Chapter 7

Summary
7. Summary

In the present study CRF patients who were non-diabetic and have not undergone any dialysis are in a state of severe oxidative stress. This perturbation in redox status was related to the degree of renal failure. There was a significant relationship found between oxidative stress and inflammation in CRF patients. Further, there was a significance association between the degree of oxidative stress (as estimated by plasma MDA and carbonyl) with fasting hyperinsulinemia and insulin resistance. Significant association was also observed between the inflammatory parameters with HOMA-IR. These findings indicates that insulin resistance in CRF are due to both oxidative stress and inflammation components. There was a significant association between oxidative stress and the process of protein glycation in CRF patients. The in vitro studies have also strengthened the hypothesis that oxidative stress can enhance the process of protein glycation. Further, lipoic acid, taurine and green tea extract have been found to prevent the oxidative stress induced glycation of hemoglobin. A close association was observed between oxidative stress, inflammation and ox-LDL in CRF patients, suggesting that this unholy triad can drive these patients into atherosclerotic complications if left unchecked.

From our animal experiments it was quiet evident that oxidative stress has a major role to play in insulin resistance observed in adenine induced CRF rats. The results from our animal experiments demonstrate that adenine feeding to male Wistar rats for 4 weeks cause oxidative stress and insulin resistance. In both the animal models of oxidative stress a significant alteration in glucose tolerance was observed. The adenine rich diet induced insulin resistance was associated with activation of redox sensitive serine kinase pathways (NF-kB, JNK, p38 MAPK) and decreased insulin stimulated IRS-1 tyrosine phosphorylation. Antioxidant supplementation in the form of taurine or green tea extract along with adenine restored the antioxidant defense, prevented the activation of redox sensitive serine kinase
pathways and preserved insulin action. Similar findings were observed in MnCl₂ treated rats as well.

Further significant protective effect against oxidative stress and insulin resistance were evident in control rats supplemented with both green tea and taurine. The supplementation of control rats with green tea or taurine was associated with decreased activation of redox sensitive serine kinase pathways (NF-kB and JNK), and increased insulin stimulated IRS-1 tyrosine phosphorylation.