# A study to test the effect of CV247 on the rate of growth of implanted RMA lymphoma cells in C57B1/6 mice.

The study was conducted under the direction of Professor P Beverley at the Department of Oncology, University College London Medical School.

## Background

The onset of cancer has been attributed, at least in part, to a reduced efficiency in combating the effects of reactive oxygen species and other free radicals, and to a reduction in the immunological defence mechanisms in the body. The formulation of CV247 is designed to help combat these deficiencies, by providing copper and manganese as essential co-factors to enhance the production and efficacy of superoxide dismutases. The inclusion of vitamin C is as an anti-oxidant, and which may also help to boost the immune system, whilst sodium salicylate, as an inhibitor of the COX enzymes and the production of PGE1, may promote cancer cell apoptosis and reduce cancer cell vasularisation. This preliminary study was designed to show whether CV247 possessed any anti-tumourogenic properties, without the side effects commonly attributed to anti-cancer drugs, by measuring its effect on the growth rate of RMA thymoma induced in mice.

## Study Objective

The objective of the study was to undertake a controlled trial of CV247 to evaluate its effects on the growth of transplantable tumours in inbred mice.

## Methods

A total of 50 male C57B1/6 mice were each injected subcutaneously with 3 X 10 RMA lymphoma cells, a dose known to give 100% tumour “take”. 24 experimental mice were treated with 0.1 ml of CV 247, administered once daily by gavage, whilst 26 control mice received water also by gavage. Experimental mice also received CV247 in their drinking water at 3 time points each day.

0.1ml of CV247 contained:

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| Mn gluconate | 0.2mg (0.025mg Mn) |
| Cu gluconate | 0.2mg (0.028mg Cu) |
| Vitamin C | 4.0mg |
| Na salicylate | 3.5mg |

Tumour diameters were measured twice daily.

## Results

The numbers of tumours growing in treated and control animals were compared using the Mann-Whitney U test, and rates of growth by repeated measure analysis of variance.
There was no significant difference between experimental and control animals during the early time points, but there was a statistically significant difference in the size of the tumours measured from day17 (median 0.53 for the experimental animals compared with 1.31 for the control group, p=0.012) and also for the weight of the excised tumours (median 0.4 for the experimental group compared with 1.0 for the control group, p= 0.0025).
In addition, at day 17, 4 tumours were too small to measure in the animals treated with CV247, compared with only 1 in the control group. In a number of mice more than 1 tumour grew along the injection needle tract, but this was considerably more frequent in the control group (10 mice) compared with the experimental group (1 mouse). In 3 control mice, tumours could not be excised because they were infiltrating deeper tissues.

There were no side effects attributable to CV247.

## Conclusion

At the doses used in this controlled study, CV247 demonstrated a convincing measurable effect on the growth rate of RMA thymoma in mice. CV 247 did not cure the cancer as tumours grew progressively in both the control and treatment groups, albeit more slowly in the latter. There were no attributable side effects suggesting that CV247 is safe.