8.7 THE SHORT TERM EFFECT OF CYANOBACTERIAL TOXIN EXTRACTS ON MICE KIDNEY

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Introduction:

The chronic kidney disease of unknown origin (CKD-U) in Sri Lanka shows clustering of these patients around the water reservoirs and similarities in variations of incidence over time in CKD-U and alcoholic liver disease in the North Central Region, indicates the possibility of a common aetiological agent

Objectives:

The aim of this study is to find the short term effects of extracts of cyanobacteria isolated from thereservoirs and canals of the high prevalence area of CKD-U on mice kidney.

Method:

Diluted extracts of Microcystis, Cylindrospermopsis and Lyngbia bloom were fed to a group of 5, 7 &10 mice respectively for a week.Another 5 mice were fed with diluted extracts of microcystis bloom for one week, followed by 2 weeks of normal water. The control group of mice (10) were given normal water for a week. Cyanobacterial extracts were analyzed for microcystisn, deoxy-cylindrospermopsin (DCYN) and cylindropsermopsin (CYN).

Results:

Acute tubular necrosis (ATN) was detected in 5/5 mice fed with extracts of microcystis bloom that contained microcystin (65µg/l), DCYN (2.1µg/l) and CYN while 2/5 mice had ATN when this extract was followed by 2 weeks of normal water. One out of seven mice fed with Cylindrospermopsis bloom that contained DCYN (29.5µg/l) and CYN (0.7µg/l) had ATN. Six out of 10 mice fed on Lyngbia bloom containing CYN (1.7µg/l) & DCYN (0.5 µg/l) had acute tubular necrosis. All control mice had normal tubules.

Conclusion:

The results show the ability of the cyanobacterial extracts to induce ATN in mice in the given concentrations. The ability of the kidneys to recover is suggested by the less frequent abnormalities seen after normal water has been supplied for 2 weeks post microcystis poisoning. As DCYN was available in all 3 extracts causing ATN, the ability of DCYN on its own to induce tubular necrosis even at low concentrations need to be investigated.

Extended Abstract:

Introduction : The epidemiology of the chronic kidney disease of unknown origin in Sri Lanka shows distribution of these patients around the water reservoirs and similarity in the variations of incidence over time in CKD-U and alcoholic liver disease in the North Central Region indicates the possibility of common etiological agent for both diseases. The histopathology of the renal disease shows evidence of a tubulointerstial nephritis indicating a possibility of toxic aetiology. Some cyanobacteria that exist in water reservoirs are capable of secreting toxins in certain environmental conditions (high temperature etc). Cyanobacterial toxins are known to have hepatotoxic, dermatotoxic, neurotoxic effects in humans and nephrotoxic effects in experimental animals.

Objectives: The aim of the study is to find the short term effects of extracts of cyanobacteria isolated from the affected reservoirs and canals of the high prevalence area for CKD-U on mice.