GENETIC DAMAGE IN BONE-MARROW CELLS OF MICE FOLLOWING CONSUMPTION OF COOKED BEEF. PRELIMINARY INVESTIGATIONS.

M. FENECH

It is currently hypothesised that cooked meat in the diet may contribute to elevated genotoxic and cancer risk, possibly as a result of the production of carcinogenic heterocyclic amines and polycyclic hydrocarbons during frying (Felton and Knize 1991) or charcoal barbecuing (Lijinsky 1991). In this study, the bone marrow micronucleus assay was used to investigate if consumption of cooked meat could induce in vivo chromosome damage in female Swiss albino mice.

In the first experiment, lean minced beef was either cooked to a 'rare' state using a microwave oven or pan-fried to a 'well done' state using a commercially available hot-plate. In the second experiment, lean diced beef was charcoal barbecued to a 'rare' or 'well done' state directly over burning charcoal in a barbecuing kettle. In each experiment, mice were allocated to three groups consisting of (a) control mice on normal diet; (b) mice on a diet consisting of 50% 'rare' meat and 50% normal diet and; (c) mice on a diet of 50% 'well done' meat and 50% normal diet. Dietary interventions were performed over a period of 21 days at the end of which the mice were sacrificed for micronucleus assessment.

The data obtained suggest that there was no difference in the micronucleus frequency of mice on normal diet and mice on normal diet supplemented with 'rare', microwaved meat. However, supplementing the normal diet with 'well done', pan-fried meat, or 'rare' or 'well done', barbecued meat produced significant increments in the micronucleus frequency of polychromatic erythrocytes - the increments were of the order of 73% (P=0.045), 90% (P=0.047) and 136% (P=0.001) respectively. These results indicate that regular, high-level ingestion of 'well done' pan-fried or barbecued meat may increase baseline genetic damage. The accompanying decreased intake of vegetable constituents may have also contributed to the observed changes.

FELTON, J.S. and KNIZE, M.G. (1991). Mutation Res. 259: 205.
LIJINSKY, W. (1991). Mutation Res. 259: 251.

CSIRO Division of Human Nutrition, PO Box 10041 Gouger St, Adelaide SA 5000