invasion of endometrial tissues into the musculature. In rats, prolactin enhances the response of uterus to trauma or decidual formation[6,7], causes the acceleration of estrogen binding to uterine explants[8] and exerts a marked inhibitory effect on oxytocin-induced contraction of uterine myometrium primed with estrogen and progesterone[9]. Furthermore, prolactin binding is found in rat uterus[10]. Although a target tissue of prolactin in the uterus has not yet been determined, the present findings may involve a possible effect of chronic stimulation of prolactin on the smooth muscle cells.

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Comparison of wing margin structures of *vestigial* and wild-type *Drosophila melanogaster* grown at 31 °C

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Summary. The development of the middle row of triple row wing bristles was examined in flies homozygous for the *vestigial* mutant, grown at 31 °C. While bristle number, length and spacing all improved toward the wild-type condition, the mean values for both sexes were only about 10% of those of wild-type, although development in males was significantly more complete than in females. The results suggest an explanation for the apparent lack of regenerative ability in this tissue.
Key words. Vestigial; imaginal disc; regeneration.

Many studies[1-4] have shown that the length, structure and cell death rate in the development of the wings of *Drosophila melanogaster* vary significantly with developmental temperature in animals homozygous for the mutant *vestigial* (2-67.0). At restrictive temperatures, the mutant gene causes the failure of the development of the distal ¾ of the wing, including all parts of the wing margin. Restrictive temperatures are considered to be 25 °C and below, while permissive temperatures were established by Stanley[1] at 30 °C, and more recently by Bownes and Roberts[2] at 29 °C. While studies of other aspects of wing disc development have shown patterns more nearly approaching those of wild-type at 31 °C[5], the extent of development of structures in the adult wing of *vestigial* flies raised at 31 °C has not been reported. The capacity of the wing disc to regenerate the distal part of the wing in *vestigial* flies cannot be determined until the development of distal wing structures at 31 °C has been analyzed. All flies used in this study were raised at 31 °C. Survival at this temperature is reduced by approximately 20% from normal levels, but no distinction was seen in survival rates for the two sexes. Two coisogenic stocks were used, derived from Oregon R wild-type and *vg* in an Oregon R background. We selected one distal wing structure for examination; the central row of bristles in the triple row (TR), characteristing the leading edge of the wing. This row of bristles is ideal for examination in both normally developed wings and in those developing from transplanted discs. In addition, it lies in a part of the wing particularly sensitive to the effects of the vestigial mutation[6]. Both wings from each of a minimum of 30 flies in each experimental group were removed and mounted in Euparal for examination. The number of bristles was determined, and the length of the middle row of the TR was measured through a 25 × ocular with a micrometer. Statistical comparisons were made by standard methods.

Results. We examined wild-type and *vestigial* flies of both sexes, and compared the two wings on each fly. No significant differences were found between the means of right and left wing measurements, and variation between sides in wild-type flies was extremely small. Greater differences were seen in *vestigial* flies of both sexes, although both sides were affected equally often.

Vestigial animals grown at 31 °C in our cultures produced three distinct categories of flies: those with at least part of the TR formed on each wing, those with TR on one wing only, and those with no TR on either wing. The results are shown in the table.

Vestigial males produced TR structures on one side only in 9 out of 74 cases (12.2%). Females developed unilateral TR structures in 8 out of 52 cases (15.4%). When the data for paired (bilateral) and unpaired (unilateral) TR structures were compared in females, no significant differences were found in the three parameters measured. In the case of males however,

Condition of middle row bristles of the wing margin's triple row (TR) at 31 °C

		Length of bristle row (μm)	Number of bristles	Interbristle distance (μm)
Wild-type	Females	1175 ± 47.8	71.2 ± 3.6	16.5 ± 0.7
	Males	1039 ± 43.7	67.5 ± 3.0	15.4 ± 0.6
	t	11.4	4.4	6.5
	p	< 0.001	< 0.001	< 0.001
Vestigial:	Females	214 ± 221.8	8.7 ± 6.6	20.1 ± 11.3
TR both	Males	288 ± 245.6	12.0 ± 10.4	22.2 ± 11.9
wings	t	1.19	1.55	0.67
	p	> 0.10	> 0.10	> 0.10
Vestigial:	Females	103 ± 53.9	9.4 ± 3.8	10.8 ± 2.5
TR one	Males	101 ± 92.7	5.4 ± 2.6	16.7 ± 9.5
wing only	t	0.05	2.56	1.79
	p	< 0.10	< 0.05 > 0.02	> 0.10

both TR length and bristle number were significantly smaller ($p < 0.001$) than in the bilateral animals, while inter-bristle distance was not. A striking observation made in *vestigial* animals was that in males, 14 out of 74 cases produced no TR structures in either wing (18.9%), while in females 26 of 52 failed to do so (50.0%).

Discussion. These data indicate clearly that, while much improvement toward the wild-type phenotype in wing structure is achieved in both sexes in *vestigial* animals raised at 31 °C, wing development is never complete, though it is consistently better in males than in females. This represents a reversal of the condition seen in wild-type flies at any temperature: TR length is routinely 10–15% greater in females than in males, possibly reflecting the generally larger size of female flies. The relationship between bristle number and inter-bristle distance reveals another interesting aspect of wing border development: although bristle number is greatly reduced from the wild-type standard in 31 °C *vestigial* animals, inter-bristle distance does not increase significantly in females, and does so only slightly (6.8 μm) in males ($p < 0.02$). It thus appears that the capacity to construct the TR wing border is expressed in a nearly normal manner by *vestigial* flies if it is expressed at all; a small number of TR bristles will not be spread over a long span of wing border. This observation is certainly in keeping with the expression of other mutations which affect the border of the wing[5,6]. It may also help to explain the apparent lack of regenerative capacity in the *vestigial* wing disc[2].

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Evidence for an activating effect of tabernanthine on rat brain catecholamine synthesis and elimination[1]

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Summary. Tabernanthine increased the synthesis and elimination of catecholamines (CA) in the striatum and the rest of the brain, but not in the hypothalamus. These data provide evidence that tabernanthine may activate CA turnover of some brain structures by acting at 2 steps of the metabolic pathway. The results are discussed in relation to a central stimulating action and a hypoxia antagonistic effect of this drug.

Key words. Rat brain; striatum; tabernanthine; catecholamine turnover.

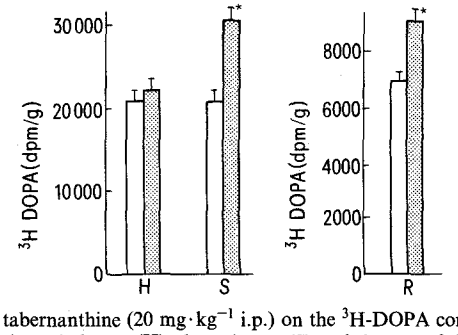
Catecholamine (CA) turnover rate is often calculated by measuring CA efflux after tyrosine hydroxylase (TH) blockade[2]. However, this method only provides information on the effect occurring at the release/degradation step and does not allow us to evaluate exactly the effect of a drug on the CA synthesis. Indeed a drug may act either on both synthesis and degradation or on only one of these steps.

The central stimulating agent, tabernanthine, has temorigenic and weak cataleptic actions[3-6] which were supposed to be related to variations in brain neurotransmitter metabolism. We have previously shown, using α-methyl paratyrosine (α-MT) to inhibit CA synthesis, that tabernanthine slightly decreases the brain turnover time of CA[7]. This effect was assumed to be due mainly to an increase in the monoamine catabolism and/or release. However, an effect on the synthesis could not be ruled out.

The present work was undertaken to study, in parallel, in several brain fractions, the influence of tabernanthine on both the synthesis and elimination processes of norepinephrine (NE) and dopamine (DA). Tyrosine hydroxylase activity was estimated by ^{3}H-DOPA accumulation after ^{3}H-tyrosine (^{3}H-TYR) and DOPA-decarboxylase inhibitor administration. The elimination process was investigated by determining the decrease in NE and DA levels after blockade of their synthesis.

Materials and methods. Experiments were performed on male Sprague-Dawley rats (Ch. River) weighing 200–240 g. The following drugs were used: Tabernanthine tartrate (CNRS, Gif-sur-Yvette, France), hydroxy benzyl hydrazine hydrochloride (NSD 1015) and α-methyl paratyrosine methyl ester (α-MT (SIGMA), L-[3,5-^{3}H] tyrosine (46 Ci·mmol^{-1}) and [3-^{14}C] DOPA (50 mCi·mmol^{-1}) (CEA, France).

^{3}H-DOPA concentration was mesured 65 min after DOPA decarboxylase inhibition by NSD (250 mg·kg^{-1} i.p.) followed 10 min later by ^{3}H-TYR injection (500 μCi·kg^{-1} i.v.). TYR chemical purity was previously verified to check the absence of DOPA. Treated rats received, 10 min before NSD, an i.p. injection of tabernanthine tartrate (20 mg·kg^{-1} as base) and were compared to a control group receiving only ^{3}H-TYR and NSD. The rats were killed by decapitation and brains dissected on a chilled plate into hypothalamus, striatum and rest of the brain. Tissues were weighed and homogenized in ice-cold 0.5 M $HClO_4$. After centrifugation, ^{3}H-DOPA from the supernatant was adsorbed on alumina at pH 8.6, as described by ANTON and SAYRE for catechol compounds[8]. Then ^{3}H-TYR was washed out by 3 additions of distilled water and ^{3}H-DOPA was eluted by twice 5 ml of 1 N HCl. Radioactivity of aliquots of each fraction was estimated by liquid scintillation counting. In order to verify TYR-elimination and to estimate DOPA recovery in the HCl eluates, ^{3}H-TYR and ^{14}C-



Effects of tabernanthine (20 mg·kg^{-1} i.p.) on the ^{3}H-DOPA concentration in the hypothalamus (H), the striatum (S) and the rest of the brain (R) after ^{3}H-tyrosine (500 μCi·kg^{-1} i.v.) and NSD (200 mg·kg^{-1} i.p.) administration. Results are means of 6–8 determinations expressed as dpm·g^{-1} ± SEM of fresh tissue. □, Controls; ▨, treated; *$p < 0.05$ between control and treated.