

# THE CONTENT OF SODIUM, POTASSIUM AND CHLORIDE IN RABBIT BLASTOCYSTS

by

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The study of the chemical composition of rabbit blastocyst fluid<sup>1,2</sup> was extended to include the determination of sodium, potassium and chloride in fluid which fills the blastocyst cavity at 6, 7, 8, and up to 10 days, after mating. The sodium and potassium determinations were carried out with a flame photometer (Evans Electroselenium); for routine analyses about 40  $\mu$ l of blastocyst fluid, suitably diluted, was used without any preliminary chemical treatment. However, 3 samples of fluid from blastocysts of different ages, were also analysed after careful dry-ashing; these gave sodium values which were identical with those of parallel unashed samples, but the potassium results were 4-7% higher. Duplicate determinations did not differ by more than 2% for sodium or more than 4% for potassium. Chloride was determined by the method of WHITEHORN<sup>3</sup> after deproteinization with tungstic acid or  $\text{Zn}(\text{OH})_2$ .

From the results presented in Table I it can be seen that individual variations in the fluid collected from blastocysts of equal age were relatively small. The sodium content was slightly but distinctly less at 7-7½ days than either at 6 or at 8 days. On the other hand, markedly more potassium was found in the fluid at 6 and 7 days than either at later stages of blastocyst development, or in rabbit blood serum. The chloride content was similar at 6 and 7 days, some 30% lower than in serum, but began to increase gradually from the time corresponding to incipient implantation (7½-8 days), to approach maternal serum, at 8-10 days.

TABLE I

THE CONTENT OF SODIUM, POTASSIUM AND CHLORIDE IN RABBIT BLASTOCYST FLUID  
AND IN BLOOD SERUM

The sodium and potassium determinations were carried out on blastocyst fluid from the same rabbits, those of chloride on fluid obtained from other rabbits.

|             |                              | <i>m Eq/l</i> |                  |                 |
|-------------|------------------------------|---------------|------------------|-----------------|
|             | <i>days<br/>after mating</i> | <i>sodium</i> | <i>potassium</i> | <i>chloride</i> |
| Blastocysts | 6                            | 138.0         | 10.3             | 72.5            |
|             | 6                            | —             | 12.1             | 70.8            |
|             | 6                            | 137.0         | 11.4             | 71.2            |
|             | 6½                           | 139.0         | 11.7             | 74.3            |
|             | 7                            | 126.0         | 14.0             | 70.2            |
|             | 7                            | 113.0         | 13.8             | 69.5            |
|             | 7                            | 125.0         | 12.1             | 76.5            |
|             | 7                            |               |                  | 74.0            |
|             | 7½                           | 118.0         | 10.4             | 80.0            |
|             | 8                            | 145.0         | 4.3              | 83.5            |
|             | 8                            | 128.0         | 6.5              | 78.5            |
|             | 8½                           | 144.0         | 4.5              | 89.6            |
|             | 8½                           |               |                  | 96.5            |
|             | 10                           | 139.0         | 6.3              | 94.8            |
|             | 10                           | 123.0         | 5.9              | 92.7            |
| Serum       | 0                            | 148.0         | 7.1              | 101.2           |
|             | 7                            | 150.0         | 6.7              | 105.6           |

It was of interest to compare the sum of sodium + potassium with that of chloride + bicarbonate content, the data for bicarbonate being available from earlier work<sup>2</sup>. As can be seen from Fig. 1, the sum of sodium + potassium exceeds that of chloride + bicarbonate; the downward slope in the cation content at 7-7½ days being due to the lower sodium content at that stage. A downward trend is also seen in the anion curve, extending to the 8th day, and corresponding to a falling off in the bicarbonate content of the blastocyst fluid. The two curves run roughly parallel between the 6-7½ day stage, thus indicating that of the sodium and potassium present nearly all is balanced by chloride and bicarbonate. The divergence in the curves which becomes apparent at 7½-8 days, is doubtless partly caused by a decrease in bicarbonate content not compensated by the relatively small increase in chloride at that stage, but presumably it also reflects the fact that, as the implantation of the blastocysts nears completion, anions other than chloride and bicarbonate appear in the blastocyst fluid, and thus the sum of chloride + bicarbonate represents a diminishing fraction of the total anion content at that period of development. A comparison with maternal serum shows that the content of sodium + potassium in the blastocyst fluid is generally below that of serum, the difference being most marked at 7-7½ days; the content of chloride + bicarbonate is also somewhat below the serum level, except at 6 days when it exceeds the serum value, owing to the high bicarbonate content of the unimplanted blastocysts.

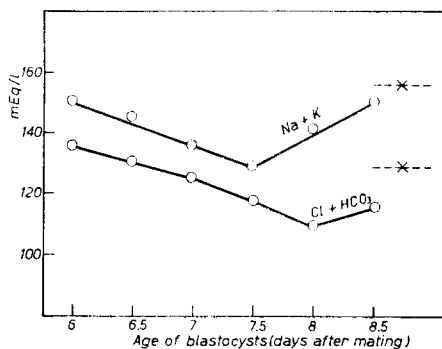


Fig. 1. The sum of sodium + potassium and the sum of chloride + bicarbonate contents in rabbit blastocyst fluid; O—O, blastocyst fluid; dotted lines indicate the level in maternal serum.

#### REFERENCES

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- <sup>3</sup> J. C. WHITEHORN, *J. Biol. Chem.*, 45 (1921) 449.

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