Asian J. Exp. Sci, Vol. 17, No. 1&2, 2003, 17-21

Plasma Magnesium Levels in the Stingray, Dasyatis akajei in Response to Administration of Salmon Calcitonin

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Salmon calcitonin was administered to the stingray, Dasyatis akajei to investigate effects on plasma magnesium levels. The plasma magnesium levels remained unchanged in the 6-hr period following the calcitonin injection. From these data, it appears that calcitonin plays no role in the endocrine regulation of magnesium.

Key words : Calcitonin, Magnesium, Stingray, Elasmobranch.

Introduction :

Magnesium is an element essential for all vertebrates for proper functioning of all cells and involved in a variety of enzymatic reactions (Filk *et al.* 1993). But, how magnesium homeostasis is fegulated in fish is still in enigma.

A number of studies have been carried out ot investigate the efects of administered calcitonin (CT) on plasma calcium contents of teleosts (Louw *et al*., 1967; Chan *et al*., 1968; Bradshaw *et al*., 1970; Lopez *et al*., 1971; Lopez *et al*., 1976; Pang 1971; Pang 1973; Orimo *et al*., 1972; Peignoux-Deville *et al*., 1975; Copp *et al*., 1978; Wendelaar *et al*., 1990; Srivastav *et al*., 1980; Hirano *et al*., 1981; Wales *et al*., 1983; Wales *et al*., 1984; Glowacki *et al*., 1985; Fouchereau-Peron *et al*., 1987; Fenwick *et al*., 1988; Srivastav *et al*., 1989; Singh *et al*., 1993; Oughterson *et al*., 1995; Srivastav *et al*., 1998; Srivastav *et al*., 1998) and elasmobranchs (Glowacki *et al*., 1985; Fouchereau-Peron *et al*., 1987; Fenwick *et al*., 1988; Srivastav *et al*., 1989; Singh *et al*., 1993; Oughterson *et al*., 1995; Srivastav *et al*., 1998; Srivastav *et al*., 1998; Haslett *et al*., 1971). Although contradictory reports were obtained. Little attention has been paid to establish a correlation between CT and plasma magnesium levels in teleosts (Hirano *et al*., 1981; Wales *et al*., 1983; Wales *et al*., 1984; Glowacki *et al*., 1985; Fouchereau-

Peron *et al*., 1987; Fenwick *et al*., 1988; Srivastav *et al*., 1989; Singh *et al*., 1993; Oughterson *et al*., 1995; Srivastav *et al*., 1998; Srivastav *et al*., 1998; Haslett *et al*., 1971; Yamauchi *et al*., 1978). There exists almost no report regarding the effect of CT on plasma magnesium levels of elasmobranchs. Hence, in the present study, an attempt has been made to see the impact of salmon CT on plasma magnesium levels of stingray, *Dasyaatis akajei.*

Materials and Methods :

Stingray, *D. akajei* (20 in number, both sexes, body wt 310-440g) were caught in Toyama Bay (Japan) and acclimated to the laboratory conditions for 7 to 10 days. Fish were not fed following their capture. Prior to the start of the experiment, blood samples were collected from the caudal vessels into heparinized syringes from five specimens (zero hour). After zero hour blood sampling, the fish were divided into two groups of 10 each. One group of fish was injected intraperitoneally with .05 ml of vehicle (0.6% NaCL containing 1% gelatin)/kg body wt and employed as controls. The other group of fish was injected intraperitoneally with 5μg / kg body wt of salmon calcitonin.

Blood samples were collected under light anesthesia with MS 222 at 0.5, 1,2,3,4, and 6 hr following the injection (either vehicle or CT). Care was taken to sample the fish only at three time intervals: 0.5,1,and 2 hr from five speciments and 3,4, and 6 hr from the remaining five specimens from both groups. After centrifugation, plasma was collected and kept at -50^{o}C until analysis. Plasma magnesium (Atomic Absorption Spectrophotometer, Hitachi-Zeeman Type 180-70) levels were determined.

Student's test was used to determine statistical significance. In all cases, CT injected group was compared with its soecific time control (vehicle injected) group.

Results and Discussion :

Administration of salmon calcitonin to the stingray caused no effect on plasma magnesium contents in the 6 hr period following the injection. This derives support from the studies of Yamauchi *et al*., (1978) and Hirono *et al.,* (1981) who have also observed no change in the plasma magnesium

levels agter CT andministration to *Anguilla japonica*. The absence of renal effects of calcitonin regarding the urinary excretion of electrolytes in ells (Hirono *et al.,* 1981)is in accord with the present findings.

It is concluded that CT has no role in the regulation of plasma magnesium of the stingray, which lives in marine water, which is very rich in magnesium content.

Acknowledgment :

A.K.S. is grateful to the Indian National Science Academy, New Delhi (India) and the Japan Society for Promotion of Science (Japan) for providing travelling grant for this study.

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