INTRODUCTION

A general description of the development of mouse chimaerae and an account of the techniques for their production were given in previous reports (Tarkowski, 1961, 1963). The chimaeric character of the embryos and young obtained was tentatively claimed in the first of these publications because (1) the actual union of two eggs into one blastocyst was seen in culture in vitro, (2) of the occurrence of intersexes, (3) pigment synthesis of the types of the dark component occurred in the majority of individuals developed from pairs of eggs differing genetically in factors for pigmentation. The last criterion was met only by macroscopic search for pigment in the eyes.

The present report gives a more detailed description of the distribution of pigment forming cells in these animals, based on histological analysis. Some remarks on the validity and applicability of such a criterion for estimating the degree of chimaerism were made at the 13th Annual Meeting of the Tissue Culture Association (Tarkowski 1963).

MATERIAL AND METHODS

The material employed in this work comprises the one series of experiments described previously (Tarkowski, 1961) in which the eggs used for fusion differed in factors for pigmentation. The two components were: (1) Pure LAB Grey, genotype aaBBCCpp, phenotypically grey with pink eyes, and (2) Hybrids between LAB Grey females and A2G albino males, genotype AaBbCcPp, phenotypically agouti with black eyes. The available individuals were: Four 11 ½-day embryos (including one pair of identical twins), two 13½-day embryos,

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nine young 0–3 days old, and one animal which attained sexual maturity and was killed after 16 months of life.

The whole embryos, or their heads, and the dissected eyes of the newborn individuals were sectioned serially. Histological sections or whole-mounted unstained preparations were made from skin taken from newborn animals in the areas between the genital papilla and anus and from the soles of the feet. Skin was also taken from the ears and tail of some individuals. Normal animals of LAB Grey and hybrid origin, and those chimaerae which developed from eggs of the same genotype, were used as controls. All sections were cut at 7 or 10μ and either mounted unstained or stained with haematoxylin and eosin.

RESULTS

Pigment in the mouse makes its first appearance in the outer layer of retina, where, in darkly pigmented genotypes, melanin granules are already visible on the 12th day of gestation. Since the pigment is not formed in melanocytes before birth, the outer layer of the retina is practically the only place which can be tested in this way for chimaerism during embryonic development. Since all but one of the young died during the first 3 days of post-natal life, coat pigmentation in these animals could be studied only indirectly, i.e. on the basis of the distribution of pigmented melanocytes in the different regions of the skin.

The eye

Embryos

In all six available embryos pigment was found in the cells of the outer layer of the retina.

In four 11½-day-old embryos pigment granules were very scanty and restricted mainly or exclusively to the dorsal part of the optic cup. Control hybrid embryos of the corresponding age show the same topographical sequence of the appearance of melanin granules. At this stage the pigmentation of the outer layer of the retina is just beginning to develop and lack of pigment granules in whole areas of the ventral half or in separate cells in the dorsal half of the optic cup cannot be considered as a proof of the chimaeric constitution of the eye. It is interesting that both embryos belonging to a pair of identical twins (separate yolk-sacs inside a common bilaminar omphalopleure) had pigmented eyes.

In the two 13½-day embryos the outer layer of the retina was almost completely pigmented with the exception of a small area just below the optic nerve. The intensity of pigmentation was still lower in the ventral half of the optic cup. In the control hybrid embryos examined pigmentation was already continuous, although less intense in the area adjacent to the optic nerve on the ventral side.

These findings lead one to believe that the retinæ in both chimaeric embryos are composed exclusively of the cells of the hybrid component and that the slight
PLATE 1

Fig. A. A tangential section of the outer layer of the retina of the newborn hybrid (agouti) young. All cells are heavily pigmented. × 200.

Fig. B. Next to the tangential section of the outer layer of the retina of a newborn LAB Grey (pink-eyed) young. Complete lack of pigmentation. × 200.

Fig. C. A tangential section of the outer layer of the retina of a newborn chimaeric young showing its mosaic constitution—both pigmented and non-pigmented cells contribute to this layer. × 200.

Figs. D, E, F. Perpendicular sections through the outer layer of the retina together with the underlying choroid of newborn hybrid (agouti) (D), pink-eyed LAB Grey (E), and chimaeric young (F). In the latter case the pigmented cells originating from the hybrid component and the non-pigmented cells derived from the LAB Grey component are intermingled. × 600.

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(Facing page 576)
FIG. G. Fragment of a mosaic outer layer of retina, shown in Plate 1, Fig. C under higher magnification. While the cells of the hybrid genotype are already overloaded with pigment granules, no pigment is detectable in the other cells. × 800.

FIG. H. Section through the eye of an adult chimaeric animal. The cells of outer layer of retina occupying the left side of the fragment reproduced contain numerous pigment granules—those on the right side show very few. In both kinds of cells pigment granules are of the same shape and colour. × 800.

FIG. I. Tangential section of the same eye as in Fig. H. Two kinds of cells, some heavily pigmented and some with few granules, are visible. Pigment granules are black spheres and elongated rods. × 1200.

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differences between chimaeric and control animals are probably connected simply with the differing stage of development.

**Newborn animals**

The observations on the composition of the outer layer of the retina in the newborn animals together with data regarding the presence of melanocytes in the choroid and Harderian gland are summarized in Table 1.

In control hybrid animals autopsied at birth all cells in this layer are heavily pigmented (Plate 1, Figs. A and D). On the contrary, in LAB Grey animals of the same age no pigment granules can be detected at all (Plate 1, Figs. B and E). The occurrence of non-pigmented cells in the outer layer of the retina of the chimaeric animals can be considered, therefore, as an unequivocal proof of their 'pink' genotype.

It can be seen from Table 1 that in seven out of nine available animals the outer layer of the retina is mosaic in character, having pigmented and non-pigmented cells intermingled (Plate 1, Figs. C and F; Plate 2, Fig. G). In the remaining two young the composition of this layer is homogeneous—one animal has non-pigmented eyes and in the other the outer layer of the retina is pigmented continuously and no cells without pigment granules can be detected. In mosaic eyes the participation of cells of both types is variable and changes from individual to individual. Sometimes slight differences can also be detected between the left and right eye of the same animal. Several attempts to estimate precisely the ratio between pigmented and non-pigmented cells were abandoned since the mosaic pattern prevails on the whole surface and none of the methods employed were precise. It is, however, possible to say which of the two types of cells preponderates.

In the newborn chimaerae and control hybrids dendritic melanocytes are already present in other structures of the uveal tract such as the choroid and the Harderian gland. Lack of melanocytes in these structures was noted in only one case—an animal with no pigment at all in the outer layer of the retina. In all others, irrespective of the ratio between the two types of cells in the retina, melanocytes were always present in the choroid and Harderian gland (Table 1), though the population of these cells was of differing 'density'. Even in the animal no. 61/4, in whose mosaic eyes non-pigmented cells dominate, melanocytes can easily be detected in both structures, though they are scarcer than in control hybrids or in chimaerae with a preponderance of pigmented cells in their retinae.

**Mature animal**

While in the pink eyes of the newborn LAB Grey animals pigment synthesis has not yet been initiated, in the adult individuals scarce pigment granules are present in the cells of the outer layer of the retina and in the melanocytes populating the choroid. The pigment granules look yellow in colour (but see
**TABLE 1**

*Pigment forming cells in the uveal tract of the newborn chimaeric young*

<table>
<thead>
<tr>
<th>Animal no.</th>
<th>Outer layer of retina</th>
<th>Choroid</th>
<th>Harderian gland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left eye</td>
<td>Right eye</td>
<td>Left eye</td>
</tr>
<tr>
<td>59/1</td>
<td>Wholly pigmented</td>
<td>Wholly pigmented</td>
<td>+</td>
</tr>
<tr>
<td>59/2</td>
<td>Mosaic, pigmented cells dominating</td>
<td>Mosaic, pigmented cells dominating</td>
<td>+</td>
</tr>
<tr>
<td>59/3</td>
<td>Mosaic, pigmented cells dominating</td>
<td>Mosaic, pigmented cells dominating</td>
<td>+</td>
</tr>
<tr>
<td>60</td>
<td>Mosaic, pigmented cells dominating</td>
<td>Mosaic, pigmented cells dominating</td>
<td>+</td>
</tr>
<tr>
<td>61/1</td>
<td>Mosaic, pigmented cells dominating</td>
<td>Mosaic, pigmented cells dominating</td>
<td>+</td>
</tr>
<tr>
<td>61/2</td>
<td>Wholly non-pigmented</td>
<td>Wholly non-pigmented</td>
<td>-</td>
</tr>
<tr>
<td>61/3</td>
<td>Mosaic ± equal share of pigmented and non-pigmented cells</td>
<td>Mosaic ± equal share of pigmented and non-pigmented cells</td>
<td>+</td>
</tr>
<tr>
<td>61/4</td>
<td>Mosaic, non-pigmented cells dominating</td>
<td>Mosaic, non-pigmented cells dominating</td>
<td>+</td>
</tr>
<tr>
<td>61/5</td>
<td>Mosaic ± equal share of pigmented and non-pigmented cells</td>
<td>Mosaic, non-pigmented cells dominating</td>
<td>+</td>
</tr>
</tbody>
</table>

+ Melanocytes present, — Melanocytes absent, n.a. Not available.
Pigmentation in mouse chimaerae

Discussion) and in the retina have the shape of very small shreds, ovals and spheres, sometimes aggregated together into big clumps. In the eyes of hybrids retinal pigment is represented by black spheres and rods and has already accumulated in great amounts by the time of birth. The difference between retinal pigmentation of mature LAB Grey and hybrid animals becomes, therefore, only a relative one, being quantitative (the amount of pigment) and qualitative (colour and shape of granules).

In the right eye of the only available adult chimaeric animal there are a few patches of cells with a low concentration of pigment on the background of heavily pigmented retina (Plate 2, Figs. H and I). The difference in pigmentation, however, is only quantitative since the attributes of the pigment granules are the same in both kinds of cells. Irrespective of the concentration of pigment the granules are always typical for the hybrid agouti genotype. The question whether such a difference can be considered as a proof of the mosaic constitution of the eye will be dealt with in the discussion.

In the left eye of the same animal only very few areas with a low concentration of pigment were revealed. The picture is, however, less clear than in the opposite eye.

In both eyes the choroid and the Harderian gland contain numerous melanocytes of the hybrid genotype.

Coat pigmentation

Skin from several regions of the body of the newborn animals was examined for the presence of melanocytes. From the data presented in Table 2 it is evident that when the retinae are fully pigmented or mosaic in character the melanocytes

<table>
<thead>
<tr>
<th>Animal no.</th>
<th>Type of eggs used for fusion</th>
<th>Between genital papilla and anus</th>
<th>Sole of right foot</th>
<th>Sole of left foot</th>
<th>Left ear</th>
<th>Right ear</th>
<th>Tail</th>
</tr>
</thead>
<tbody>
<tr>
<td>59/2</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>n.a.</td>
<td>n.a.</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>59/3</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>+</td>
<td>n.a.</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>60</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61/1</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61/2</td>
<td>LAB Grey + hybrid</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>61/3</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>61/4</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>61/5</td>
<td>LAB Grey + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>hybrid + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40/2</td>
<td>hybrid + hybrid</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31/1</td>
<td>LAB Grey + LAB Grey</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

+ Melanocytes present, − Melanocytes absent, n.a. Not available.
can be always detected in the skin taken from the region between the genital papilla and the anus and from the soles of the feet. It was only in the animal with non-pigmented eyes that no melanocytes could be found in the samples of the skin examined.

The mature animal developed a uniform fur of the hybrid type.

**DISCUSSION**

Though the way the fused eggs develop in vitro shows that all the blastomeres are incorporated into a single blastocyst, the need for additional and direct proofs of chimaerism in the resulting individuals is obvious. Among several theoretically possible criteria (see Tarkowski, 1963) the distribution of pigment-forming cells in the body of the animal developed from eggs differing in the factor for pigmentation is perhaps the simplest one. As can be seen from the discussion which follows, however, its limitations are manifold.

The structure which can first be tested in this way is the outer layer of the retina. Since in the normal development of the hybrid animals employed not all cells in this layer have started producing pigment by the 13-day stage, all earlier stages are of limited value in diagnosing the composition of eyes in chimaeric animals. Up to 13½ days of embryonic development this method only allows us to say that cells of the pigmented component are present and to suggest their approximate share in the whole structure. It does not permit certain characterization of the genotype of cells which lack pigment granules.

While in the outer layer of the retina pigment is produced in situ, pigmentation of the skin and hairs is caused by melanocytes whose predecessors originate from the neural crest and migrate afterwards to their definitive locations (Rawles, 1947). Consequently, the pattern of pigmentation in the retina reflects directly and in quantitative terms the genotype of the whole population of cells constituting this layer. Coat pigmentation, on the other hand, being caused by cells which are immigrants in this territory, shows indirectly the composition of the neural crest only and may not provide any information regarding the genotype of ectodermal cells contributing to the skin. Secondly, analysis of coat pigmentation in newborn animals when it is based on the presence of melanocytes in the skin before the development of fur reveals only pigment forming cells of the dark component. The only consequence of the simultaneous presence of melanoblasts derived from the other component would be a smaller density of pigmented melanocytes as compared with control animals of the same age. In practice, such estimates are so imprecise and depend on so many factors that their value is doubtful.

No strict information regarding the routes of migrations of melanoblasts in relation to the longitudinal axis of the body are available. It seems more plausible to assume that melanoblasts from a given place in the neural crest populate a radially diverging sector but do not migrate far in a longitudinal direction from
Pigmentation in mouse chimaeræ

the level of their origin. If such an assumption is correct then the presence of melanocytes in the hind region of the body of chimaeræ (e.g. soles of feet, area between genital papilla and anus) would suggest that cells of the ‘dark’ genotype also contribute to the hind region of the neural tube. Comparison of data presented in Tables 1 and 2 shows that when the outer layer of the retina is wholly pigmented or mosaic then melanocytes can always be detected in the skin of the hind region of the body. On the other hand, examination of the skin of the single animal without pigmented cells in the retina failed to reveal any melanocytes (Table 2). These observations suggest that if the presence of cells of both genotypes is confirmed in the outer layer of the retina then it is very likely that these two kinds of cells were intermingled along the whole neural tube or, generalizing by inference, along the whole longitudinal axis of the primitive ectoderm.

From the above discussion it follows that the outer layer of the retina is the only structure in the body whose chimaeric constitution can be directly estimated and proved with the help of the criterion of pigmentation. Though, theoretically, the validity of such an estimate is restricted to this particular structure, in practice it can be considered as an indirect indication of the composition of other derivatives of the whole anterior part of the neural tube. The outer layer of the retina differentiates from the optic vesicle which arises from the side wall of the forebrain and no other cells contribute to the retina. The cells which constitute the retina can be considered as a sample of the cell population from the anterior region of the neural tube. The high degree of intermingling of cells of both types observed in this territory suggests that the high degree of mixture must be achieved quite early during development. The fact that the cells of the dark genotype were encountered in both eyes of each co-twin embryo provides confirmation. In this particular case the cells of the dark genotype must have been distributed in the whole embryonic disc before the formation of the two egg-cylinders, i.e. between the 4½- and 5½-day stage.

Since seven out of the nine newborn animals have mosaic retinas, a chimaeric constitution is achieved in the majority of animals produced. In the case of homogeneous retinas the chimaeric composition of an animal cannot be excluded, however, because this method does not provide any information regarding the constitution of endodermal and mesodermal layers and their derivatives. Since at least the bulk of mesoderm originates from primitive ectoderm (Snell, 1941; Bonnevie, 1950), its composition can be indirectly postulated to be chimaeric if other ectodermal derivatives such as neural tube prove to be so.

The pigmentation of the eyes of the one adult chimaeric animal needs special mention. According to Markert & Silvers (1956) pigment granules in the eyes of pp mice are black or brown in accordance with the alleles at the B locus (BB, Bb—black, bb—brown). The LAB Grey animals employed in the present work are of aaBBCCpp constitution. However, in the author’s opinion, pigment granules in the outer layer of the retina and choroid can hardly be described as black—they look yellow or ‘dirty’ yellow. The same was noticed when the eyes
of CBA/p (AABBCCpp) were studied. Moreover, in the animals belonging to these two strains the shape and the size of the granules in the outer layer of the retina do not conform with those of the granules in their hairs. In the former, pigment is represented by small shreds and ovals and spheres of rather regular contours and sometimes there are also big, spherical, though not very regular, granules. In the latter, the granules were found to be small shreds and flocculent clumps, in accordance with the description given by Russell (1949). Since the effect of pp/PP substitution on the ‘morphology’ of granules seems to be different in the hairs and the outer layer of retina and since, according to Russell (1949), pp genes do not affect the shape of phaeomelanin granules in hairs, it may be that the melanin in the retinal cells chemically resembles phaeomelanin more than eumelanin or at least it is different from that synthetized in the hairs.

Leaving apart the question of the precise description of the colour of granules and the character of melanin in the structures investigated, the important point for the present considerations is the striking difference between pigment granules in the eyes of aapp(LAB Grey) and AaPp(hybrid) animals, regarding their colour and shape.

In the eyes of the adult chimaeric animal, cells with low pigment concentration were encountered together with others overloaded with pigment granules. Irrespective of the amount of accumulated pigment, the granules look the same in both kinds of cells, being black spheres and elongated rods, i.e. of the type characteristic for the hybrid component. Two interpretations can be advanced to explain this observation.

1. The lightly pigmented cells are also of hybrid origin and consequently the eye is not mosaic but for some unknown reason the intensity of pigment production has been affected.

2. The lightly pigmented cells are of pp genotype derived from the LAB Grey component and, consequently, the eye is a mosaic, but under the influence of the neighbouring cells they have been stimulated in some way to synthetize pigment granules of the composition and shape typical for inducing cells. This induction would have only a qualitative aspect, since no quantitative increase of pigment can be observed. New observations are required to confirm this single finding and before the latter explanation could be taken into account seriously.

Pigmentation of the other structures of the uveal tract, such as the choroid and Harderian gland, is caused by typical melanocytes. It has been suggested by Bartelmez (1962) that the structures of the uveal tract might be populated by melanocytes originating from the neural crest of the forebrain. Though of different origin and history these melanocytes and the cells in the retina stem from the topographically neighbouring regions of the neural tube. From gross counts of melanocytes in the choroid and Harderian gland of chimaerae it seems that their number is lower than in control hybrid animals. In the light of Bartelmez assumption this would be understandable—the heterogeneous population of melanocytes is only partially detectable.
Pigmentation in mouse chimaerae

It would be interesting to know why in some cases the retinas show the chimaeric constitution and in others they do not. The method employed for fusion of eggs and scrutiny in selecting the blastocysts for transplantation precludes the possibility of the transferred blastocysts not being chimaeric. Two possibilities arise: either the cells of one genotype are completely eliminated from the developing embryo at very early stages (which does not seem very likely) or, they are not incorporated at all or take a very small share in the embryonic part of the egg cylinder. This would not preclude, however, the chimaeric composition of other embryonic tissues and elements such as entoderm, primitive blood cells and primordial germ cells. Pigmentation as a criterion of chimaerism, being applicable only to the derivatives of the neural tube or indirectly to all derivatives of primitive ectoderm of the embryonic part of the egg-cylinder, is of no use in this respect and other methods must be concurrently employed.

SUMMARY

1. Distribution of pigment-forming cells has been analysed in sixteen individuals (six embryos, nine newborn young, one adult animal) developed from fused eggs differing in genotype for pigmentation (pink eye dilution versus agouti).

2. The following structures were examined: the outer layer of the retina (all individuals), choroid and Harderian gland and skin from various regions of the body (postnatal individuals).

3. In the six embryos, pigment was revealed in their retinas but since the development of pigmentation was still in progress at that age the genotype of non-pigmented cells could not be identified.

4. In seven out of the nine newborn young the outer layer of the retina was a mosaic with pigmented and non-pigmented cells intermingled. In the two other animals the outer layer of the retina was homogenous, being of ‘pink’ type in one animal and of ‘agouti’ type in the other.

5. In the adult animal the outer layer of the retina of one eye seems to be composed of two types of cells. The difference of pigmentation between them is quantitative only, the colour and shape of the granules being the same and typical for the agouti (hybrid) component. To postulate the chimaeric constitution it would be necessary to assume, therefore, that the cells derived from the LAB Grey component (pink-eyed) have been in some way induced by the neighbouring hybrid cells to synthesize pigment typical of the latter.

6. In all newborn animals, except the one with non-pigmented eyes, melanocytes from the agouti component were detected in the choroid, Harderian gland and the samples of skin examined. However, the presence of melanocytes of the other genotype could be neither proved nor rejected.

7. On the basis of the composition of the retinas and the distribution of pigmented melanocytes in the skin it is inferred that the majority of animals
developed from fused eggs are real chimaeras, at least as far as the neural derivatives are concerned. Since pigmentation does not reveal the genetic constitution of structures of different developmental history and derivation, the chimaeric character of animals with homogenous retinae cannot be excluded.

Résumé

Manifestations de la pigmentation dans des chimères produites expérimentalement chez la Souris

1. La distribution des cellules formatrices du pigment a été analysée chez 16 individus (6 embryons, 9 jeunes nouveau-nés, 1 adulte) provenant de la fusion d’œufs différant par le facteur de pigmentation (*pink eye dilution* contre *agouti*).

2. Les structures examinées ont été le feuillette externe de la rétine (chez tous les individus), la choroïde, les glandes de Harder et la peau de régions variées du corps (chez les nouveau-nés et l’adulte).

3. Dans les 6 embryons, du pigment s’est rencontré dans les rétines mais comme le développement de la pigmentation était encore en cours à leur âge, il n’a pas été possible d’identifier le génotype des cellules non pigmentées.

4. Chez 7 des 9 nouveau-nés, le feuillette externe de la rétine était une mosaïque de cellules pigmentées et non pigmentées, se présentant en mélange. Dans les deux autres animaux de ce groupe, ce même feuillette était homogène, formé chez l’un de cellules du type *pink*, chez l’autre du type *agouti*.

5. Chez l’adulte obtenu, le feuillette externe d’une des rétines paraît composé de deux espèces de cellules. La différence de pigmentation perceptible entre elles est seulement quantitative, la couleur et la forme des granules étant partout la même et du type observé chez le composant *agouti* (hybride). Pour postuler la constitution chimérique de ce feuillette rétinien, il est par conséquent nécessaire d’admettre que les cellules provenant du composant LAB Grey (ayant des yeux *pink*) ont été induites de quelque façon par les cellules hybrides voisines à synthétiser le pigment typique de celles-ci.

6. Chez tous les animaux nouveau-nés, à l’exception de celui dont les yeux n’étaient pas pigmentés, on a pu déceler des mélanocytes provenant du composant agouti, et cela dans la choroïde, dans la glande de Harder et dans les échantillons de peau examinés.

7. En se basant sur la composition de la rétine et la distribution, dans la peau, des mélanocytes pigmentés, on peut admettre que la majorité des animaux issus d’œufs fusionnés sont réellement des chimères, du moins en ce qui concerne les dérivés neuraux. Etant donné que la pigmentation ne révèle pas la constitution génétique de structures procédant d’une origine embryologique et d’un mode de dérivation différents, on ne peut exclure que les animaux porteurs de rétines homogènes soient néanmoins des chimères.

Acknowledgement

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