

**ABSTRACT**

**INVESTIGATION OF THE CARDIOVASCULAR AND  
HAEMATOLOGICAL EFFECTS OF GINGER OLEORESIN IN  
HYPERCHOLESTEROLEMIC RATS**

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Ginger is a well known spice worldwide with many folklore claims. Ginger however has been reported to reduce blood pressure, serum lipids and to interfere with blood coagulation. Hypercholesterolemia is a major risk factor for cardiovascular diseases in which there can be alterations in blood pressure, plasma lipids and coagulation. Based on these reports, the present study was undertaken to investigate the cardiovascular and some haematological effects of ginger oleoresin in hypercholesterolemic rats.

In the study, male Sprague-Dawley rats were fed standard rat chow or a hypercholesterolemic diet (95% rat chow, 4% cholesterol and 1% cholic acid) along with ginger oleoresin (242 µg/kg and 484 µg/kg) or 1.1% alcoholic solution (ginger oleoresin vehicle) for six weeks.

The results show that the hypercholesterolemic diet significantly increased blood pressure, total serum cholesterol, triglyceride and low density lipoprotein (LDL) concentrations but it reduced prothrombin and activated partial thromboplastin times (PT and PTT respectively) in comparison to

animals fed rat chow and the ginger oleoresin vehicle. Administration of ginger oleoresin to animals fed the hypercholesterolemic diet decreased blood pressure, commencing at week three with significant reductions being observed at weeks five and six. Serum triglyceride concentration was also significantly decreased by ginger oleoresin (484 µg/kg), but total cholesterol, LDL and high density lipoprotein (HDL) concentrations were not significantly affected. However animals that were fed rat chow and 484 µg/kg ginger oleoresin had significantly elevated HDL concentrations. Administration of ginger oleoresin to animals fed the hypercholesterolemic diet also prevented the reductions in PT and PTT that were observed in the animals on the hypercholesterolemic diet and 1.1% alcoholic solution.

A possible mechanism by which ginger oleoresin reduced blood pressure was investigated using rat aortic rings. From these investigations, it was found that there were no differences in response in the aortic rings to phenylephrine, acetylcholine or sodium nitroprusside between animals on the hypercholesterolemic diet and 1.1% alcoholic solution and the hypercholesterolemic diet and ginger oleoresin. It was however observed that aortic rings from animals in the latter group had significantly greater relaxations to clonidine than those of animals fed the hypercholesterolemic diet and 1.1% alcoholic solution.

The effect of ginger oleoresin on bodyweight was also investigated, however ginger oleoresin did not significantly affect bodyweight.

Histological examination of aorta from animals in the study showed that the diets did not affect the anatomical integrity of the aorta. The hypercholesterolemic diet however resulted in severe fat infiltration in hepatocytes while the ginger oleoresin treatment reduced the fatty infiltration.

From these results, it is evident that ginger oleoresin can reduce some of the cardiovascular and haematological changes produced by hypercholesterolemia and a possible mechanism by which ginger oleoresin reduced blood pressure in hypercholesterolemic rats could be via vascular  $\alpha_2$  receptors.

Keywords: Tricishanna Racquel Henry; ginger oleoresin; hypercholesterolemic rats; blood pressure.