TRANSDUCTIONS OF FLA AND H FACTORS FROM SINGLE PHASE CULTURES OF
SAL. ABQ4Y (SW803 Fla+ b:ex+) TO SAL. TYPHIMURIUM (SW1157 Fla-
i:1,2).

Report by Tetsuo Iino
Feb. 22, 1956

In the earlier report on "the effect of phase difference on the
H-antigen transduction in Salmonella", Sal. abovy SW803 Fla+ phase-1(or
phase-2) -- x Sal. heidelberg SW1092 Fla- phase-1(or phase-2) was performed.
The result has shown that H1 is transduced simultaneously with Fla1092 in
certain frequencies and the phase of transduction is exclusively determined
by the phase of recipient. These results has led to the introduction of "H2-
epistatic, unstable hypothesis".

The present report deals with the similar experiment used Sal.
typhimurium TM2 Fla- mutant SW1157 (-- Fla- 5 in the previous report) as a
recipient. The experiment was planned in order to confirm the previous
result and to test its generality. At the same time, frequencies of linked
transduction were compared.

MATERIALS AND METHODS.

SW1157 are Fla- mutant obtained by ultra-violet treatment of Sal.
typhimurium TM2. As reported in the previous report, Fla factor correspond
to Fla- locus of SW1092 (designated tentatively as Fla1092) is transduced
linked with H1 in certain frequency but not with H2. Fla1157 belongs different
loci from Fla666 and Fla1092, which also have been found out to be transduced
linked with H1 and have been used in the previous experiments.

The method of preparation of single phase cultures or lysates and
the procedure of transduction experiment are the same as the previous experiment.
RESULTS AND DISCUSSION.

The results were summarized in Table 1.

With very few exceptions, which may be explained by phase variation during the course of experiment, following articles, observed in the previous experiment, are confirmed in the present experiment.

1). The difference of donor phase gives no different result.
2). The phase of the transformed cell is the same with the phase of the recipient.
3). $H_1$ is transduced linked with Fla in certain frequencies regardless the phase of donor or recipient, whereas $H_2$ is not transduced linked to Fla.

The ratio of linked transduction (RLT) range from 0.09 to 0.28. However, $X^2$-test calculated from the Brandt and Snedecor's formula shows $P$-value $0.3 < P < 0.5$. This means the difference of RLT between different phase combinations are not regarded as significant, contrary with the result of the previous experiment. There is clear difference between the present experiment and the previous on RLT: the ratio of $H_1$-linked transduction in SW1157 is about one fourth of the case of SW1092. Whether these difference of frequencies represents the relationships of local distance or not is still uncertain. In order to get more clear sight on the local relationships, following experiments may be helpful:

\[
\begin{align*}
\text{SW1092(Fla}^{-}\text{1092 }H_1^r) & \rightarrow x \text{ SW1157(Fla}^{-}\text{1157 }H_1^i) \\
\text{Fla}^+\text{ SW1092(Fla}^+\text{1092 }H_1^r) & \rightarrow x \text{ "} \\
\text{SW1157(Fla}^{-}\text{1157 }H_1^i) & \rightarrow x \text{ SW1092(Fla}^{-}\text{1092 }H_1^r) \\
\text{TM2 (Fla}^+\text{H}_1^i) & \rightarrow x \text{ "}
\end{align*}
\]

Select Flia+ on MGA-plates and compare RLT between Flia and H.
Table 1.

Transductions of Fla and H factors from single phase cultures of *Sal. aborty* (SW803 Fla⁺ b:enx) to *Sal. typhimurium* (SW1157 Fla⁻ 1:1,2). Fla⁺₁₁₅₇ was used as selective marker.

<table>
<thead>
<tr>
<th>Phase of donor</th>
<th>Phase of recipient</th>
<th>H-antigen types of Fla-transduction cells</th>
<th>Ratio of linked transduction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Unlinked type (1,2)</td>
<td>Linked type (b,2)</td>
</tr>
<tr>
<td>i (1,2)</td>
<td>(i)1,2</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>2. enx</td>
<td>1</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>2. enx</td>
<td>2.1,2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>38</td>
<td>11</td>
</tr>
</tbody>
</table>

APPENDIX.

Test of homogeneity of the frequency of linked transduction of H₁ to Fla⁺₁₁₅₇.

\[ X^2 = 2.42 \text{ calculated from the Brandt and Smedes' formula.} \]

\[ n = 3, \quad 0.3 < P < 0.5 \]

Donor 9:9

Recipient