EFFECT OF TEA ON THE TISSUE-DISTRIBUTION OF CAFFEINE

E. H. Karunanayake, P. Jayawardena
(Dept. of Biochemistry, Faculty of Medicine, University of Colombo, Colombo 8)
and
G. R. Roberts
(Tea Research Institute, Talawakelle)

Investigations were carried out to evaluate the effect of tea on the tissue-distribution of caffeine and its interactions with cellular macromolecules.

SECTION A

Following oral administration of (1-methyl-^{14}C) caffeine or (1-methyl-^{14}C) caffeine with tea to rats (n = 3), tissues (liver, kidney, spleen, testes and heart) were harvested, at 1, 2, 3, 4, 5, 6, 12 and 24 hours. Samples of tissues after processing were assayed for radioactivity. In all tissues, the highest radioactivity was observed 3 h after administration of caffeine. However, in the heart, the peak radioactivity was observed 6 h after oral administration.

In contrast, when caffeine was administered with tea, the highest level of radioactivity was observed in the testes. In all tissues, except the testes, the administration of caffeine with tea significantly lowered the tissue content of radioactivity. There was also evidence of a biphasic pattern of distribution of radioactivity in kidney, heart, spleen and testes, with a second peak of tissue-radioactivity appearing 6 h after the administration of caffeine with tea. At the cellular level, a significant amount of ^{14}C-label was associated with proteins and nucleic acids. The ratio of association between proteins and nucleic acids was approximately 4 : 1. These studies also revealed a very high association of radioactivity with the nucleic acids of ovarian tissues. This association of administered radioactivity with proteins and nucleic acids may play a role on the reported[1] teratogenic effects of caffeine.

The results of the effect of tea on the tissue distribution of caffeine again suggest a possible reduction in the bioavailability of caffeine by the component(s) present in tea.

This work was supported by a grant from the the Tea Research Institute.

Reference

1. Collins, F. X. T. (1979). Review on reproduction and teratology studies of caffeine, *F.D.A. By-lines*, (7), (Sept.).