Chapter – 5

CONCLUSION
CONCLUSION

In conclusion, it can be inferred from the present study that:

1. Apprericable degree of suppression in GPx activity in both sera as well as in monocyte cultures of osteoporosis patients was observed, and that, the intramonicocyte GSH levels were also found to be significantly down-regulated in osteoporosis patients.

2. Allicin from garlic as well as resveratrol and curcumin dose-dependently ameliorated/up-regulated the suppressed GPx activity as well as GSH levels in osteoporosis patients.

3. Activation of monocytes of osteoporosis patients which was mediated by reactive oxygen species (ROS) resulted in the induction of enhanced/augmented basal levels of TNF-α and IL-1β. Furthermore, allicin, resveratrol and curcumin efficiently caused down-regulation in TNF-alpha and IL-1beta in both sera as well as in monocyte cultures of osteoporosis patients.

4. Appreciably high levels expression of TNF-α and OPG in monocytes of osteoporosis patients was observed.

5. 25 µg/ml of Resveratrol, 25 µg/ml of Curcumin and 500 ng/ml of allicin exhibited no toxic effect on the cell viability as it showed no effect on human housekeeping gene R18.

6. All the three natural antioxidants namely allicin, resveratrol and curcumin were found to dose-dependently down-regulate the expression of TNF-alpha mRNA in monocytes of osteoporosis patients.

7. All the three natural antioxidants namely allicin, resveratrol and curcumin that were separately co-cultured with PBMCs in osteoclastogenic medium for 3 and 5 days resulted in an appreciable amount of suppression/down-regulation/reduction in appearance of multinucleated osteoclast precursors, thereby reflecting upon the beneficial potential of allicin, resveratrol and curcumin to exert regulatory effect in osteoclast generation and differentiation.
8. Osteoporosis patient’s cultures exhibited high magnitude of augmented levels of sRANKL and osteopontin levels in comparison to healthy controls.

9. The natural antioxidants namely allicin, resveratrol and curcumin dose-dependently suppressed / down-regulated / decreased sRANKL and Osteopontin secretions in cultures of osteoporosis patients.

10. All the natural antioxidants selected in this study exhibited potential antioxidant as well as anti-bone resorptive properties as suggested from results observed from down-regulation of bone markers like sRANKL, osteopontin, TNF and IL-1b.

11. Modulation with positive modulator namely calcitonin failed to minimize the potent negative modulatory effects of allicin, resveratrol or curcumin on osteopontin.

12. Out of these three natural antioxidants, allicin proved to be the most potent suppressor/down-regulator of OPN and sRANKL, followed by resveratrol and in turn, followed by curcumin.

13. One of the most striking findings was that allicin followed by resveratrol was equally good as Denosumab (Prolia), which has recently been employed in the treatment of osteoporosis, in suppressing Osteopontin levels.

Thus, in summary, based on the results, it is hoped that the present study would be of immense help in the better understanding of osteoporosis management by employing natural antioxidants.