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Reduction of Adipose Tissue In-vivo by Use of Ultrasound Treatment with Synthesized Capsaicin-loaded Polycaprolactone Microparticles

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Abstract

Ultrasound therapy and the use of capsaicin-loaded microparticles were studied in order to determine their efficacy in reducing adipose tissues. A simple emulsion/solvent evaporation method was performed in order to encapsulate the capsaicin to increase gastric tolerability, followed by scanning electron microscope (SEM) and energy dispersive x-ray (EDX) analysis to ensure that the capsaicin was properly encapsulated. Forty-five (45) mice were divided in nine (9) study groups were namely: (1) positive control, (2) negative control, (3) ultrasound-treated group, (4) orally-delivered capsaicin group, (5) topically-delivered capsaicin group, (6) orally-delivered capsaicin together with topically-delivered capsaicin group, (7) ultrasound-treated with orally delivered capsaicin group, (8) ultrasound-treated with topically delivered capsaicin group, and (9) ultrasound-treated with orally and topically delivered capsaicin group. Mice were exposed to ultrasound for ten minutes then were administered with capsaicin orally and topically investigated in-vivo. Weight, fat thickness, cholesterol level and triglyceride test were performed throughout the 21 day treatment period. It was found that treatment combining ultrasound, orally and topically administered capsaicin showed the highest percentage reduction in weight and fat thickness. Weight in the triple-combination group decreased by 26% and fat thickness decreased by 73%. However, treatment by orally-administered capsaicin alone showed the highest percentage decrease in cholesterol level and the lowest triglyceride level among all groups. Cholesterol levels of mice treated solely with capsaicin orally decreased by 13.9%. It can be concluded that the effect of ultrasound and capsaicin are constructive together in order to increase the metabolism of adipose cells, weight reduction and adipose tissue reduction.

Keywords

Capsaicin, ultrasound treatment, reduction of adipose tissue, ultrasound treatment on mice, capsaicin treatment on mice, fat reduction in mice