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An atypical *net*^{Ch86} allele isolated from a natural population of *Drosophila melanogaster*.

Weisman, N.Ya., and I.K. Zakharov. Institute of Cytology and Genetics of Siberian Branch of the Russian Academy of Sciences, Novosibirsk, 630090, Russia;
e-mail: weisman@bionet.nsc.ru

The *Drosophila* wing is divided into several cells by longitudinal veins and crossveins. A number of genes are involved in the formation of normal vein patterns. The *net* (*net, 2-0.0*) gene of *Drosophila melanogaster* is one of the key players in the process of vein development. The known spontaneous and induced *net* gene mutations cause disruption of vein patterns in all but the first posterior wing cell. A variegated expression of mutant phenotype is observed in different *net* alleles. Almost all of the known *net* mutations are recessive to the wild type allele (Lindsley and Zimm, 1992).

In our previous work, a number of *net* mutations differing in expression from the known *net* alleles have been found in natural populations of *D. melanogaster* (Weisman *et al.*, 2001). An atypical *net*^{Ch86} allele (Figure 1c) was isolated from a *D. melanogaster* line obtained from the Chernobyl population (Ukraine) in 1986. The *net*^{Ch86} mutants demonstrate a lesser extent of vein disruptions than the flies homozygous for standard *net*$^{2-45}$ allele (Figure 1b). Segments of extra veins develop in marginal, submarginal, second and third posterior wing cells in *net*^{Ch86} flies. In contrast to previously described *net* mutations, up to 10% of *net*^{Ch86} flies carry an extra vein in the distal part of the first posterior cells (sector C).

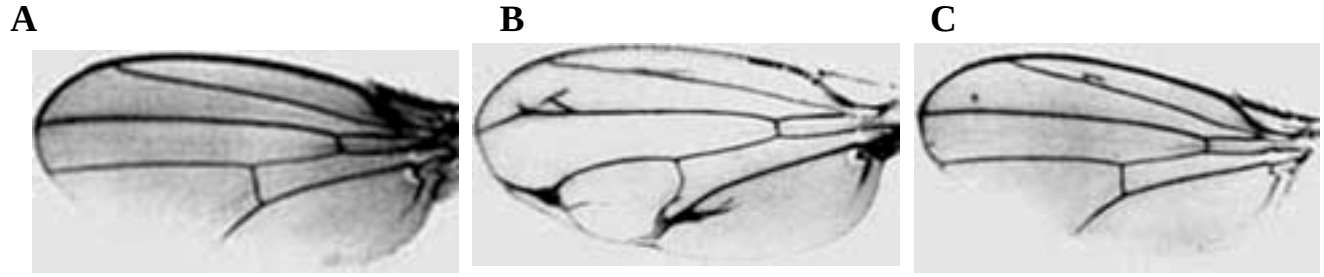

Figure 1. Wing vein patterns in *Drosophila melanogaster*: wild-type wing (A), phenotypic expression of *net*$^{2-45}$ (B), and *net*^{Ch86} (C) alleles.

The *net*^{Ch86} mutation is semi-dominant to the wild type *net*$^{+}$ allele. In the progeny of crosses of *net*^{Ch86} line with *Oregon* and *Canton-S* laboratory stocks, up to 20-30% of hybrid flies develop small extra veins in the second and third posterior cells.

Genetic analysis was carried out with the use of the following mutant *D. melanogaster* lines from the collection of the Laboratory of Genetics of Populations, Institute of Cytology and Genetics, Siberian Branch of the Russian Academy of Sciences:

1. Line homozygous for standard *net*$^{2-45}$ allele causing multiple wing vein disruptions;
2. Line *Df(2)net*^{62}*/Cy* carrying the deficiency for the *net* locus.

In *net*$^{2-45}$*/ net*^{Ch86} heterozygotes, the vein disruptions are similar to those of *net*^{Ch86} homozygotes and less expressed than those of *net*$^{2-45}$ homozygotes. Up to 7% of heterozygotes carry an extra vein in

the distal part of the first posterior wing cell. Thus, the allele net^{Ch86} with a less expressed vein disruption as compared to the standard mutant allele net^{2-45} is dominant to the latter. However, the net^{Ch86} / $Df(2)net^{62}$ heterozygotes develop severe vein disruptions in the form of nets and segments of veins including the extra vein in the first posterior sector.

As previously mentioned, the *net* mutations with an extra vein in the first posterior cell are very rare. Among 2720 flies and 250 isofemale lines derived from *D. melanogaster* populations from the two regions of Russia – Altai (populations Askat and Belokurikha) and Udmurtia (populations Izhevsk, Karambai, and Pychas) - in the year 2000 as well as among 1398 flies and 200 isofemale lines from populations Pychas (Udmurtia), Bishkek (Kyrgizstan), Zvenigorodka (Cherkassy region, Ukraine), and Vladivostok (Russia) collected in the year 2001, no *net* mutations with an extra vein in the first posterior cell has been found (Weisman *et al.*, 2001b).

Some other genes involved in the development of wing cells and suppressing the vein development are expressed in the wing disk, such as *blistered* (*bs*), *knot* (*kn*), *plexus* (*px*) (Fristrom *et al.*, 1994; Lindsley and Zimm, 1992; Mohler *et al.*, 2000). Supposedly, the activity of these genes in different sectors of the wing may overlap. The differences in expression of natural *net* alleles can be, possibly, due to the different molecular lesions of *net* gene. Interactions of these *net* alleles with the modifiers of *net* and other genes involved in the wing pattern formation can locally divert the imaginal disk cells from normal differentiation pathway to the development into the vein cells.

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