SHORT COMMUNICATION

EFFECT OF SEXUAL CYCLE ON RED CELL MEMBRANE PERMEABILITY AS REVEALED BY INFLUX OF RUBIDIUM-86 AND ADENOINETRIPHOSPHATASE IN FEMALE RATS

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Summary : Red cell membrane permeability, as revealed by influx of Rubidium-86 and ATPase activity, was studied in different phases of sexual cycle in female rats and no significant changes have been found.

Key words : membrane permeability influx of Rubidium-86 ATPase sexual cycle

INTRODUCTION

Red blood cell, a relatively simple membrane system has been used extensively for studying active transport of potassium influx and the enzyme Adenosine triphosphatase (E.C. 3.6.1.4) in humans (1,5,8,9,10,11) and animals (13). But the above studies have been carried out in males and no reports are available in females. It has been reported that aldosterone (12) and triiodothyronine (6) affect Sodium Potassium ATPase in rats. Hence it will be of interest to study the effects of sex hormones on ATPase and potassium influx, since no study has yet been reported in females specially in different phases of sexual cycle. This short communication reports on sodium potassium activated ATPase activity and influx of potassium in red blood cells, using Rubidium-86 as the marker in different phases of sexual cycle in female rats.

MATERIAL AND METHODS

Adult female Sprague-Dawly rats, six months old, were used. Different phases of sexual cycle were evaluated histologically. Sodium potassium activated ATPase activity in red blood cell membrane was determined as per recommended method (3). Red blood cell ghosts were prepared by hemolysing sedimented red cells with water and centrifuging at 20,000 g for 20 min, which was then incubated at 40°C for 60 min

with appropriate reagents. Reaction was stopped with perchloric acid and inorganic phosphorous was estimated.

Influx of potassium *in vitro* in red cells was studied as per recommended method (2) using Rubidium-86 as the marker, since kinetic studies have shown that Rubidium is transported in the same manner as potassium. Red cells were incubated with sodium and potassium Ringer's solution along with Rubidium-86. After incubation red cells were hemolysed with water. Radioactivity was measured in aliquots of the hemolysates using Nuclear Chicago Autogamma Spectrometer Model 4219. Protein was measured by the method of Lowry (7). Potassium in plasma and red cells were measured colorimetrically (4). Results are shown in Tables I and II.

TABLE I : Influx of ^{86}Rb and ATPase activity (basal and sodium potassium activated) in erythrocytes.

Group	*^{86}Rb incorporation per ml RBC*	*^{86}Rb incorporation per ml RBC (in presence of ouabain)*	*ATPase–P_i liburased in µg/hr/mg protein/40°C*	
			Basal (Mg dependent)	*Mg dependent Na K activated*
Pro-estrus	7187±204	4448±218	2.36±0.5	3.74±0.8
O-estrus	8311±871	5121±421	1.89±0.4	2.76±0.7
Meto-estrus	7080±360	4327±364	1.96±0.4	2.86±0.5
Di-estrus	7925±573	4211±192	2.14±0.4	3.08±1.5
Male rats	6647±457	4055±209	1.84±0.3	2.16±0.6

(Values are mean ± SE of 10 rats)

TABLE II : Blood potassium in male and female rats.

Group	*Plasma potassium meq/litre*	*Red blood cell potassium meq/litre cells*
Male	7.5±0.3	69.1±3.7
Female	8.3±0.4	75.1±4.0

(Values are mean ± SEM of 10 rats)

RESULTS AND DISCUSSION

Results of Table I reveal that statistically significant changes did not occur in the incorporation of Rubidium-86 in red blood cells of female rats in different phases of sexual cycle, both in presence and absence of ouabain. Also, no changes were noted in male and female rats of same age group.