

Notes from Charlie
Eason's presentation
Mon 21 May.

Toxicology Perspective relating to human health question at the ERMA meeting, Auckland 21/5/07 Dr C.T.Eason.

My name is Charles Eason. I am a New Zealand toxicologist and I have had a career studying the effects of drugs and toxins.

A toxicologist's role in this context is not to say "1080 is safe" nor is it to underplay the risks. It is to say what we know and be honest about what we do not know.

The effects of 1080, including the sub-lethal effects, have been studied in animals as surrogates for humans for 40-50 years. There are recent publications from New Zealand researchers as well as a wealth of international literature.

Therefore the acute toxicity of large doses as well as the sub-lethal effects of lower doses are known and these include biochemical effects and pathological effects. Known target organs in animals given substantial but sub-lethal doses include the:-

- Heart
- Lungs
- Liver
- Kidney
- Testes

And in addition the foetus.

Sub-lethal effects still require a substantial amount, as compared to minute residues and are more likely if there is prolonged exposure.

For example early publications on the sub-lethal effects of 1080 are found in the veterinary toxicology literature. These publications noted the effects, including damage to heart tissue induced by fluoroacetate in livestock that have been browsing poisonous plants containing fluoroacetate over a period of time.

Questions that were raised this morning related to EDCs and DNA.

Endocrine Disrupting Chemicals (EDCs) are classified by toxicologists as chemicals that have oestrogenic and anti-oestrogenic activity through binding to endocrine receptors. EDCs are synthetic chemicals that block normal oestrogenic activity e.g. dioxins, PCBs and DDT.

Receptor studies on 1080 and fluorocitrate conducted and published (and part funded I think by NZDA) showed that 1080 is not oestrogenic and lacks EDC effects. The sub-lethal effects on testes, which are well

documented, are most likely to be mediated through the effects of 1080 on the Krebs cycle.

1080 is classified as non-mutagenic based on the results of 3 standard toxicity tests:- The Ames test, the mouse micronucleus test and the mouse lymphoma assay.

Hence, 1080 is not mutagenic and not a classical EDC. But YES it can have sublethal effects and these effects including toxic effects on the testes and these are well documented. These effects have the potential to occur in humans.

To assess "Risk" to humans account needs to be taken of the likelihood of exposure as well as toxicity. Toxicologists think in terms of Risk= Hazard x Exposure.

In this context the important question is not so much can 1080 have sub-lethal effects? To which the answer is "yes".

(Other poisons for possum control including brodifacoum will also have the potential to cause sub-lethal effects).

The more important question is can exposure of the community occur at levels that could cause sub-lethal effects?

1080 water monitoring for over 10 years followed by very recently published work by Surens from NIWA shows that exposure through water supply is most unlikely. Dilution prevents exposure to toxicologically significant amounts and occurs very quickly.

My perspectives on exposure risk and personal concerns are in order:-

- i) firstly focused on those workers at the factories and who work with 1080 in the bush who must minimise personal exposure
- ii) the risk of secondary poisoning of dogs which is very hard to avoid

Communities are unlikely to be exposed if operations are conducted diligently and baits kept well away from communities.

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