Fahrig, R. and F. Anders. Genetisches Institut der Justus Liebig-Universität Giessen, Germany. The influence of glutamic acid upon the nucleic acid content of Drosophila melanogaster.

In earlier experiments we found that an excessive diet of glutamic acid enlarges the amount of DNA and free amino acids and the salivary gland chromosomes (Anders and Anders 1964; Drawert, Reuther und A. U.F. Anders 1965). The earlier experiments were for orientation only; exact determinations of DNA were still lacking. They are presented in this article. The determination of nucleic acid content of the larvae fed with glutamic acid has been carried out in five separate series of experiments. In this article, only the data of one of the five series will be presented (Table 1).

Table 1

	Control	
	No. of experiments	Mean with standard error
Weight of 100 larvae in mg	8	190.5 ± 0.94
Dry weight/100 g wet weight	8	15.46 ± 0.105
Nucleic acid content/100 g dry weight	8	5.30 ± 0.040
RNA content/100 g dry weight	8	5.02 ± 0.033
DNA content/100 g dry weight	8	0.190 ± 0.0070

	Experiment			
	No. of experiments	Mean with standard error	Mean deviation of the experiment from the control in %	Probability of error in % (t-test)
Weight of 100 larvae in mg	8	189.0 ± 0.38	- 0.79	ca. 25
Dry weight/100 g wet weight	8	15.49 ± 0.071	+ 0.19	ca. 50
Nucleic acid content/100 g dry weight	8	5.93 ± 0.040	+ 11.89	< 0.1
RNA content/100 g dry weight	8	5.56 ± 0.027	+ 10.76	< 0.1
DNA content/100 g dry weight	8	0.226 ± 0.0049	+ 18.95	< 0.2

At first one must observe that glutamic acid has no influence upon the weight of the larvae and the portion of the lipid-free dry-weight (table line 1 and 2). Upon the amount of nucleic acids, however, it has a significant influence. In total, the experimental objects have about 8 to 10% more nucleic acids than the control objects (table line 3).

RNA makes up the biggest part of the nucleic acids; therefore, here one finds about the same values as for the total content of nucleic acids (table line 4). But particularly spectacular is the influence of the glutamic acid diet upon the content of DNA. The experimental objects can possess about 50% more DNA than the control objects, the average is 25% (table line 5). Therefore, the DNA/RNA-ratio is changed considerably.

The extent of the salivary gland chromosomes depends in the same way on the glutamic acid diet (Fahrig, Sieger und Anders 1967). Hitherto existing countings of salivary gland cells gave no indication that their number is influenced by the glutamic acid diet. Therefore, the increase of the chromosomes can, assuredly, be led back to a raised content of DNA.

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References:

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