caffeine to caffeine medium than in those transferred from caffeine to normal medium. The latter groups, however, do not significantly differ from larvae completing their development on normal medium. A significant decrease of tumor incidence can be therefore shown only if caffeine is present in medium since the beginning of development and for the whole larval life. Such decrease should not be ascribed to different survival rates, since survival patterns do not always correspond to tumor incidence patterns.

This work was supported by a grant from Ministero Pubblica Istruzione (60%).

Table 2. *($P < 0.05$) (compared to control)

Period of larval life treated		treated larvae	survival rate	% ♀♀ tu	N. ♀♀	% ♂♂ tu	N. ♂♂
Deposition onto normal medium:							
48 h	To normal	621	47.6	18.7	160	4.4	136
	To caffeine	1184	30.8	11.1*	252	0.7	276
72 h	To normal	272	53.6	13.5	74	2.7	72
	To caffeine	666	55.7	15.4	194	1.7	177
96 h	To normal	203	78.8	15.4	71	2.2	89
	To caffeine	401	62.1*	16.7	137	3.5	112
120h	To normal	426	66.9	21.3	145	1.4	140
	To caffeine	377	64.1	23.1	108	0.7	134
Deposition onto caffeine medium:							
24 h	To normal	1249	33.8*	23.3*	231	7.8	192
	To caffeine	1434	24.4	13.6	190	4.3	161
48 h	To normal	947	28.2*	21.5*	130	8.6	138
	To caffeine	1069	22.6	13.3	127	1.7	115
72 h	To normal	628	42.6*	35.9*	139	3.1	129
	To caffeine	716	18.8	9.2	76	0.0	59
96 h	To normal	402	64.1*	34.2*	105	6.5	153
	To caffeine	525	50.6	14.1	141	0.8	125
120h	To normal	480	52.5	29.7*	138	1.6	118
	To caffeine	540	50.3	16.5	121	0.0	151
Development in normal medium		986	43.7	27.4	215	6.4	216

Di Pasquale Paladino, A. and P.Cavolina. University of Palermo, Italy. Further investigations on the tu-pb melanotic tumor mutant of D.melanogaster.

In the search for understanding the mechanism of tumor manifestation in the tu-pb mutant, a peculiar case of melanotic tumor manifestation in Drosophila melanogaster (Di Pasquale Paladino & Cavolina 1982; Di Pasquale Paladino & Cavolina 1983), we have undertaken an analysis of factors that may in some way affect this character.

Results of temperature shift experiments, which are carried out in order to determine the temperature-sensitive period, are summarized in Fig. 1. Shift-down experiments show that tumor manifestation is inhibited when temperature is shifted during the early stages of larval development. Tumors appear, although with a very low frequency, when flies had been left at 23.5°C until the 72nd hr of development. Percent tumor incidence typical of the strain is attained when development is completed at 23.5°C. In shift-up experiments a detectable decrease of tumor incidence is found only when larvae are left at 18°C also during the late stages of development. Tumor incidence is found to decrease also when temperature shift corresponds to the 144th hr of development.

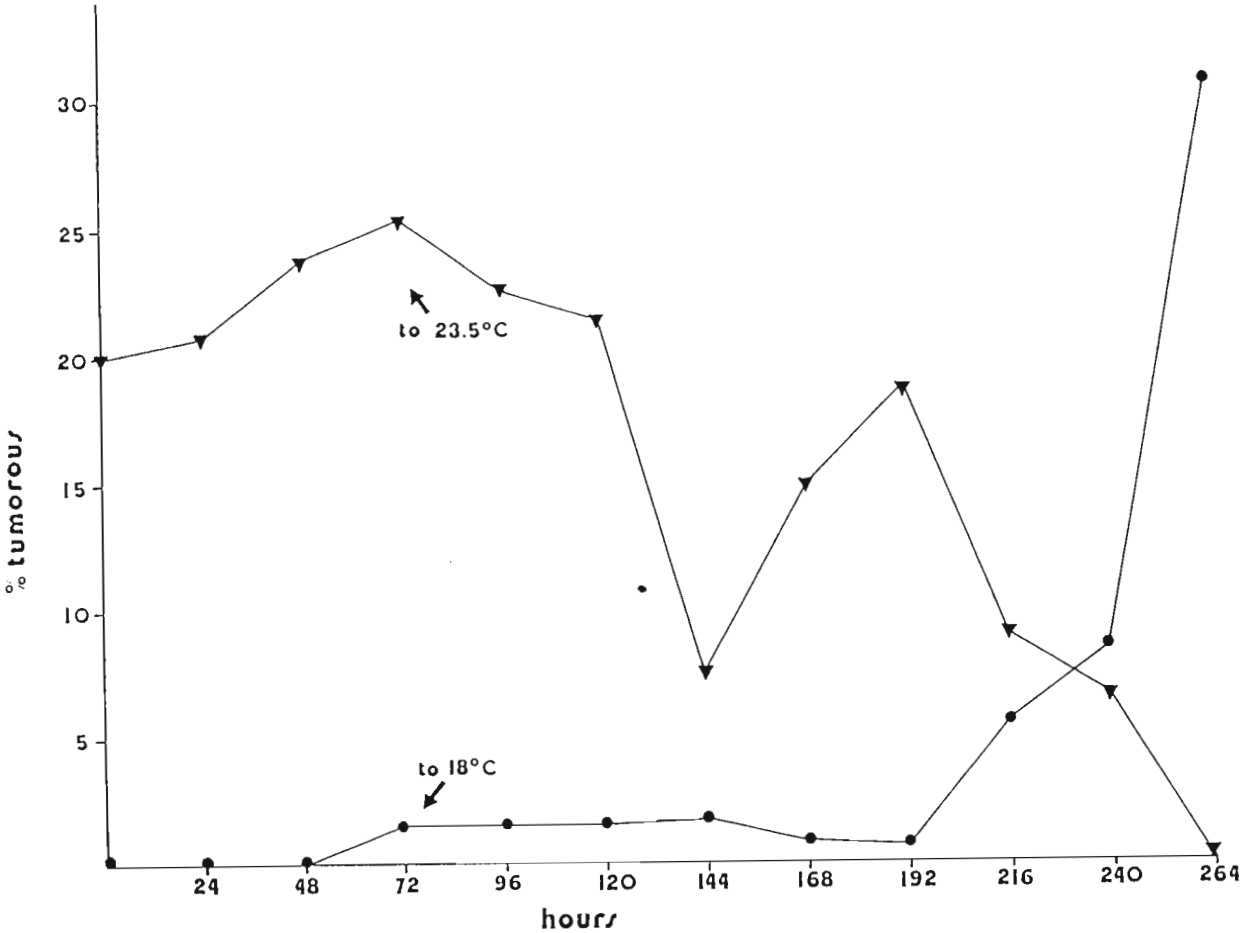

Figure 1. Results of the temperature shift studies.

i	♀♀	O/C(1)RM,y^2su(w^a)w^a ; +/+ ; +/+ X ♂♂ tu-pb/tu-pb
ii	♀♀	Y/C(1)RM,y^2su(w^a)w^a ; tu/+; tu/+ X ♂♂ tu-pb/tu-pb
iii	♀♀	Y/C(1)RM,y^2su(w^a)w^a ; tu(or +)/tu ; tu/tu X ♂♂ bb/YSX.YL;In(1)EN,y ; +/+ ; +/+ (selected fenotypically tu)
iv	♀♀	O/C(1)RM,y^2su(w^a)w^a ; tu(or +)/+ ; tu/+ X ♂♂ tu-pb/tu-pb
	1/2 of XO males and XXY females are: tu(or+)/tu ; tu/tu	

Figure 2. Crosses made to obtain XX/Y females and X/O males carrying the tu-pb genes.

Table 1. Tumor incidence in XX/Y, X/Y and X/O individuals.

	% ♀♀ tu	N.♀♀	% ♂♂ tu	N.♂♂
progeny from the (ii) cross: ♀ XX/Y and ♂ X/Y	11.1	216	2.24	223
progeny from the (iv) cross: ♀ XX/Y and ♂ X/O	8.77	729	1.46	953

The different degree of penetrance in either sex is a constant feature of tu-pb. Number of experiments were carried out to elucidate the possible relationship between male or female genotype, sexual phenotype and tumor manifestation. No difference of percent tumor incidence was observed between XY and XO males (χ^2=0.27) when combinations of sex chromosomes were altered (Fig. 2 and Table 1). Percentage of individuals with tumors, however, is higher in females (even with XXY genotype). Percent difference between sex is not modified. Tumor incidence in female individuals with XX genotype, but phenotypically transformed into males by the transformer gene and having gene combination yielding tu-pb manifestation was checked by a series of crossings described in Fig. 3. The results shown in part 1 of Table 2 show that tumor incidence in male individuals and in female individuals transformed into males attains the same values, since penetrance is low in both cases. On the other hand, as is shown by results summarized in part 2 of Table 2, tumors become manifest in a remarkably higher percentage in females than in males, in individuals carrying the same recombinant chromosome tra tu-pb, in which the heterozygous gene transformer is not manifest.

i ♂♂ $\frac{B^S Y}{+}$; $\frac{+}{+}$; $\frac{TM3}{tra}$ x ♀♀ $\frac{+}{+}$; $\frac{SM5}{Sp}$; $\frac{TM3}{D^3}$

ii ♂♂ $\frac{B^S Y}{+}$; $\frac{SM5}{+}$; $\frac{D^3}{tra}$ x ♀♀ tu-pb/tu-pb

iii ♂♂ $\frac{B^S Y}{+}$; $\frac{SM5}{tu}$; $\frac{D^3}{tu}$ x ♀♀ $\frac{+}{+}$; $\frac{SM5}{tu}$; $\frac{tra}{tu}$

I ♂♂ $\frac{+}{+}$; $\frac{SM5}{tu}$; $\frac{TM3}{tu}$ x ♀♀ tu-pb/tu-pb

II ♀♀ $\frac{SM5}{tu}$; $\frac{TM3}{tu}$ x ♂♂ $\frac{SM5}{tu}$; $\frac{D^3}{tu}$

iv ♂♂ $\frac{B^S Y}{+}$; $\frac{tu}{tu}$; $\frac{D^3}{\text{recombinant ?}}$ x ♀♀ $\frac{+}{+}$; $\frac{tu}{tu}$; $\frac{TM3}{D^3}$ (single pair matings)

v ♂♂ $\frac{B^S Y}{+}$; $\frac{tu}{tu}$; $\frac{TH3}{\text{recombinant ?}}$ x ♀♀ $\frac{+}{+}$; $\frac{tu}{tu}$; $\frac{\text{recombinant ?}}{TM3}$ (brothers and sisters)

PROGENY CLASSES

♂♂ $\frac{B^S Y}{+}$; $\frac{tu}{tu}$; $\frac{\text{recombinant ?}}{\text{recombinant ?}}$ ♀♀ $\frac{+}{+}$; $\frac{tu}{tu}$; $\frac{\text{recombinant ?}}{\text{recombinant ?}}$

♂♂ $\frac{B^S Y}{+}$; $\frac{tu}{tu}$; $\frac{\text{recombinant ?}}{TM3}$ ♀♀ $\frac{+}{+}$; $\frac{tu}{tu}$; $\frac{\text{recombinant ?}}{TM3}$

The progeny were scored for tu-pb manifestation in transformed females; females and males tra tu-pb/tra tu-pb were then crossed as follows:

♂♂ $\frac{B^S Y}{+}$; $\frac{tu}{tu}$; $\frac{tra\ tu}{tra\ tu}$ x → ♀♀ $\frac{+}{+}$; $\frac{tu}{tu}$; $\frac{tra\ tu}{TM3}$

→ ♀♀ tu-pb/tu-pb

Figure 3. Matings made to obtain tu-pb tra recombinant chromosomes.

These results suggest that temperature-sensitive period starts when pupae are almost near emergence and that temperature during emergence appears to be decisive for the manifestation of this character. Temperature-sensitive period coincides more or less exactly with the stage in which melanotic masses become evident. There is probably some relationship between the different incidence of tumors in the two sexes and the male or female phenotype, while such difference seems to be independent of the sexual genotype. Tumor manifestation is particularly low in phenotypically male individuals.

This work was supported by a grant from Ministero Pubblica Istruzione (60%).

References: DiPasquale Paladino, A. & P.Cavolina 1982, Atti A.G.I. 28:155-158; DiPasquale Paladino, A. & P.Cavolina 1983, DIS 59:31-33.

Table 2. Tumor manifestation in individuals carrying a tra tu-pb recombinant 3rd chromosome.

1. Tumor incidence in homozygotes tra,tu-pb/tra,tu-pb from the cross:

♀ $B^SY/+$; tu/tu ; tra,tu-pb/tra,tu-pb x ♂ +/Y ; tu/tu ; TM3/tra,tu-pb

transformed females		males	
% tu	N.	% tu	N.
8.09*	184	8.42**	190

* χ^2=86.032; P<0.01

2. Tumor incidence in heterozygotes tra,tu-pb/tu-pb from the cross:

♀ $B^SY/+$; tu/tu ; tra,tu-pb/tra,tu-pb X ♂ tu-pb/tu-pb

** χ^2=1.394; 0.20<P<0.30

females		males	
% tu	N.	% tu	N.
52.04*	269	12.50**	224

Dubucq, D., E.Depiereux and A.Elens. Universitaires Notre Dame de la Paix, Namur, Belgium. Phototactism and temperature.

The data here presented concern the phototactical behavior of Drosophila flies, assayed according to Benzer (1967) and to Kekic (1981), at three temperatures: 20°C, 25°C and 30°C. In both methods, the negative as well as the positive responses to light are determined. In the Benzer "counter-current" method the flies are submitted, moreover, to repeated mechanical stimuli: the most "sluggish" flies remain in the "0.0" test tube, the most phototactic flies concentrate in the "0.5" tube. In the Kekic maze the most phototactic flies go to the right

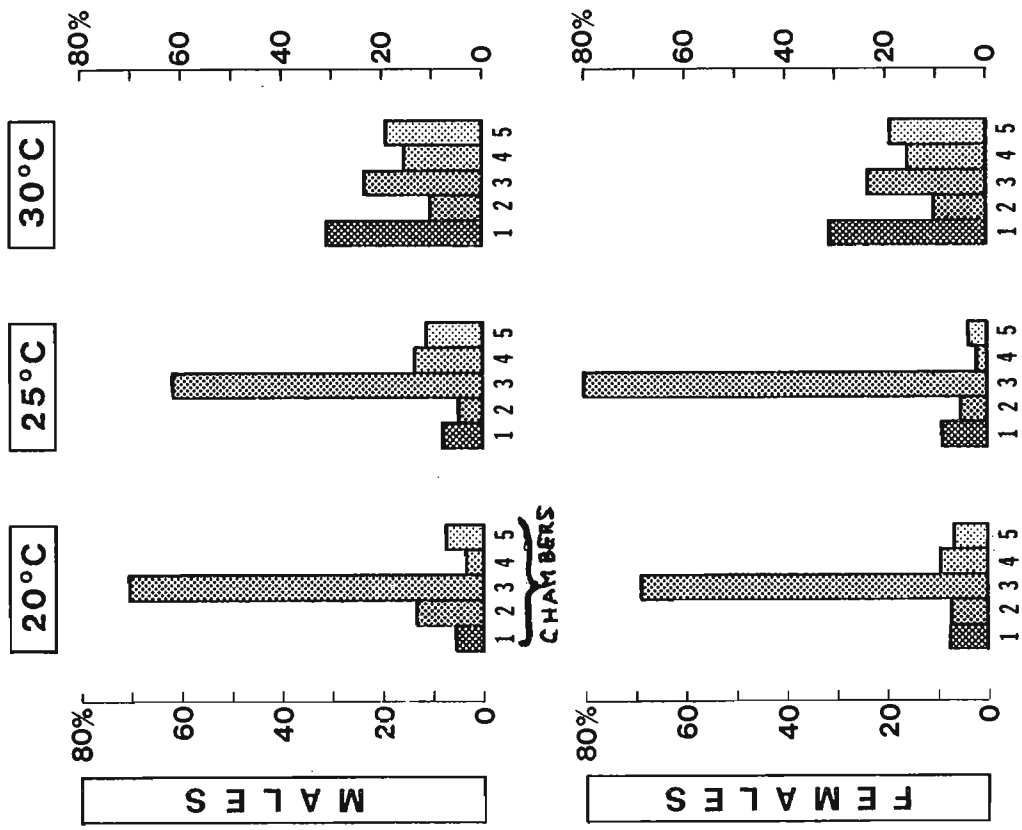

Fig. 1. Distribution of the flies after 1 hr tests in the Kekic maze (in%).

Chambers	Light, lux
1	500
2	800
3	2,000
4	4,500
5	6,500