

## DETECTION OF CATECHOLAMINES IN THE BILE

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No details have yet been given concerning the concentration of catecholamines in the bile and the maintenance of their activity in the duodenal contents. The liver is known to contain large quantities of catecholamines, which are almost completely destroyed in that organ [2, 4, 5].

The authors determined the catecholamine in the bile of the gall bladder and in the contents of the small intestine of cattle, sheep, and pigs, and also in the contents of the human duodenum.

### EXPERIMENTAL METHOD

The bile from the gall bladder and the contents of the small intestine of animals, obtained from a meat factory, and human duodenal contents, obtained from diagnostic laboratories, were investigated. The adsorption-colorimetric method of Shaw, modified by N. A. Smazhnova [3], was used in some determinations. The catecholamines were also determined by a fluorometric method proposed for estimation of catecholamines in the urine by E. Sh. Matlina [1]. The Soviet FM-1 fluorometer was used.

### EXPERIMENTAL RESULTS

Experiments showed that a 1% solution of bile from the gall bladder of the animals caused transient relaxation of a segment of rabbit's intestine, suggesting that it contained catecholamines.

Table 1 shows that a considerable quantity of adrenergic and adrenalin-like substances were found in the bile and the contents of the small intestine of cattle and pigs.

By means of the fluorometric method, the total concentration of free and bound catecholamines could be determined in the bile from the animals' gall bladder and the human duodenal contents. As Table 2 shows that in all the determinations carried out on the bile from the gall bladder of cattle, sheep, and pigs, and also on the human duodenal contents, catecholamines were found. The concentration of free catecholamines was approximately 50% that of the bound catecholamines..

TABLE 1. Concentration of Catecholamines (in  $\mu\text{g } \%$ ) in Bile from the Gall Bladder and Contents of the Small Intestine of Cattle and Pigs (Determined by Adsorption-Colorimetric Method)

| Material                              | Number of investigations | Adrenergic substances | Adrenalin-like substances |
|---------------------------------------|--------------------------|-----------------------|---------------------------|
| Bile from gall bladder of cattle      | 5                        | 23-40                 | 7-40                      |
| Contents of small intestine of cattle | 2                        | 30-45                 | 32-50                     |
| Bile from pig's gall bladder          | 4                        | 20-60                 | 30-75                     |
| Contents of pig's small intestine     | 2                        | 25-40                 | 15-28                     |

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TABLE 2. Total Concentration of Catecholamines (in  $\mu\text{g } \%$ ) in Bile from Gall Bladder of Animals and in Human Duodenal Contents

| Material                         | Number of investigations | Free                   | Bound                  |
|----------------------------------|--------------------------|------------------------|------------------------|
| Bile from gall bladder of Cattle | 6                        | 0,008—0,058<br>(0,039) | 0,035—0,081<br>(0,070) |
| Sheep . . . . .                  | 5                        | 0,010—0,025<br>(0,016) | 0,019—0,031<br>(0,027) |
| Pig . . . . .                    | 3                        | 0,029—0,053<br>(0,037) | 0,045—0,088<br>(0,066) |
| Human duodenal contents . .      | 15                       | 0,009—0,076<br>(0,042) | 0,024—0,170<br>(0,082) |

Note. Mean values are given in parentheses.

The results described show that the concentration of catecholamines discovered was much smaller when estimated by the fluorometric method than by the adsorption-colorimetric method. This discrepancy could be due either to the inadequate specificity of the adsorption-colorimetric method or to loss of catecholamines during their analysis by the fluorometric method.

#### LITERATURE CITED

1. E. Sh. Matlina, Papers on New Apparatus and Techniques [in Russian], No. 2, p. 142, Moscow (1963).
2. E. Sh. Matlina and V. V. Men'shikov, Uspekhi Sovr. Biol., 58, No. 3/6, 321 (1964).
3. N. A. Smazhnova, In the book: Collected Scientific Publications of the Staff of the Central Research Laboratory, Second Moscow Medical Institute [in Russian], No. 1, p. 66, Moscow (1958).
4. A. Fischer, The Physiology and Experimental Pathology of the Liver [in Russian], Budapest (1961).
5. F. B. Straub, Biochemistry [in Russian], Budapest (1963).