Rose, R., S. Shafer and R. Hillman. Temple University, Philadelphia, Pennsylvania. Reciprocal in vitro transfer RNA aminoacylation between Escherichia coli and D. melanogaster.

Comparative in vitro studies of the species specificity of the interaction of transfer RNA (tRNA) and aminoacyl tRNA synthetases from yeast, E. coli, and rat liver, have indicated that the extent of the charging of tRNA depends not only on the source of tRNA and the source of the enzymes, but also on the particular amino acid involved in the reaction (Benzer and Weisblum, PNAS 47: 1149, 1961). We have observed similar phenomena in charging experiments using tRNA and enzyme preparations from E. coli and the Oregon-R strain of D. melanogaster.

The in vitro aminoacylation of the E. coli and D. melanogaster tRNA by the partially purified post-microsomal supernatant fractions prepared from E. coli or D. melanogaster was carried out according to the procedure of Rose and Hillman (Biochem. Biophys. Res. Comm. 35: 197, 1969).

The two classes of results are shown in Table 1. With glutamic acid and proline, only homologous charging was observed: D. melanogaster enzymes charge D. melanogaster tRNA and E. coli enzymes charge E. coli tRNA, with little or no heterologous activity. However, with leucine, phenylalanine, valine, and lysine, not only homologous but also heterologous aminoacylation was observed. Of the two heterologous systems studied, the activity is much higher using D. melanogaster enzymes and E. coli tRNA. In the case of lysine, this reaction is three times greater than the corresponding E. coli homologous reaction.

Table 1. Results of Reciprocal Aminoacylation Experiments

	E. coli tRNA		D. melanogaster tRNA	
C^{14} Amino Acid	E. coli Supernatant Fraction	D. melanogaster Supernatant Fraction	E. coli Supernatant Fraction	D. melanogaster Supernatant Fraction
	CPM/mg tRNA x 10^{-3}			
Glutamic Acid	621.3	58.8	13.4	243.8
Proline	487.3	7.9	10.9	84.3
Leucine	336.9	585.7	8.3	191.6
Phenylalanine	266.0	526.9	39.7	253.6
Valine	357.6	418.5	33.1	245.7
Lysine	349.1	1368.3	34.1	228.2

The results indicate that the extent of heterologous tRNA aminoacylation between E. coli and D. melanogaster is affected not only by the source of the material, but also by the particular amino acid tested. (Supported in part by an Institutional Grant IN 88 from the American Cancer Society to Temple University and in part by Grant 1T1-HD 138 from the U.S. Public Health Service.)

Russell, M.A. and F.W. Robertson. Department of Genetics, University of Edinburgh, Scotland. The comparison of growth differences in D.melanogaster in terms of DNA and protein content.

Fluorimetric methods of measuring DNA have been modified to allow estimations on individual adults of D.melanogaster. Extensive comparisons of both DNA and protein content per fly have been carried out for different genotypes, which include inbred lines and crosses between them, selected lines etc., while the effects of different environmental treatments have also been examined. Both genetic and environmental differences may lead to substantial differences in the protein/DNA ratio so that equivalent proportional changes in adult body size may be arrived at in different ways. Such differences apparently derive from the properties of regulation and the rules which determine how a given change in adult size will be effected in terms of cell size and number. Comparisons between the biochemical evidence and estimates of cell size and number changes in the wing, as well as the comparison of heritability of protein and DNA content, support this view.