BRIEF NOTE

Enzyme Activity of Juxtaglomerular Cell Granules of the Mouse

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In mammals, renal juxtaglomerular cells (JGC) secrete renin which through angiotensin controls blood pressure and which, on the other hand, stimulates the cells of the zona glomerulosa of the adrenal cortex and then promotes secretion of aldosterone. Control of the water-electrolyte balance is dependent considerably on the renin-angiotensin-aldosterone system [6].

JGC contain juxtaglomerular cell granules (JGG) in the cytoplasm. JGG are thought to carry renin or its precursor. JGG are usually 1 μ m in size and round or oval in shape. They are of moderate electron density and enveloped by a limiting membrane. With these morphological characteristics, JGG are similar to lysosomes. Furthermore JGG show acid phosphatase activity when examined by the electron microscopical enzyme cytochemistry [1, 2, 7].

In this paper JGG were examined for the presence of some phosphatases and nonspecific esterase activity.

The methods and results of demonstration of enzymes are shown below.

Methods	Results
Acid phosphatase:	

lead nitrate, Gomori [4]. (+)

Alkaline phosphatase:

lead citrate, Mayahara et al. [3]. (—)

Adenosine triphosphatase:

lead nitrate, Wachstein-Meisel [4]. (—)

Nonspecific esterase:

α -naphthyl acetate, Gomori [5]. (—)

Of the four enzymes mentioned above, only acid phosphatase was demonstrated in JGG by light microscopy. From this result it was emphasized that JGG are of lysosomal nature. Esterase was assumed to be one of the lysosomal enzymes, but was negative in JGG. So, JGG were not identical with general lysosomes which were observed in the renal tubule. Finally, it was not determined whether all JGG had acid phosphatase or some of JGG were carriers of renin and other usual lysosomes. In order to solve this problem detailed examination should be performed to clarify the enzyme activities of JGG.

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Explanation of Figures

Fig. 1. Nonspecific esterase. α -Naphthyl acetate, Gomori [5].

Fig. 2. Adenosine triphosphatase. Lead nitrate, Wachstein-Meisel [4]. JGG showing negative activity are found in the tunica media of an arteriole near the glomerulus.

Fig. 3. Alkaline phosphatase. Lead citrate, Maya-

hara et al. [3]. In this glomerulus afferent and efferent arterioles are observed. No reaction products can be seen.

Fig. 4. Acid phosphatase. Lead nitrate, Gomori [4]. JGG show strong positive reactions in a cross section of an arteriole getting in contact with a glomerulus.