treated rats.

On the other hand, testis of young rats showed the significant genotoxic response in
the micronuclei test, comet assay and the gpt mutations test compared with adult rats.
DNA adduct analysis revealed that N7-GA-Gua was significantly increased in testis and
mammary gland of AA-treated young rats in a dose-dependent manner. The adduct
level of testis treated with AA at the high dose was 8-folds higher in young rats than
those in adult rats. There was no significant difference of genotoxicities in peripheral
blood and liver of between young and adult rats. From these results, AA caused
significant genotoxicity in only testis of young rats and it corresponded to the adduct
level in testis. We should examine the germinal mutagenicity and reproductive toxicity
of children exposed to AA through daily foods.