The biosynthesis of ribose has been postulated to occur (a) directly from hexose by loss of an end carbon and (b) from smaller units by condensation, e.g. \( C_6 + C_2 \). Data obtained in previous experiments have been interpreted to indicate that in the chick, the synthesis of this pentose probably occurs by the latter mechanism, possibly by a condensation of glyceraldehyde-3-phosphate and an active \( C_6 \) unit (e.g. from fructose-6-phosphate) catalyzed by transketolase. The technique employed was to isolate glycogen and ribose from the combined internal organs.
of chicks after the administration of \(^{14}\)C-labeled precursors and to compare the patterns of \(^{14}\)C in the two carbohydrates. If ribose were synthesized from hexose directly, the pattern of \(^{14}\)C in the ribose should be similar to that of five consecutive carbons in the hexose. Dissimilar patterns would indicate the probable existence of another mechanism. The patterns of \(^{14}\)C in the glycogen and ribose isolated from the tissues of the chicks were markedly different and it was concluded that the data were consistent with the hypothesis that the pentose arose by combination of C\(_2\) and C\(_3\) units. The applicability of this conclusion to other organisms was then investigated using the same technique.

In *Escherichia coli*, strain B, as suggested by Lanning and Cohen\(^4\), ribose appears to be synthesized primarily from hexose by loss of carbon 1\(^5\). In the rat, however, the data indicate that the direct pathway from hexose is not the only mechanism for the synthesis of the pentose. When rats were given Na\(^{14}\)CO\(_3\) and ribose and glycogen were isolated from the liver, the distribution of \(^{14}\)C in the two carbohydrates were dissimilar.

Rats (about 300 g each) were starved for 48 hours and given intraperitoneally a total of 1.4 \times 10^6 c.p.m. per 100 g body weight of Na\(^{14}\)CO\(_3\) (1.23 mM) in equal doses at 0, 0.5, 1, 2, 2.5, 3, 3.5 and 4 hours and by stomach tube 200 mg of glucose at 0 time. At 4.5 hours, the animals were sacrificed and the ribose (from ribonucleic acid) and the glycogen were isolated from the pooled livers by the methods previously described\(^2\). After hydrolysis of the glycogen, the resulting glucose was purified by filter paper chromatography, diluted 97 fold with unlabeled glucose and recrystallized\(^6\). The pattern of radioactivity in the hexose was determined by fermentation with *Leuconostoc mesenteroides*\(^6\). The ribose was also purified by paper chromatography\(^8\) and after a 450 fold dilution with carrier was degraded for analysis of \(^{14}\)C by fermentation with *Lactobacillus pentosus*\(^7\). Radioactivity data for the individual carbons, obtained by gas phase counting\(^8\), are presented in specific activities relative to that determined for one of the carbons given a value of 100.

The relative specific activities found were as follows\(^***\):

<table>
<thead>
<tr>
<th>Glycogen</th>
<th>Ribose</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>0.3</td>
<td>2</td>
</tr>
</tbody>
</table>

\((100 = 2.53 \times 10^6 \text{ c.p.m.}/\text{mM carbon})\)

\((100 = 1.16 \times 10^8 \text{ c.p.m.}/\text{mM carbon})\)

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\* Specific activity determinations on the recrystallized product indicated 5.19 \times 10^6 \text{ c.p.m.}/\text{mM} of glucose. Potassium gluconate prepared from this material contained 5.05 \times 10^6 \text{ c.p.m.}/\text{mM} of compound. Fermentation data showed 5.08 \times 10^6 \text{ c.p.m.}/\text{mM} of hexose.

\** Potassium ribonate prepared from the diluted material contained 2,150 \text{ c.p.m.}/\text{mM} of compound. Fermentation data indicated a specific activity of 2,060 \text{ c.p.m.}/\text{mM} of pentose.

\*** The specific activities shown for the carbons given a value of 100 represent the levels at which the determinations were actually made on the diluted samples.