

ATRIAL GRANULES IN THE ATRIA OF SHEEP

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ÖZET

Koyun Atriumunda Atrial Granüller

Bu çalışmanın amacı koyun atriumlarında atrial granüllerin varlığını belirlemek ve onları sıçan atriumundakiler ile karşılaştırmaktır. Granülleri incelemek için elektron mikroskop kesitleri alınmış ve resimleri çekilmiştir. İki farklı grup sıçan ve bir grup koyundan atrium ve ventrikül doku örnekleri alınmıştır. Bir grup sıçan % 4 NaCl ilaveli yemle beslenmiş diğer gruba normal yem verilmiştir. Koyunlar da normal yem ile beslenmişlerdir. Sıçan atriumlarında olduğu gibi koyun atriumlarında da atrial granüller gözlenmiş, ventriküllerde granül görülmemiştir. Yemdeki sodyum artışı ile atriumlardaki granüllerin atrial cardiocyte'lerin etrafında daha yoğun olarak gözleendiği belirlenmiştir.

Anahtar Kelimeler : Koyun atriumu, atrial granüller, ANP

SUMMARY

The aim of this study is to observe the atrial granules in the atria of sheep and compare them with those of in rats' atria. Electron microscope slides were prepared to examine the granules. Atria and ventricles were taken from the two different groups of rats and one group of sheep. One group of rats were fed with 4 % by weight of NaCl added diet. The other group were fed with normal rat diet. The sheep were fed with normal sheep diet. The granules were found in the atria of sheep as seen in rats atria, but they were not observed in the ventricles. In the atria, granules were seen densely around the atrial cardiocytes, increased when the amount of sodium in the diet rised.

Key Words : The atria of sheep, atrial granules, ANP

INTRODUCTION

It was recently found that the heart atrial muscle produces polypeptide hormones. Those polypeptides called atrial natriuretic peptides (ANP). (1,2). They regulate the salt and water balance and of blood pressure (3). Electron microscopic slides prepared from atrial and ventricular tissue samples showed that cardiocytes were different from each other (4). Atrial cardiocytes had granules around the nuclei, but ventricles had none. In contrast, granules were seen in the walls of ventricles as well as in the atria of non mammalian species (5.). It was pointed out that quantity of ANP changed between animals species. Several researchers showed that small rodents had far more atrial granules than large mammals and right atrium has more granules than

the left (1,6,7).

MATERIALS AND METHODS

Sheep and rats were decapitated, their atriums and ventricles rapidly excised. They were kept in 2.5 % glutaraldehyd-phosphate buffer at 4°C for 2 hours in a refrigerator. Then the tissue material were fixed in 1% OsO₄ solution and later transferred into acetone series which were prepared from same buffer solution. When they were dehydrated vestapol inclusion were obtained. Slides of 600-900 Å are taken in Reichert UM 3 ultramicrotoms. These slides were examined in microscope with uranil acetat Reynold's technique (100C electron microscope). Electron micrographs were taken (8,9).

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RESULTS

The histological slides of sheep and rats' atria photographed electron microscopically in order to observe the existence of atrial granules (Photos 1-5). Atrial granules were obviously seen around the nuclei of atrial cells, Right atrial cells seem to have

more granules than the left's. In the salt added group atrial granules were seemed to be denser and bigger.

Ventricules seemed to have no granules (Photo 6).

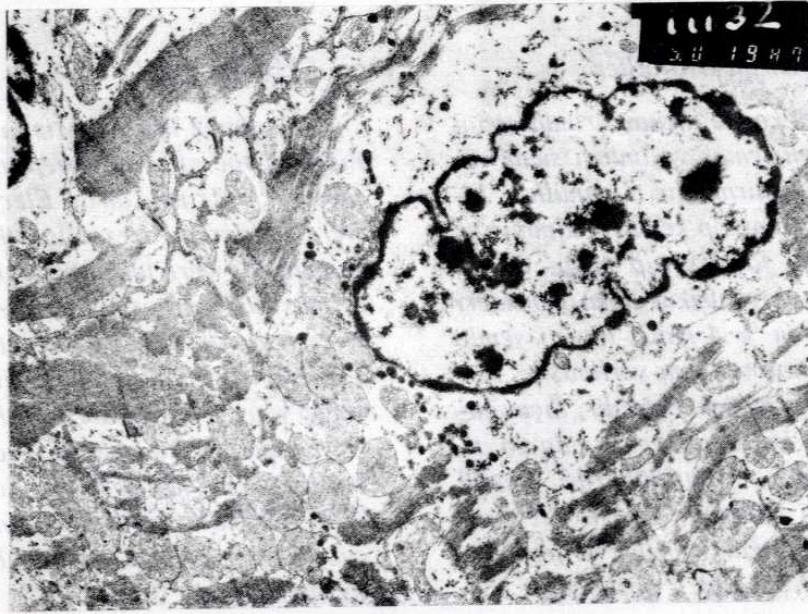


Photo 1. Sheep left atrial cells (x10000)

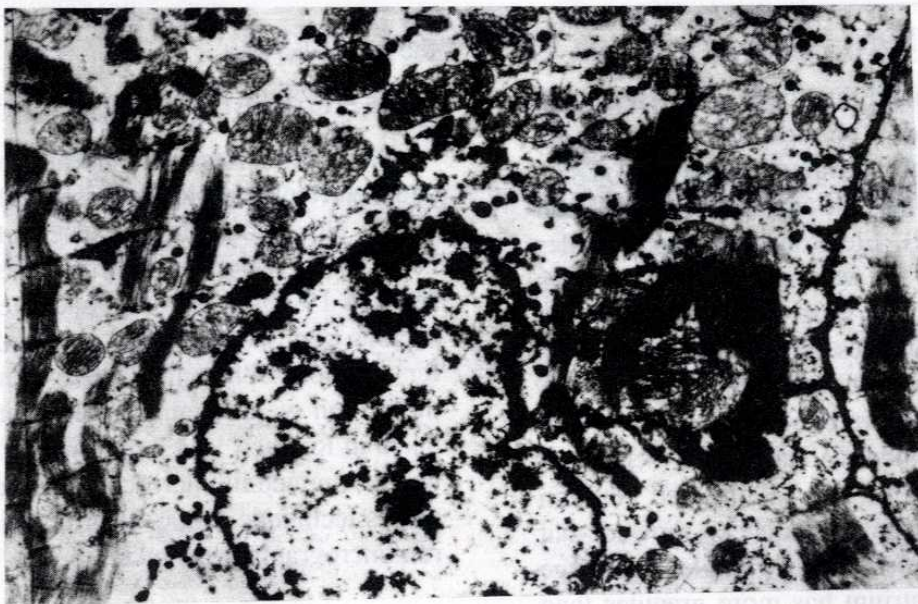


Photo 2. Left atrial cell of the experimental rat (x10000)

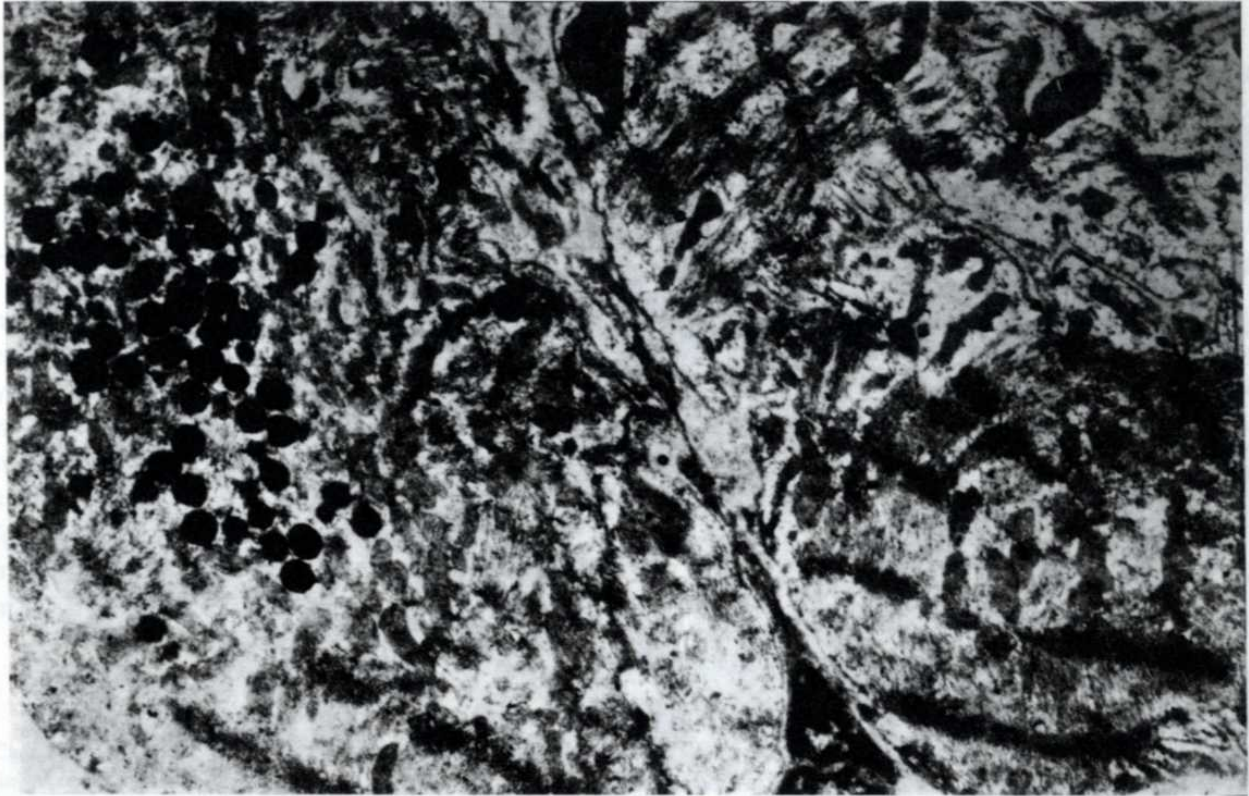


Photo 3. Right atrial cell of the experimental rat (x10000)

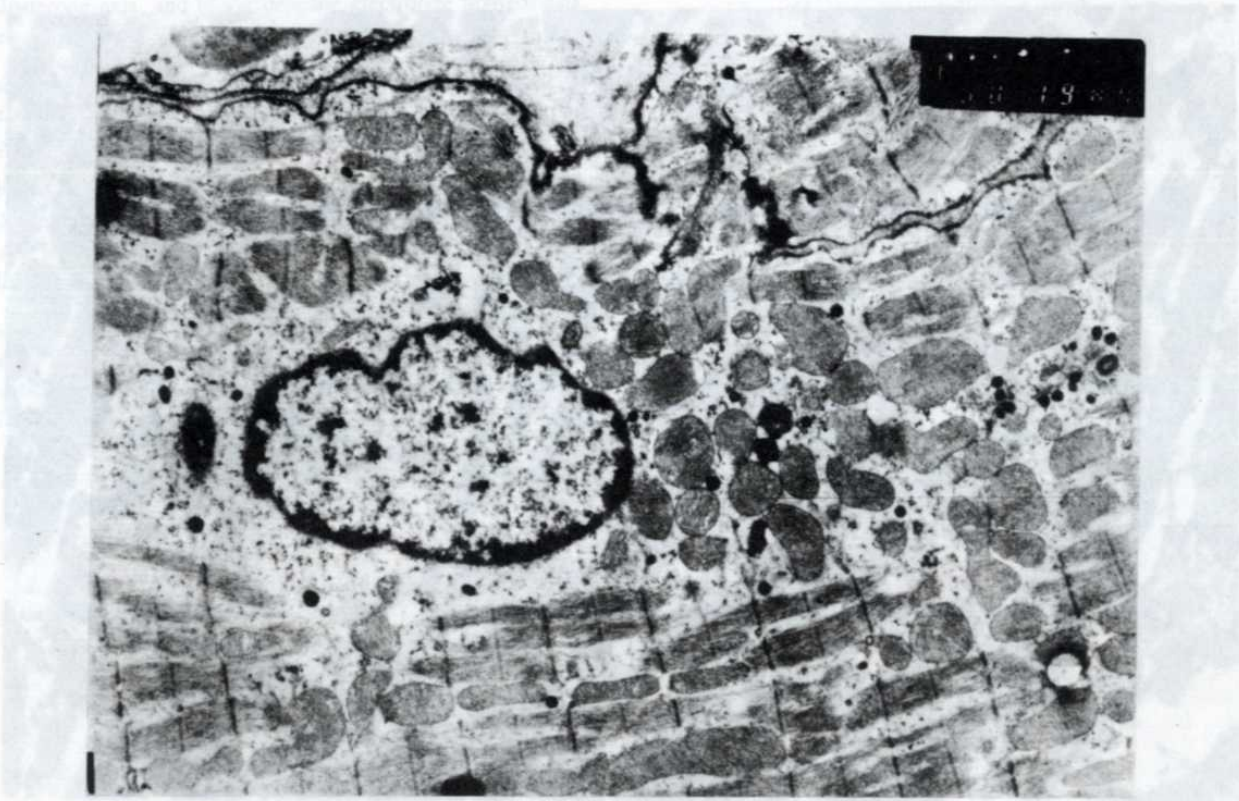


Photo 4. Sheep right atrial cell (x10000)

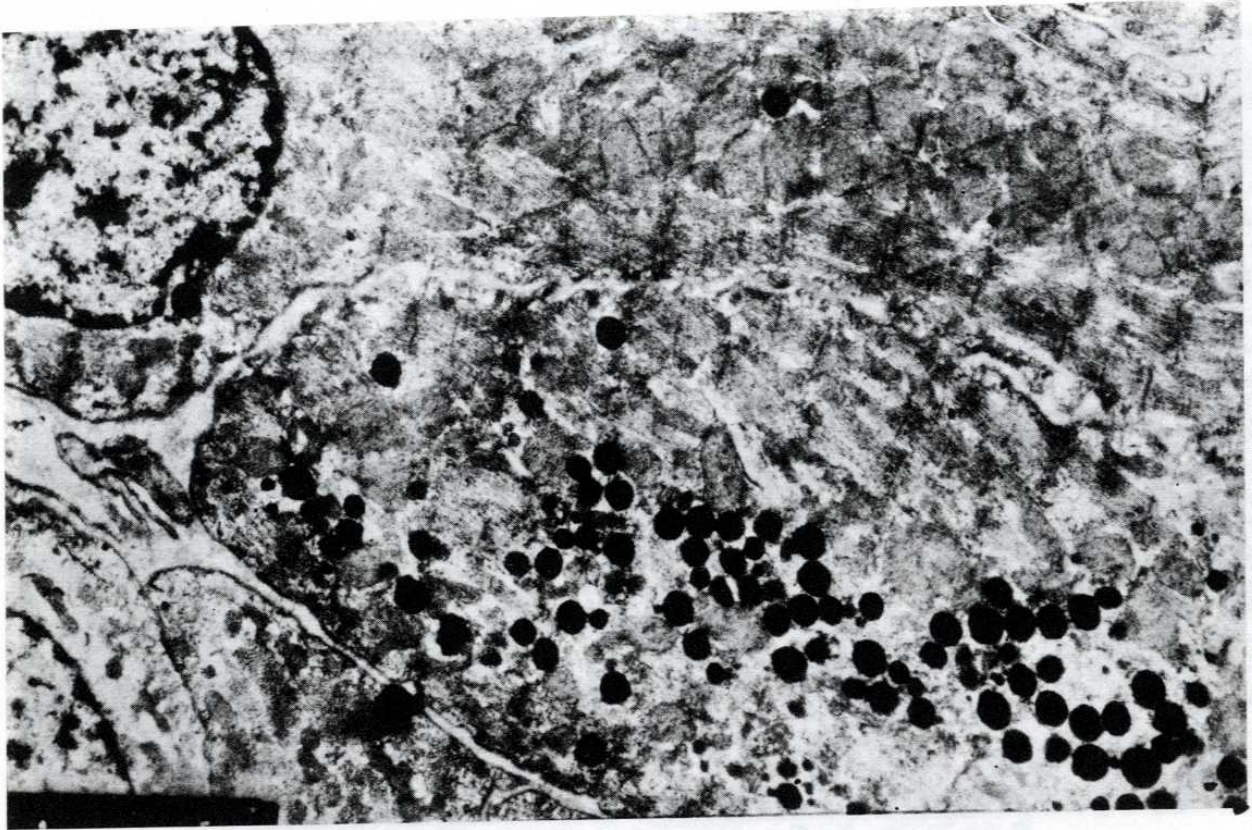


Photo 5. Right atrial cell of the experimental rat in salt added group (x10000)

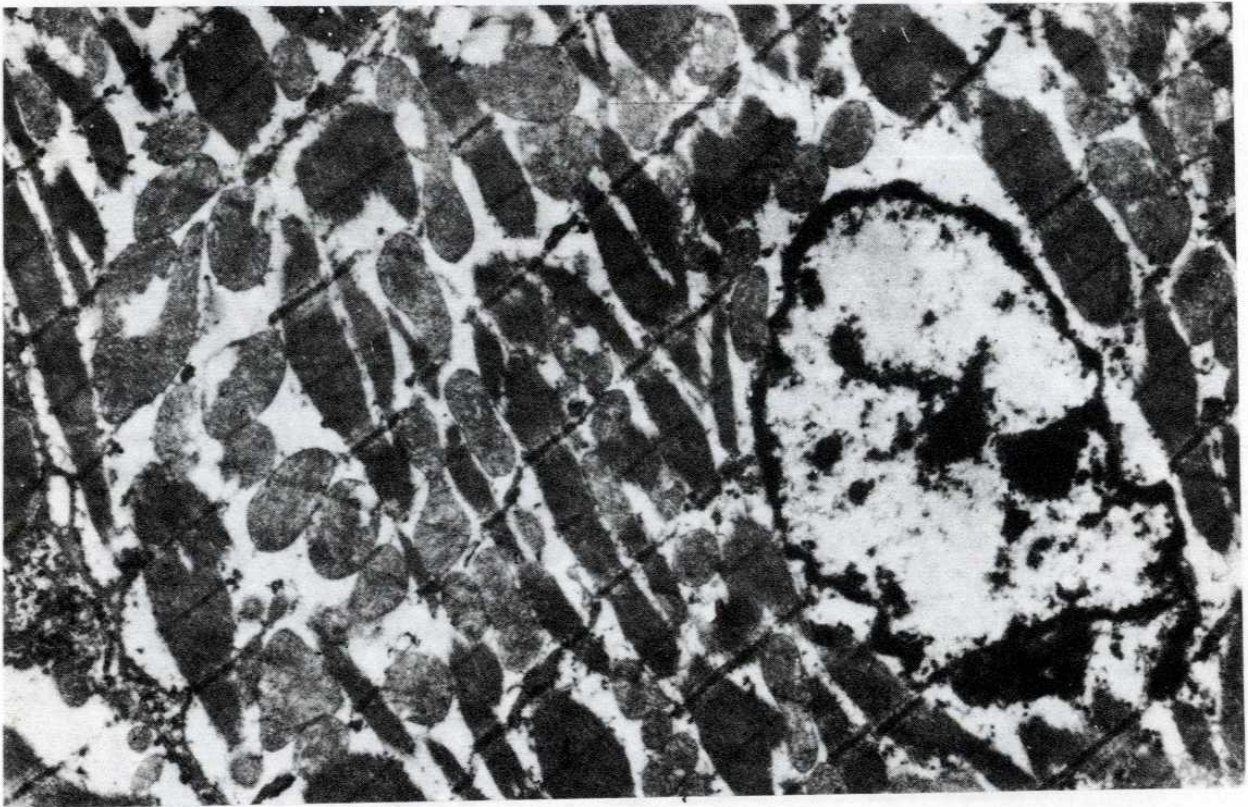


Photo 6. Sheep ventricular cell without any granules (x10000)

DISCUSSION

It was found that atria of mammals had granules but ventricles had none. In electron microscope slides (Photo 1) granules were seemed to accumulate around the nucleus as De Bold and Cantin (1,10) had mentioned. It was said that granules showed some differences (quantity, size, distribution) in different animal species (2,11). In the slides it was observed that atria of rats contained more granules than atria of sheep and also rat granules were bigger than those of sheep's (Photos 3-4). In addition, it was admitted that the amount of ANP showed some differences between right and left atrium. Right atrium contains 1.5-4 times more granules than left atrium (12).

In this study both the left atria of rats and sheep were seemed to contain granules. Right atria contained more granules than left atria. The number of atrial granules were comparable increased by the salt concentration in the diet. Thus there was an increase in the number of the granules in the rats consumed 4 % salt added diet (Photos 5).

Histological studies shows that, in the mammals, atria are the basic source of ANP and ANP secretion is also directly related to the salt consumption.

As in most mammals atria of sheep also contains similar granules thought to be the secretion site of ANP.

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