

# Генетика 2014. Введение в современную генетику для не\_биологов



random]plasatd

# Генетика 2014. Введение в современную генетику для не\_биологов

(Небольшая пауза, чтобы встать и уйти)



Лёва



Владеет  
Аня С.



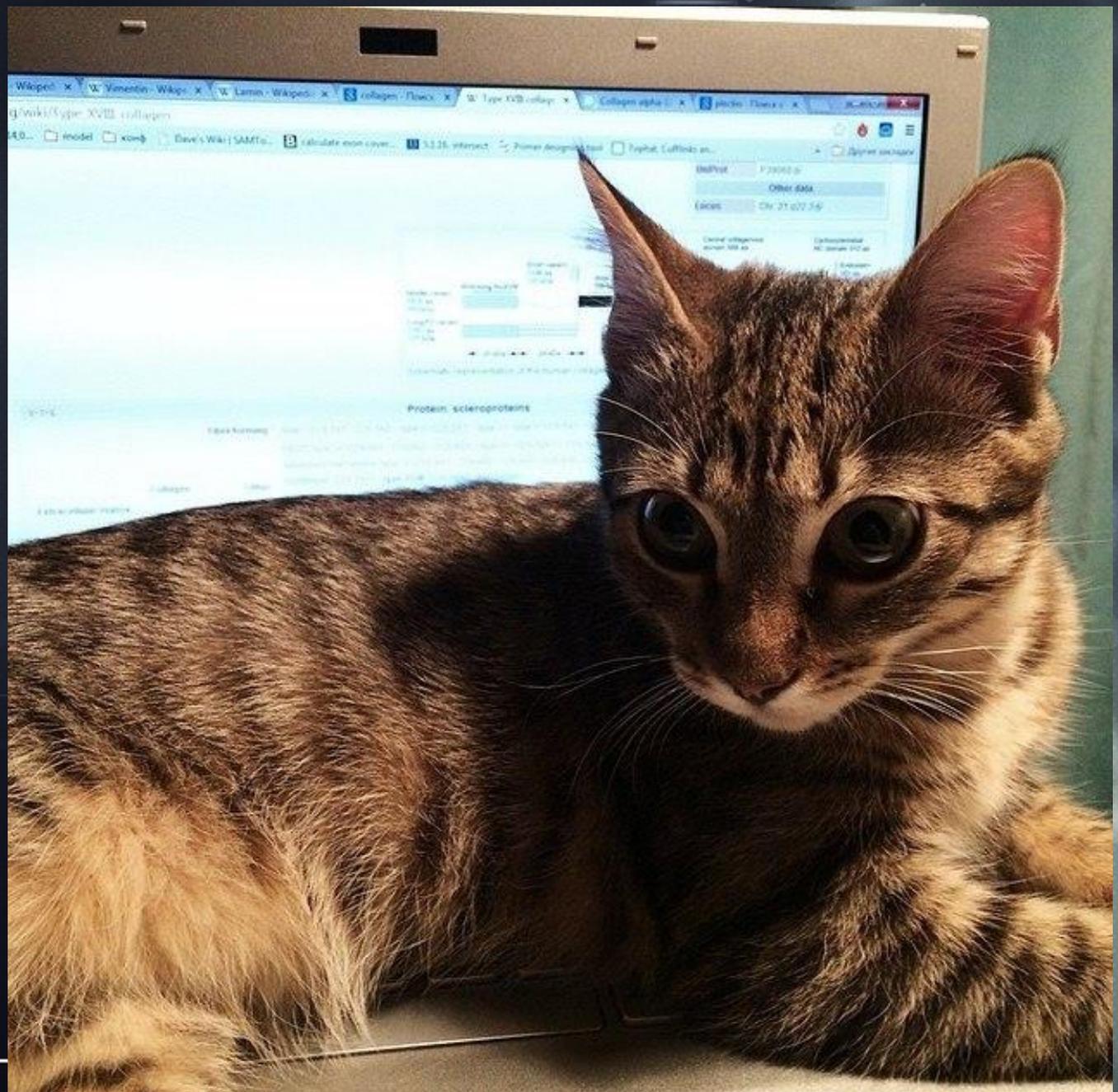


# Шрёда



**Владеют  
Вика К. и  
Даня П.**

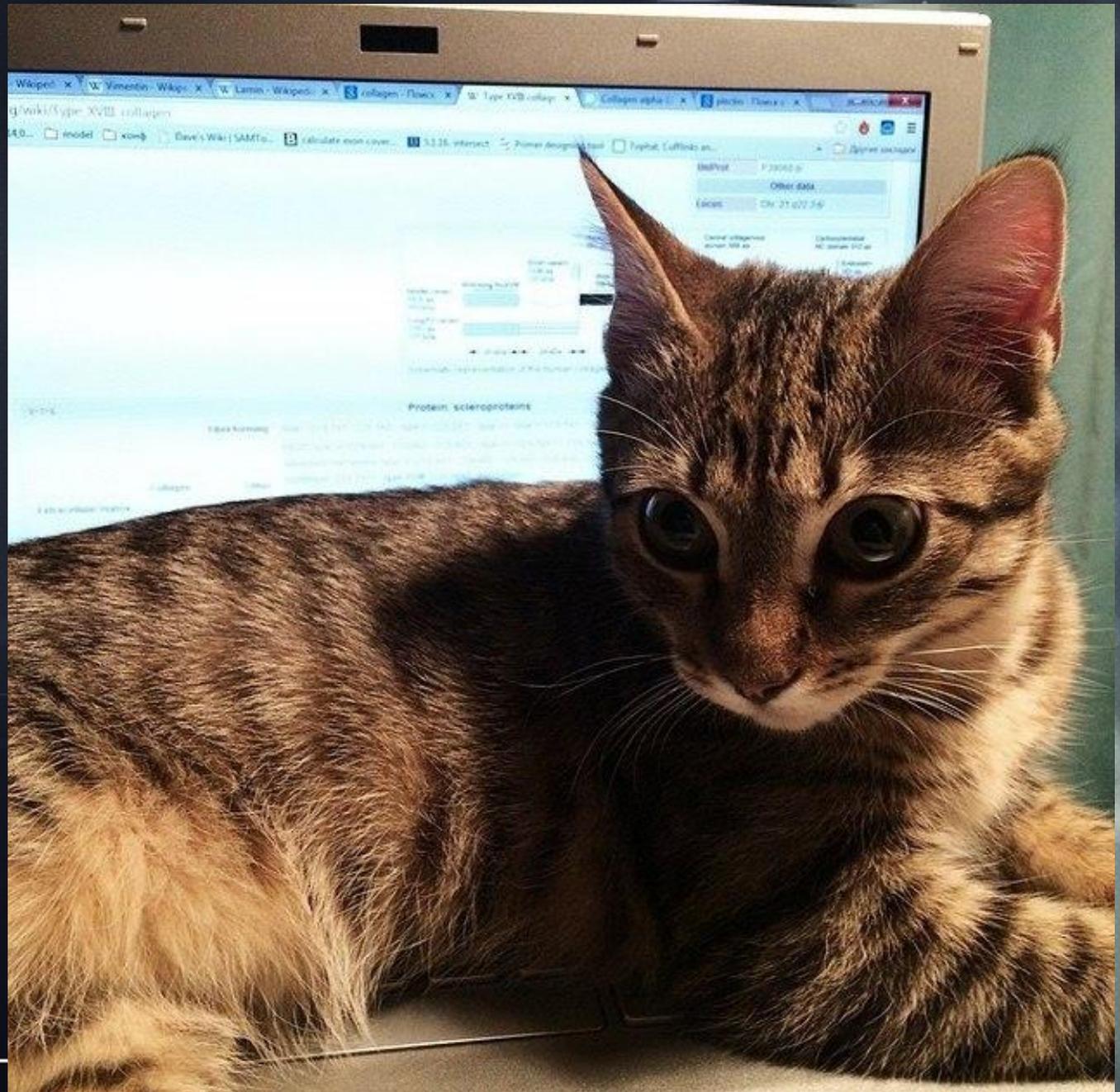




Ушнишавиджая



Владеет  
Даша С.





Малыш



Владеет  
Стас С.





yCamp 26-28 IX 2014

# Василиса

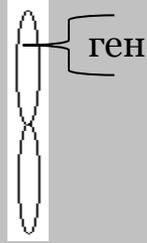


**Владеют  
Миша и Маша  
Н.**



**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

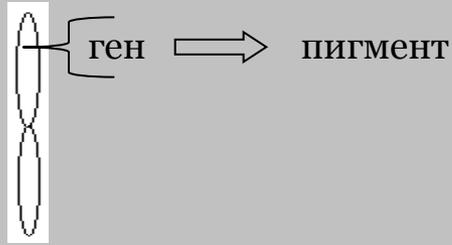
**Дано:**



X-хромосома

**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

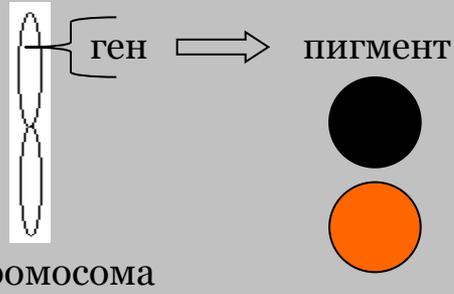
**Дано:**



X-хромосома

**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

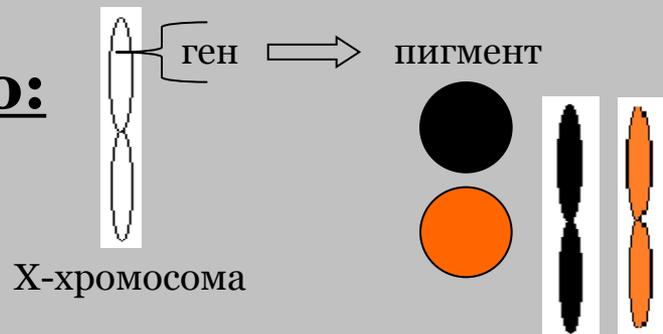
**Дано:**



X-хромосома

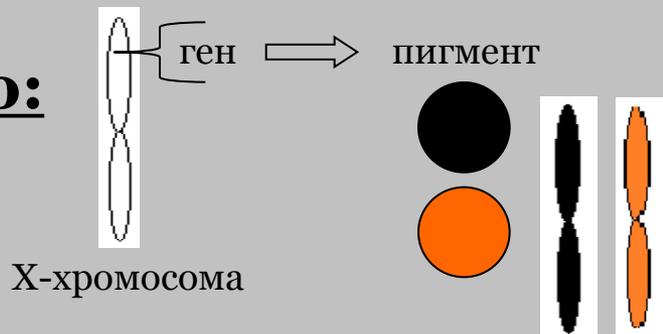
**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

**Дано:**



**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

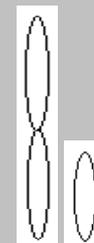
**Дано:**



**Самка XX:**

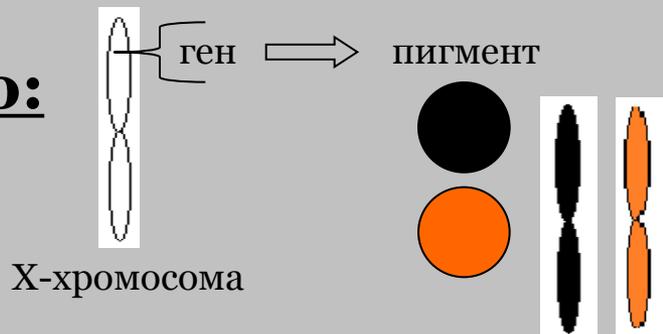


**Самец XY:**



**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

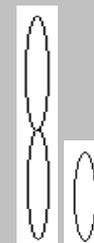
**Дано:**



**Самка XX:**



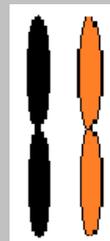
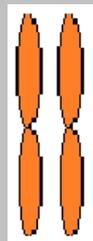
**Самец XY:**



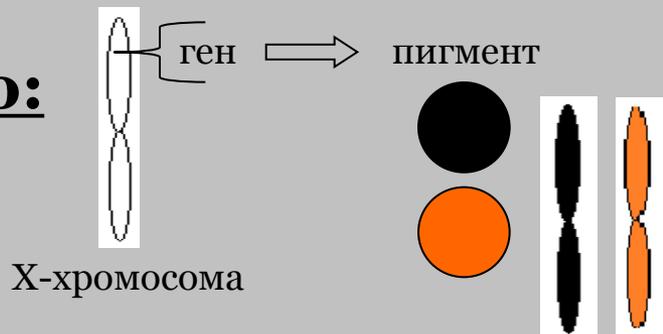
**Доказать:** трёхцветными могут быть только кошки,  
а коты не могут

**Доказательство:**

**Варианты кошек:**



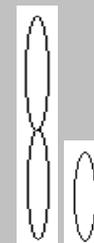
**Дано:**



**Самка XX:**



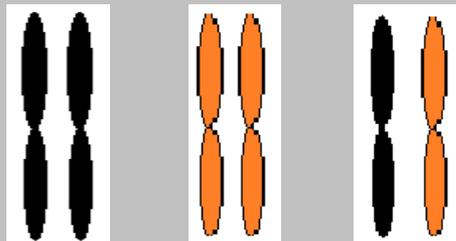
**Самец XY:**



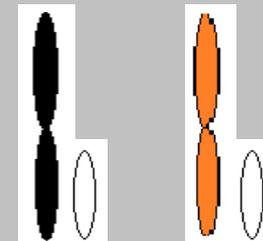
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а коты не могут

**Доказательство:**

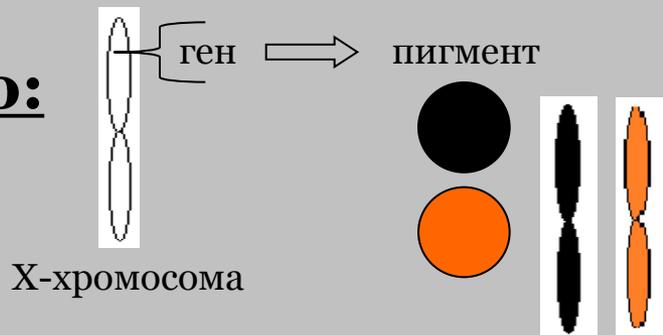
**Варианты кошек:**



**Варианты котов:**



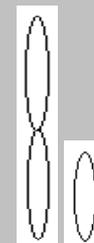
**Дано:**



**Самка XX:**



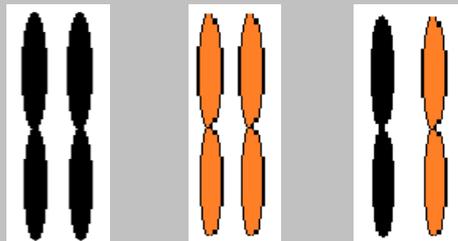
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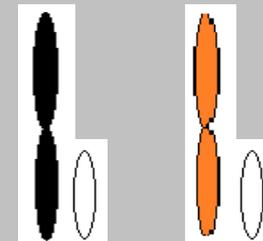
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а коты не могут

**Доказательство:**

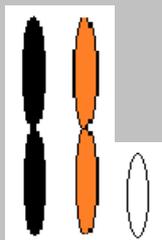
**Варианты кошек:**



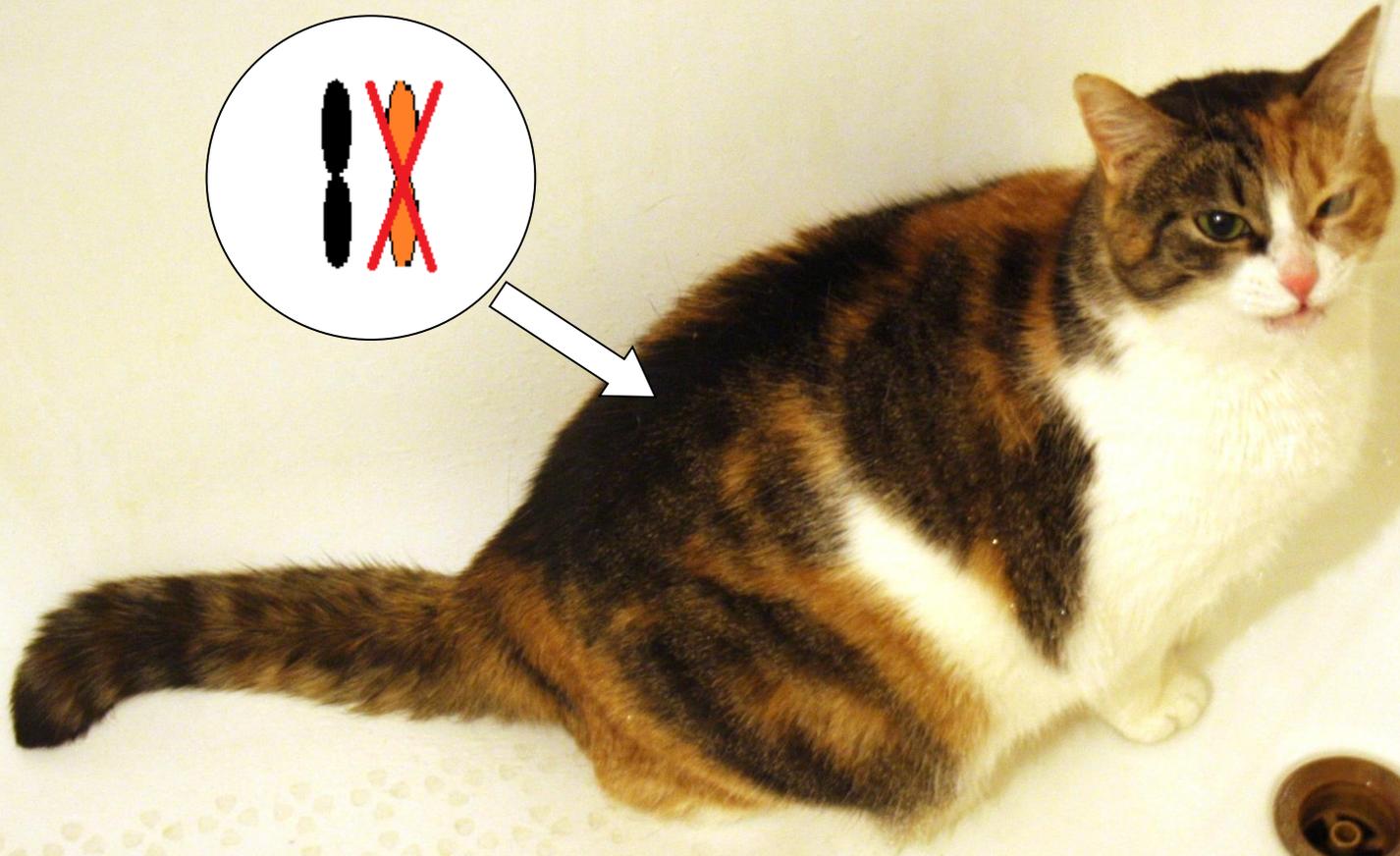
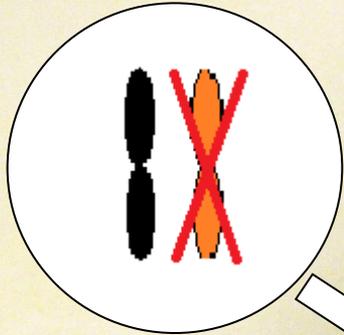
**Варианты котов:**

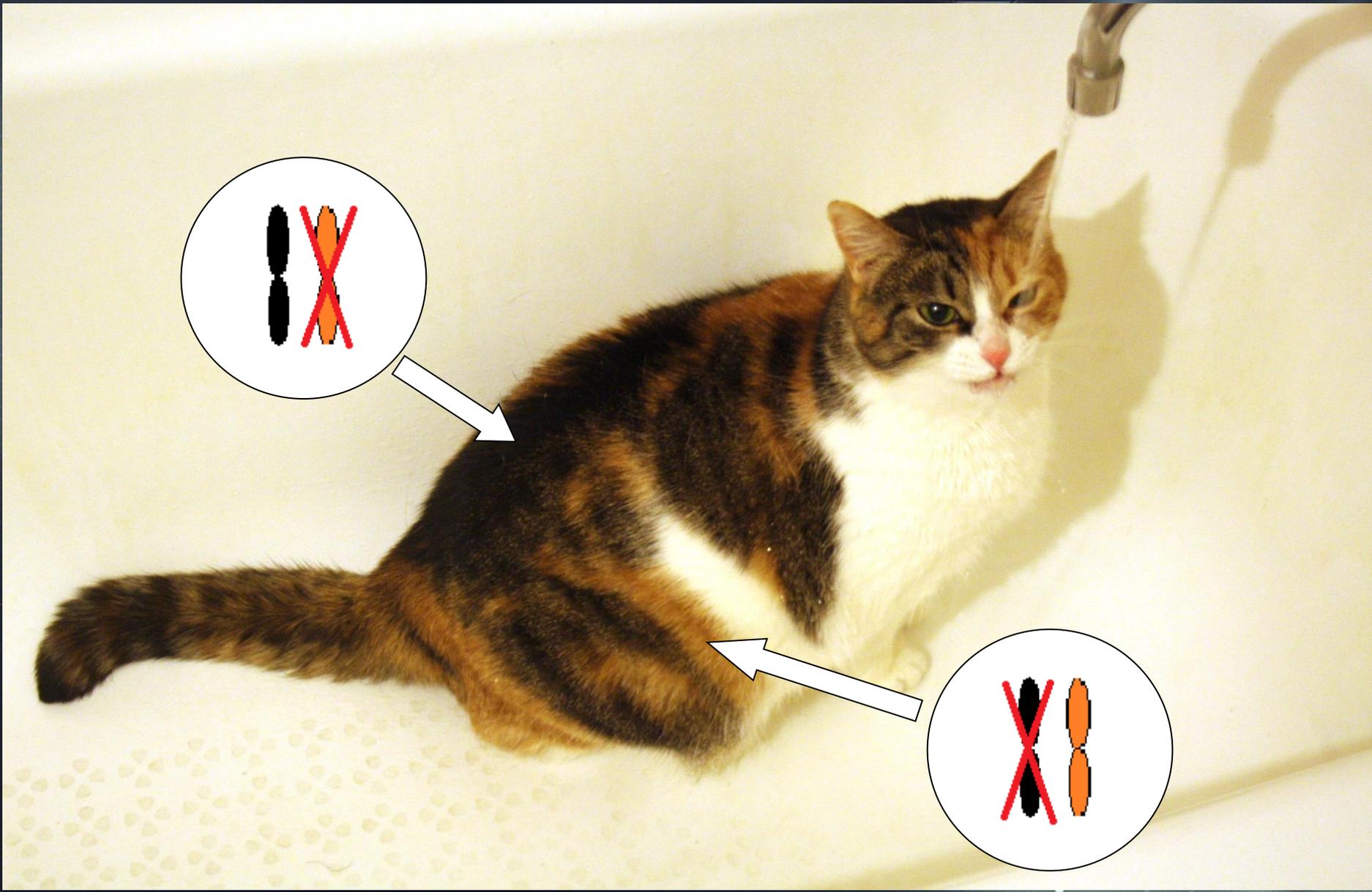


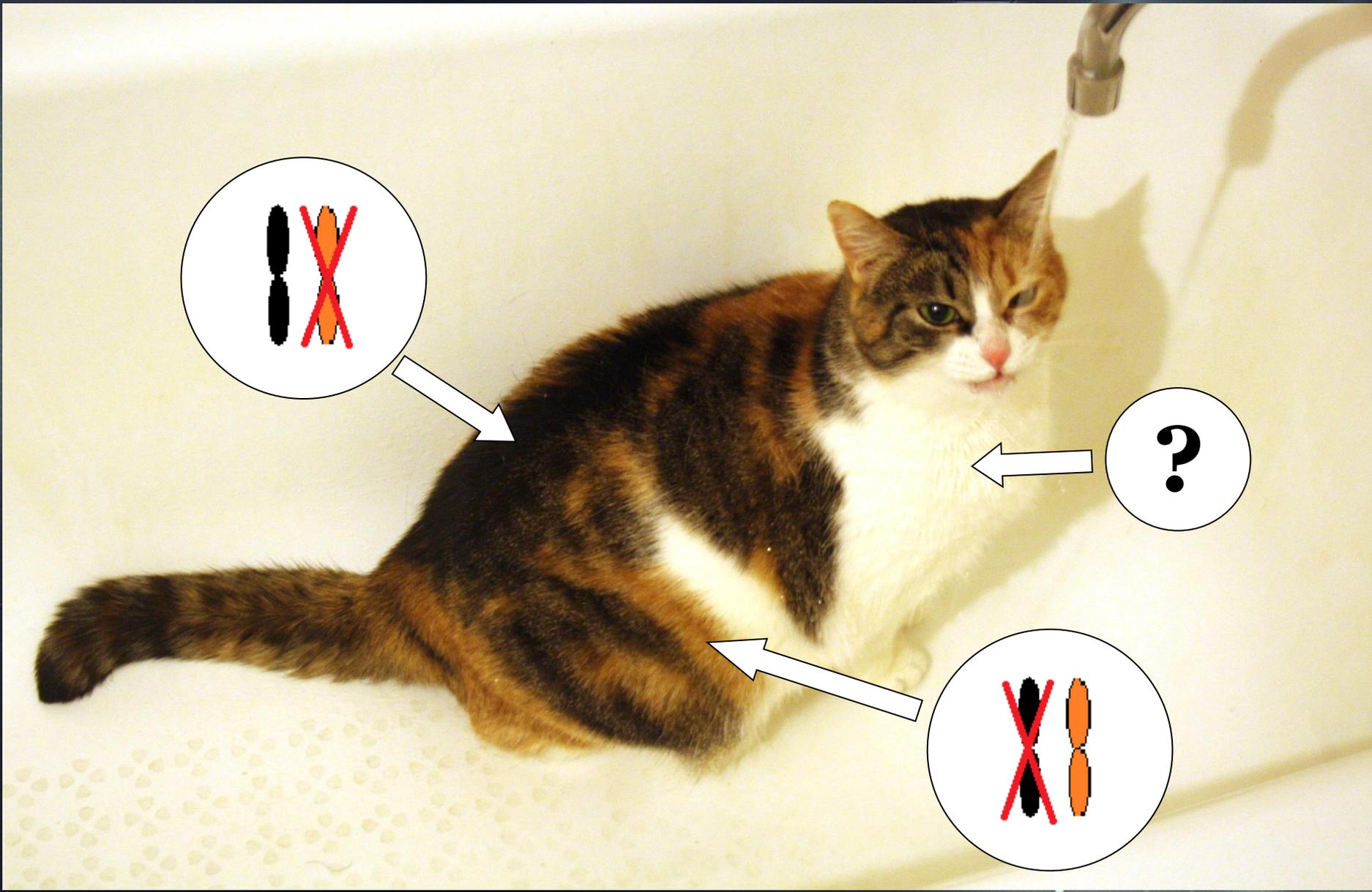
**Исключение –  
несчастный кот XXУ**







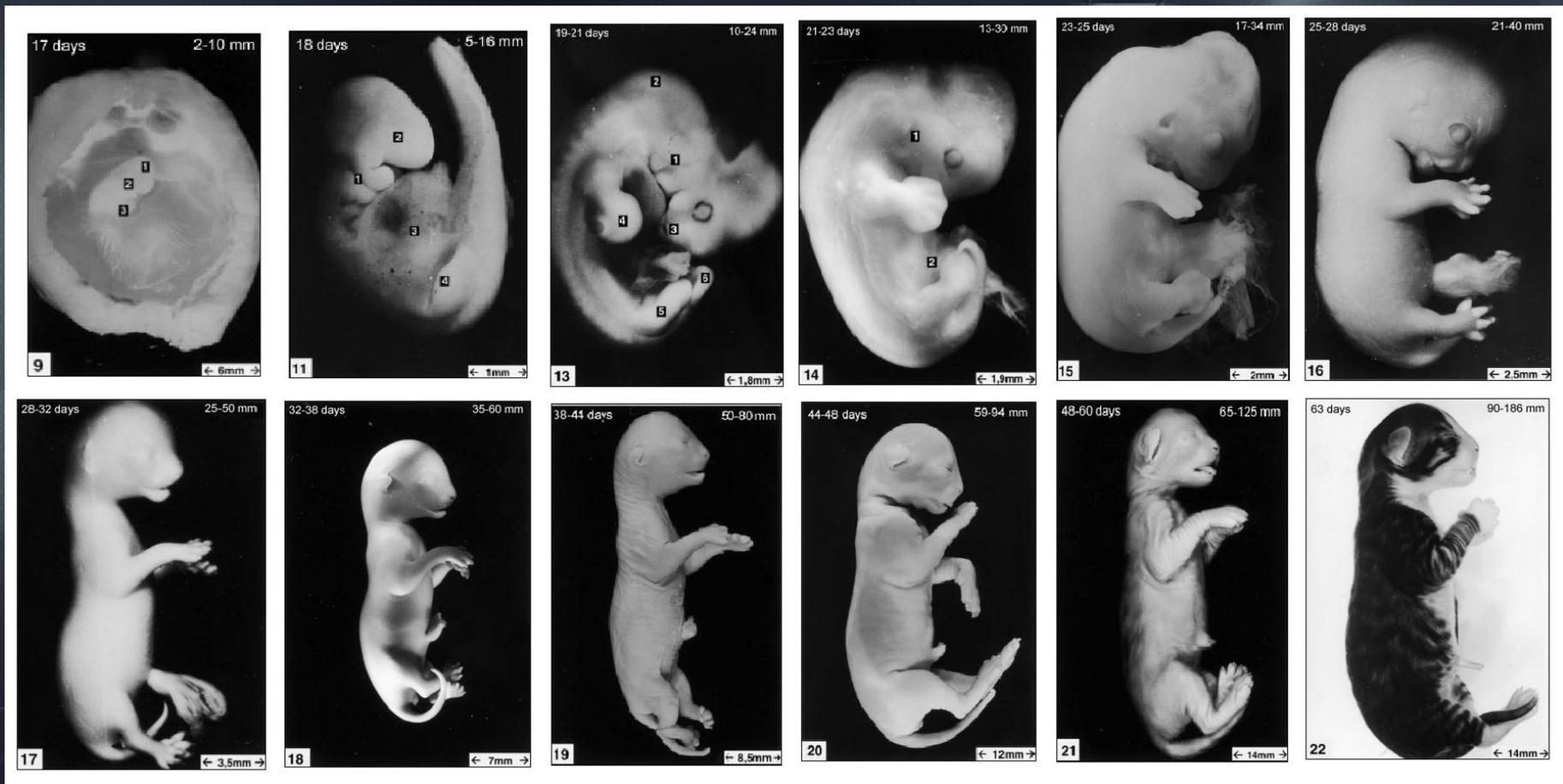






<http://pawpeds.com/pawacademy/reproduction/embryology>





<http://pawpeds.com/pawacademy/reproduction/embryology>



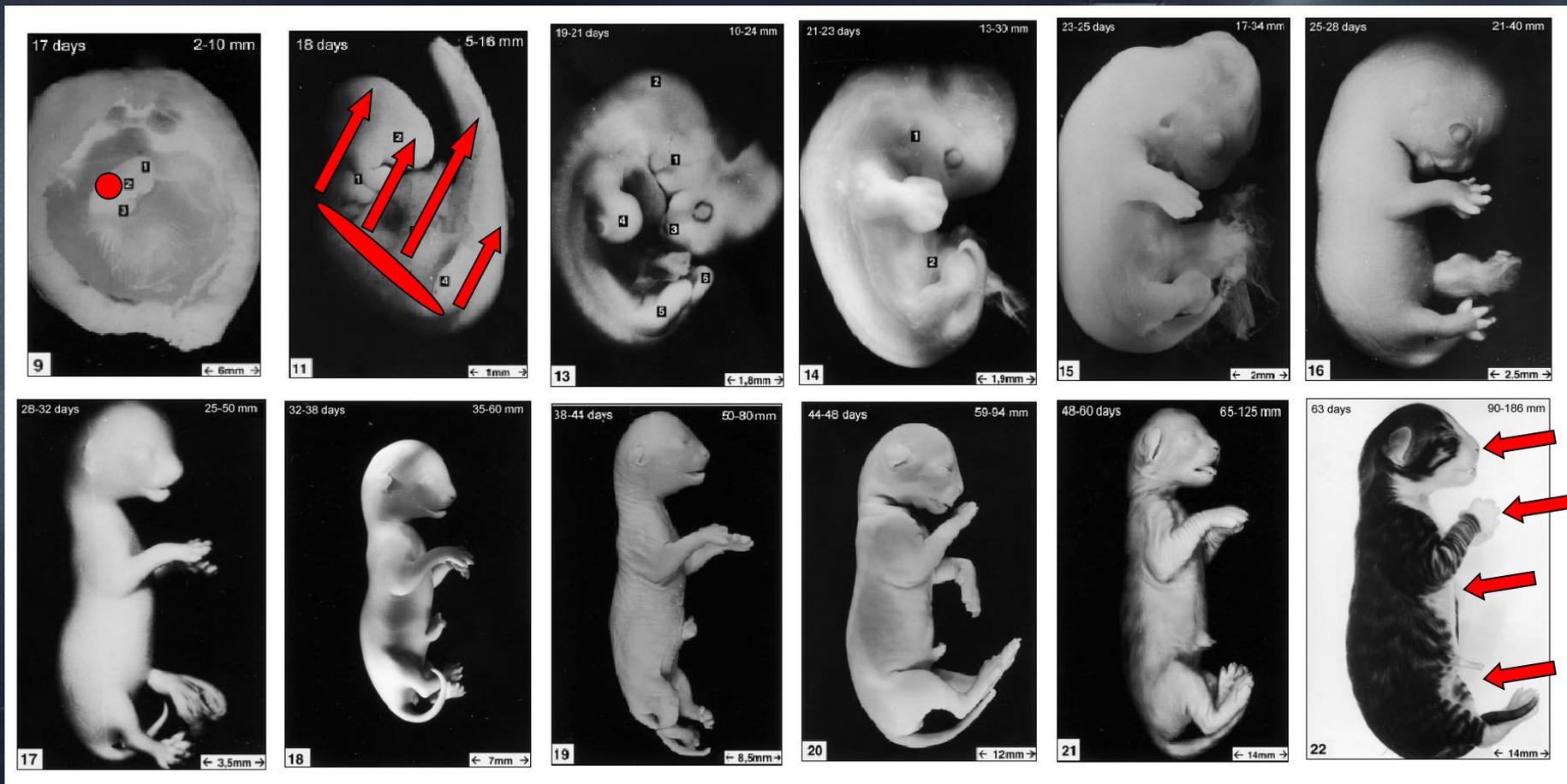
...number of ... which is ... to ...  
... ... of ... and ...  
... ... to ...  
... ...  
... ...



<http://pawpeds.com/pawacademy/reproduction/embryology>



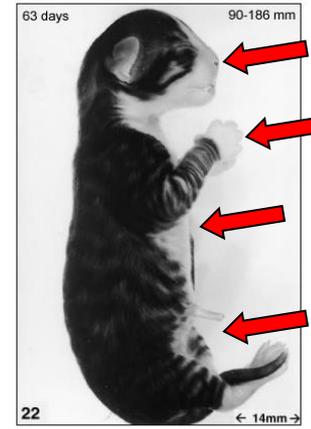
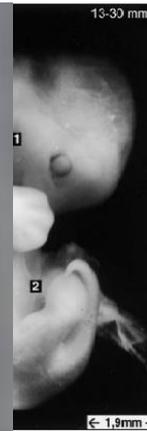
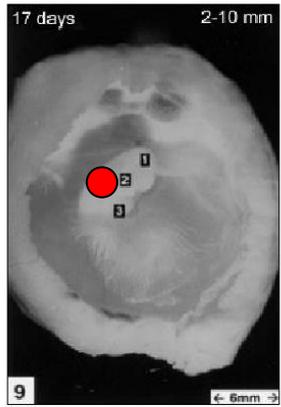
...number of cells, which is critical to produce  
...of cells and that it may be  
...to produce a viable embryo.  
...to produce a viable embryo.  
...to produce a viable embryo.



<http://pawpeds.com/pawacademy/reproduction/embryology>



...number of ... which is ... to ...  
... of ... and ...  
... to ...  
... about the ...

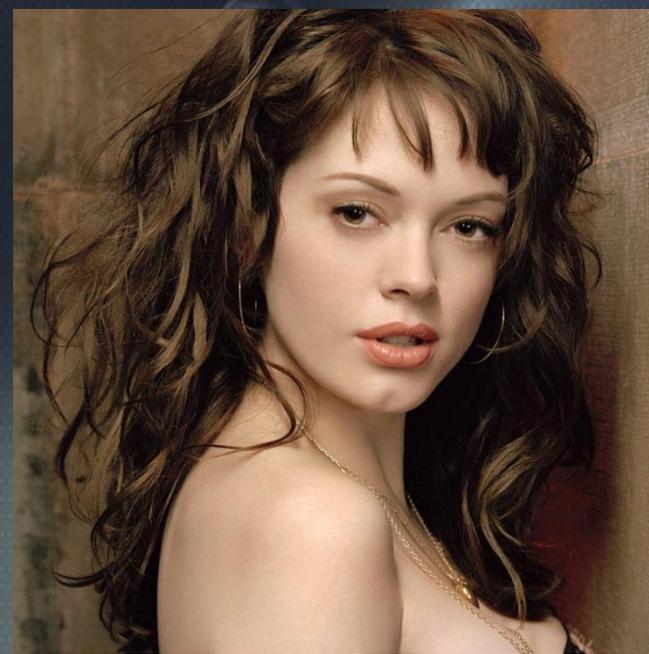


<http://pawpeds.com/pawacademy/reproduction/embryology>



...number of ... which is ... to ...  
... of ... and ...  
... to ...  
... about the ...





...the...  
...of...  
...the...  
...of...  
...the...  
...of...



...and...  
...of...  
...the...  
...of...  
...the...  
...of...

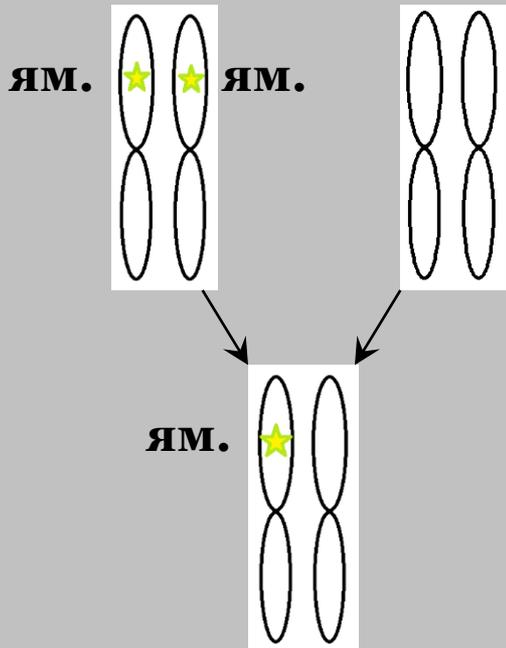
...the...  
...of...  
...the...  
...of...  
...the...  
...of...

...the...  
...of...  
...the...  
...of...  
...the...  
...of...

*«Влюбившись в ямочки на щеках,  
мужчина по ошибке женится на всей  
женщине» Стивен Ликок*

**Папа:**

**Мама:**



**Чад**  
**100%**  
**с ямочками**



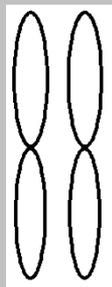
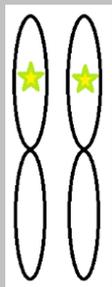
*«Влюбившись в ямочки на щеках,  
мужчина по ошибке женится на всей  
женщине» Стивен Ликок*

**Папа:**

**Мама:**

**А если папа  
такой:**

**ЯМ. ЯМ.**



**ЯМ.**



**ЯМ.**



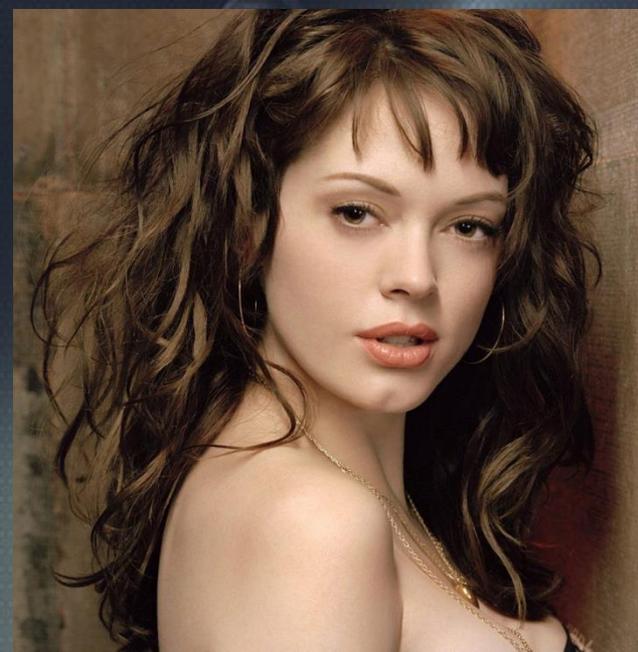
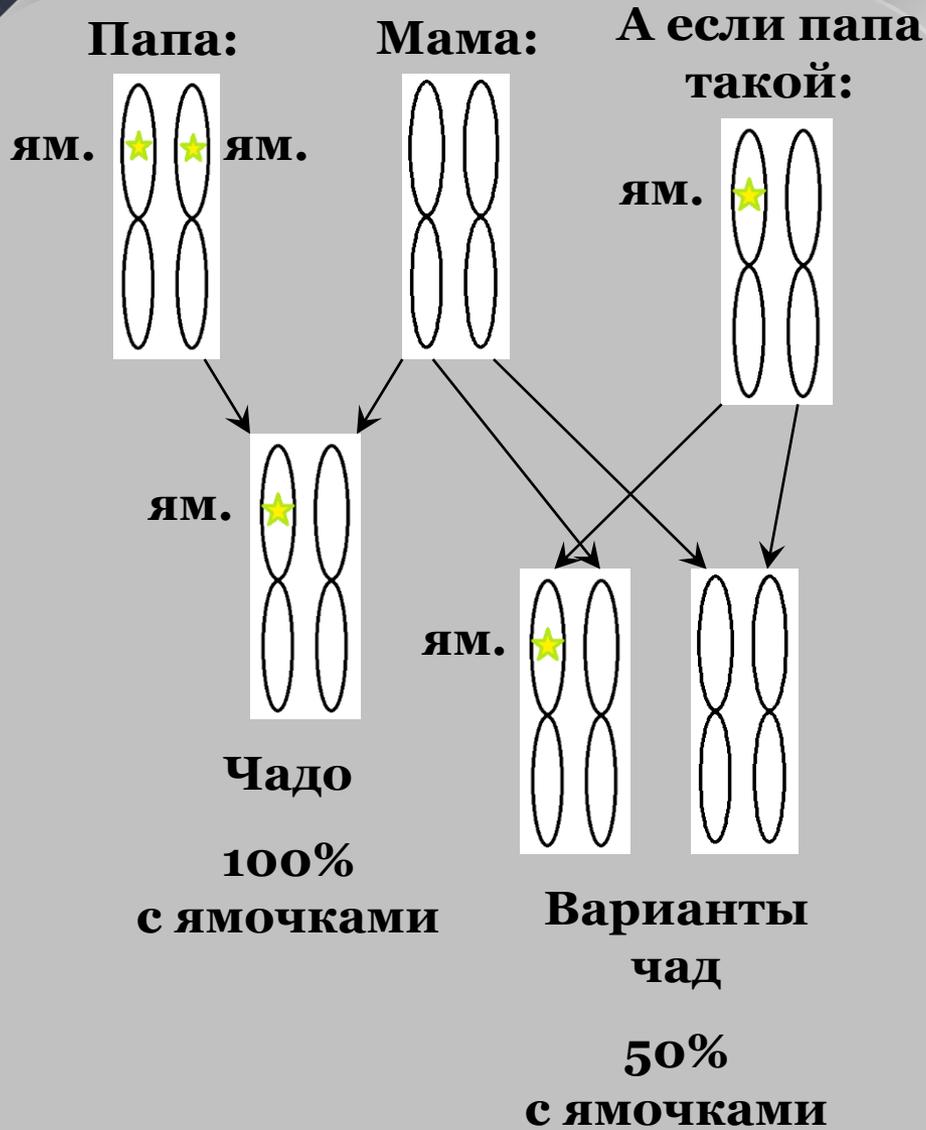
**Чадó**

**100%**

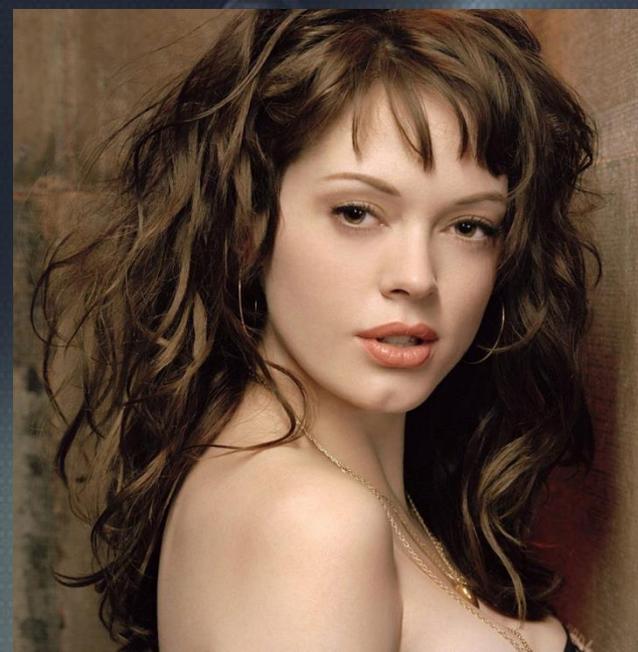
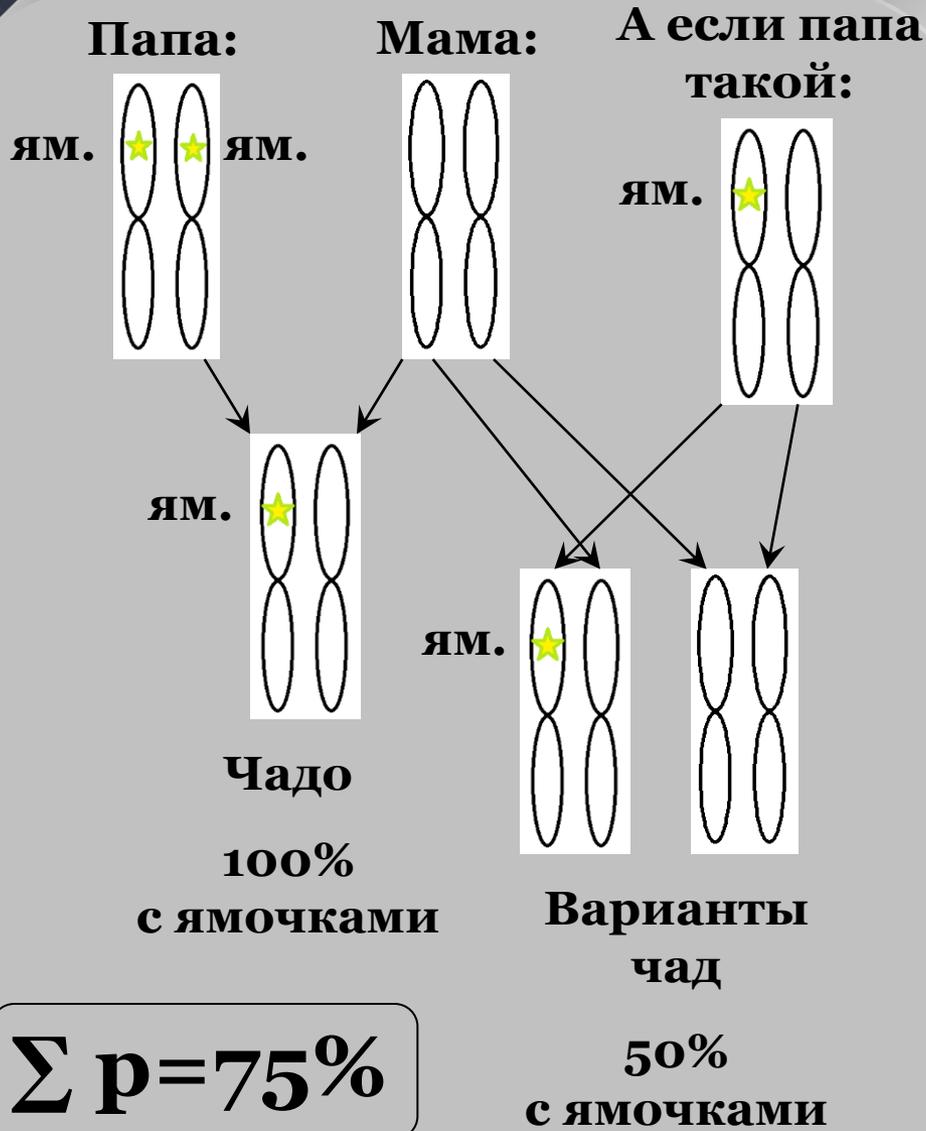
**с ямочками**



*«Влюбившись в ямочки на щеках,  
мужчина по ошибке женится на всей  
женщине» Стивен Ликок*



*«Влюбившись в ямочки на щеках,  
мужчина по ошибке женится на всей  
женщине» Стивен Ликок*



*«Влюбившись в ямочки на щеках, мужчина по ошибке женится на всей женщине» Стивен Ликок*

# Наследование по Менделю

«Вдовий пик»



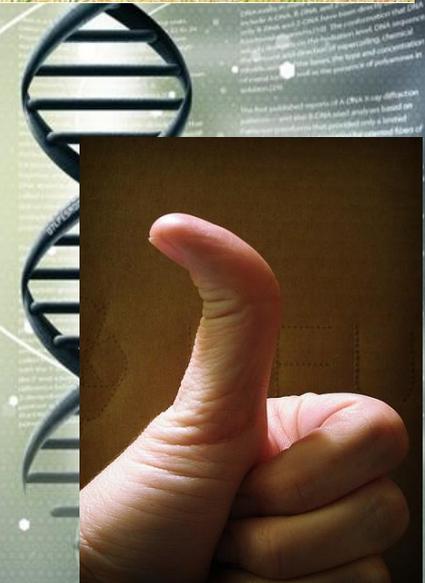
Веснушки



Группа крови

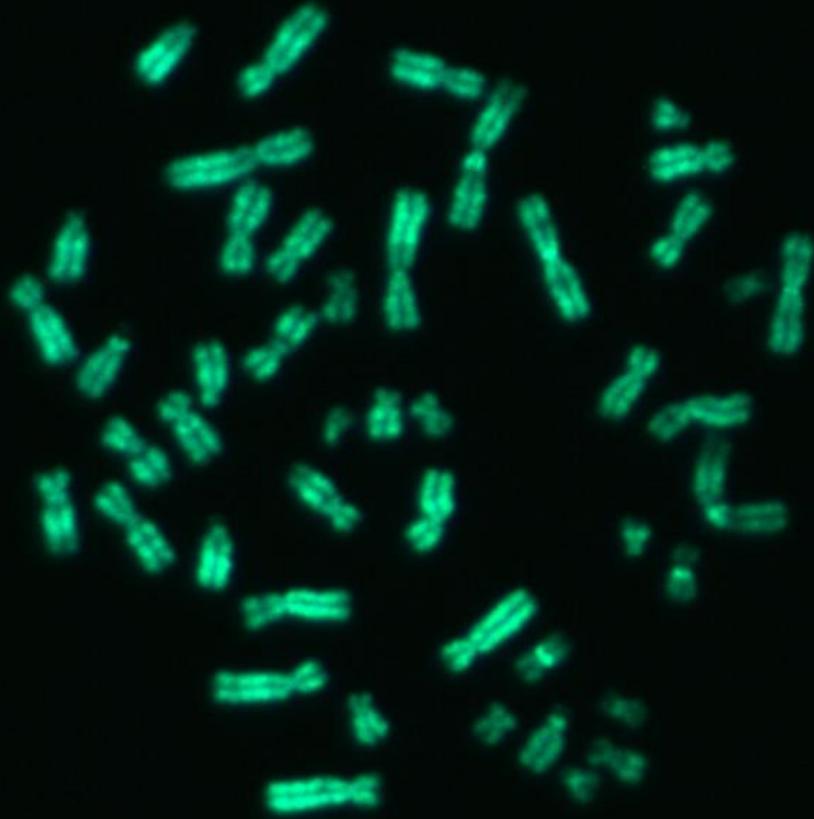


«Приросшая» мочка уха

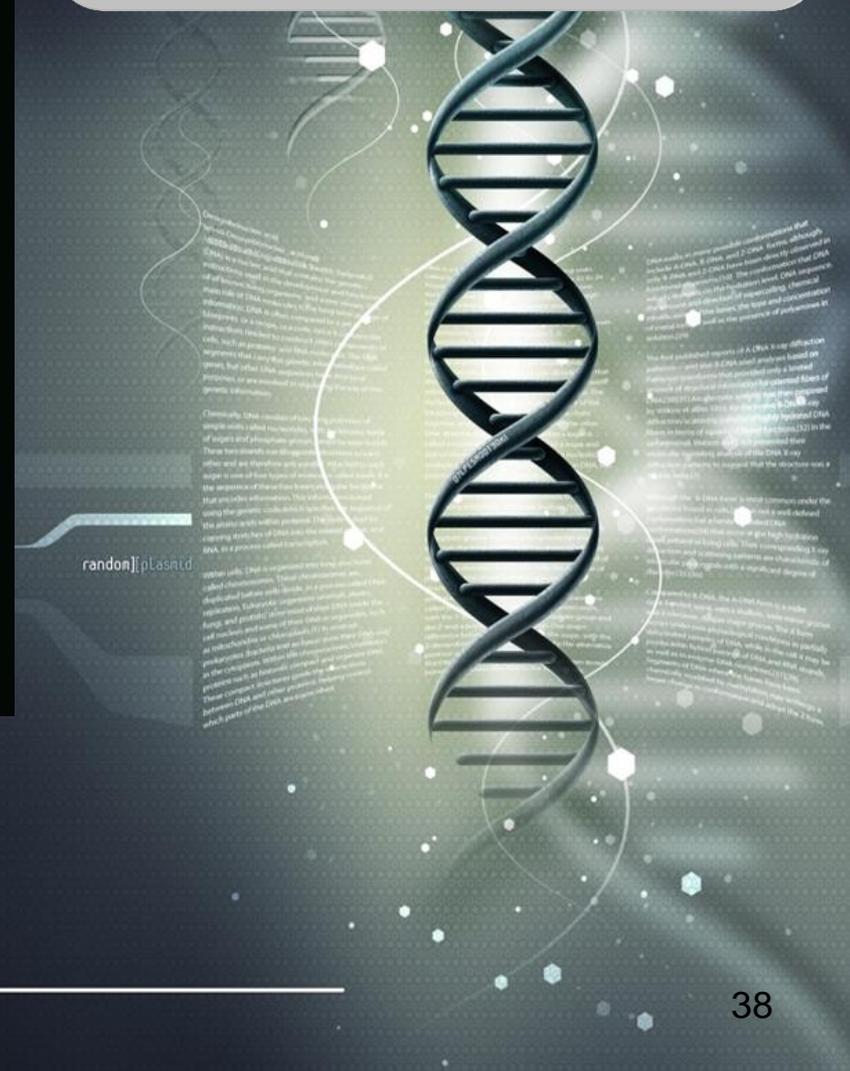


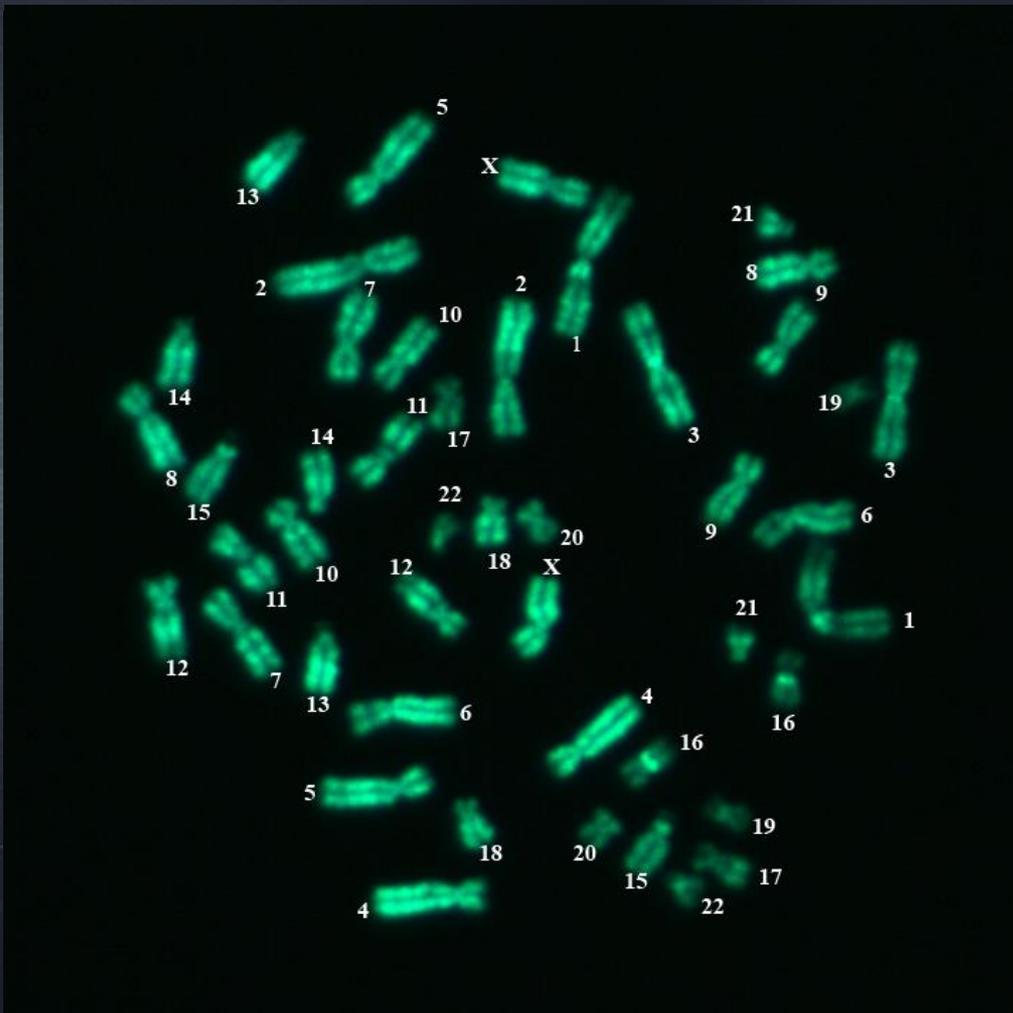
«Палец автостопера»

# Человек: 23 пары хромосом 30.000 генов



Мои хромосомки ^-^



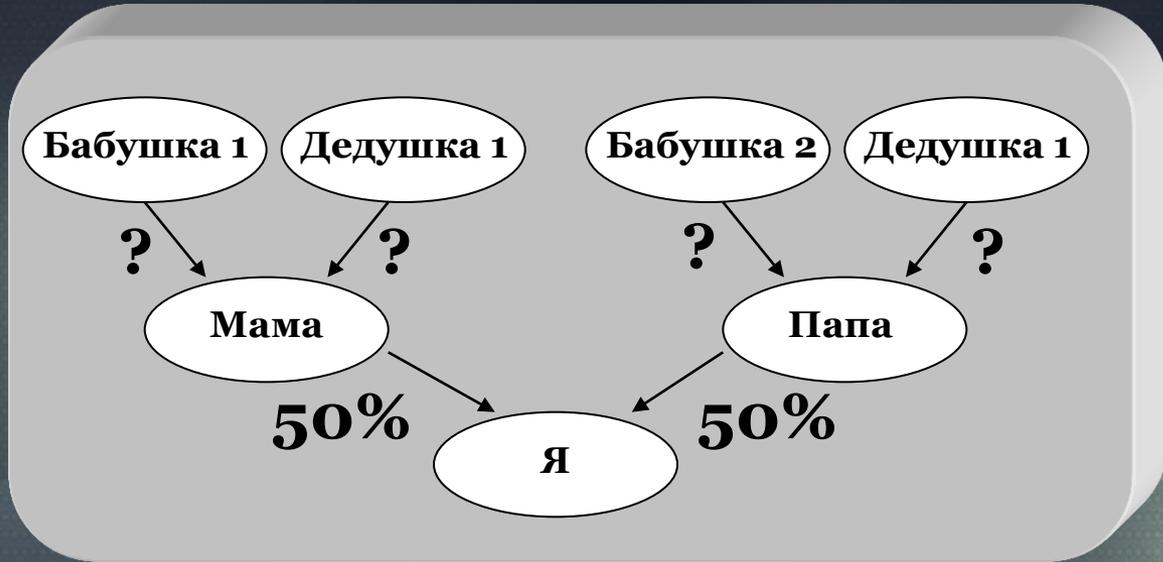


**Человек:**  
**23 пары хромосом**  
**30.000 генов**

$$2^{23} = 8388608$$

**комбинаций**  
**хромосом в**  
**яйцеклетке или**  
**сперматозоиде**

**Мои хромосомки ^\_^**



Chemical structure and...  
 single units...  
 random] plasatd  
 DNA is a...  
 double helix...  
 genetic information...





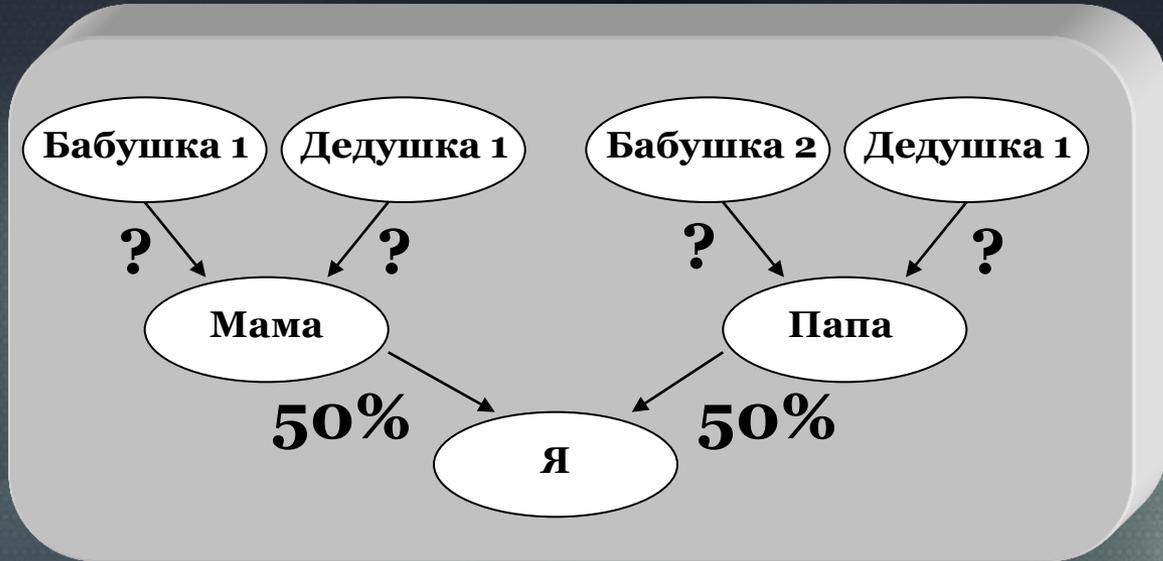
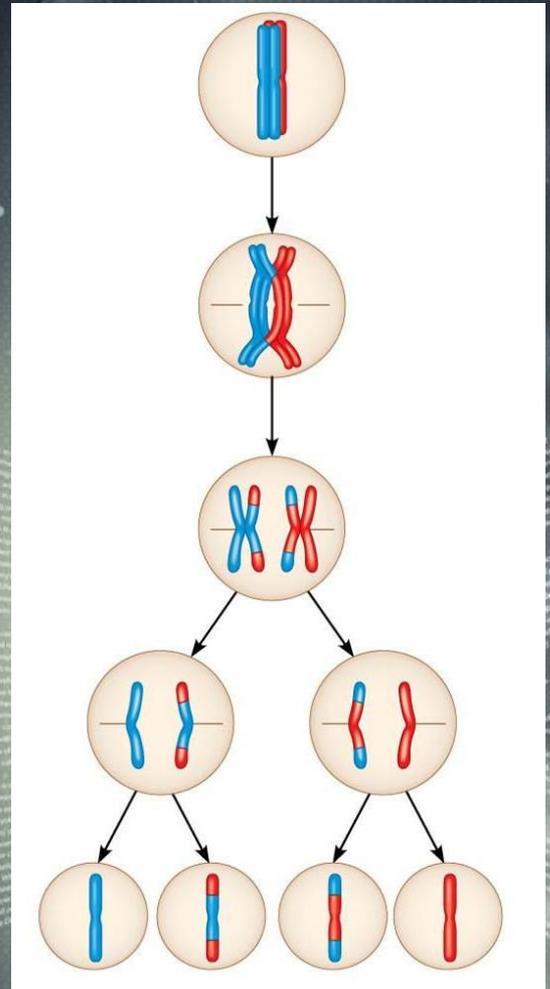


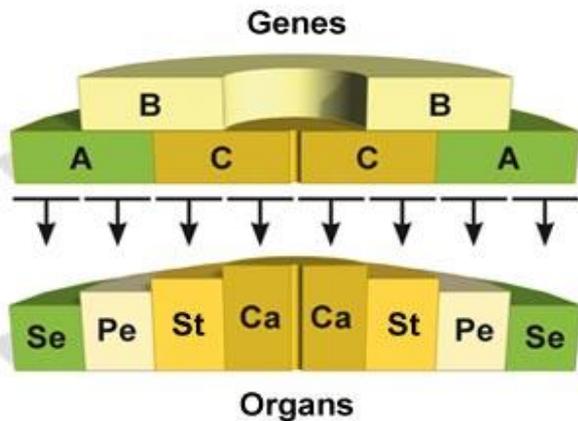
фото А.П.



2011 Pearson Education Inc.

*«Вся жизнь похожа на детскую игру «Испорченный телефон» Константин Северинов*





## Лепесток

Petals (Pe)  
Class A + B

Sepals (Se)  
Class A

## Чашелистик

## Пестик

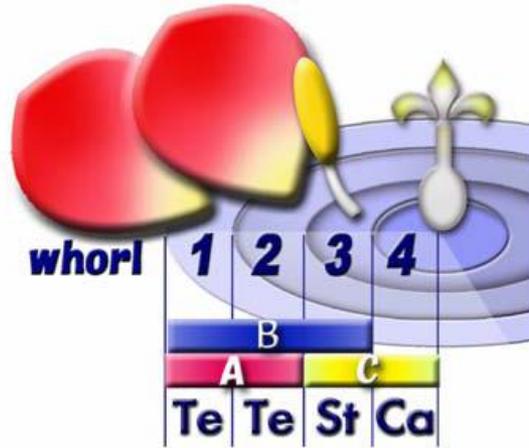
Carpels (Ca)  
Class C

Stamen (St)  
Class B + C

## Тычинка

[www.estium-concept.com/en/computer\\_graphics.htm](http://www.estium-concept.com/en/computer_graphics.htm)





© Kelley Macdonald 2009

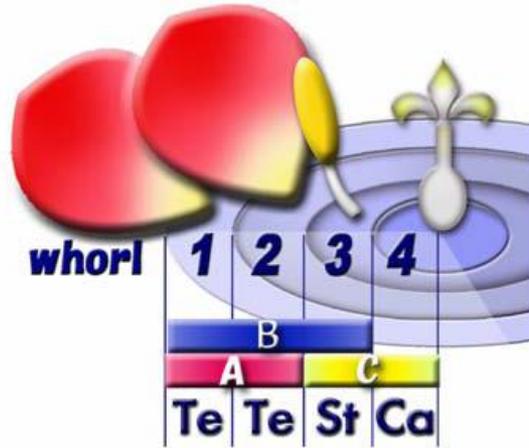
Although the DNA sequence of the A and B whorls is identical, the A whorl produces petals and the B whorl produces sepals. This is due to the presence of the *Yucca* gene in the A whorl, which is not present in the B whorl. The *Yucca* gene is a homeobox gene that encodes a protein that binds to the DNA sequence of the A whorl, thereby activating the *Yucca* gene. This is an example of a cis-regulatory element, which is a DNA sequence that controls the expression of a gene in a specific tissue or cell type.

The B whorl produces sepals because it lacks the *Yucca* gene. The C whorl produces stamens because it has a different set of genes, including the *Yucca* gene. The D whorl produces the pistil because it has a different set of genes, including the *Yucca* gene. This is an example of a cis-regulatory element, which is a DNA sequence that controls the expression of a gene in a specific tissue or cell type.

Chemically, DNA consists of a single strand of sugar and phosphate groups. The sugar and phosphate groups are linked together by phosphodiester bonds. The nitrogenous bases are attached to the sugar groups. The sequence of these bases is the genetic code. The genetic code is a set of rules that defines how the sequence of bases in a gene is translated into the sequence of amino acids in a protein. The amino acids are the building blocks of proteins. Proteins are the molecules that perform most of the functions in a cell. The DNA sequence is the blueprint for the production of proteins.

random]plasaid

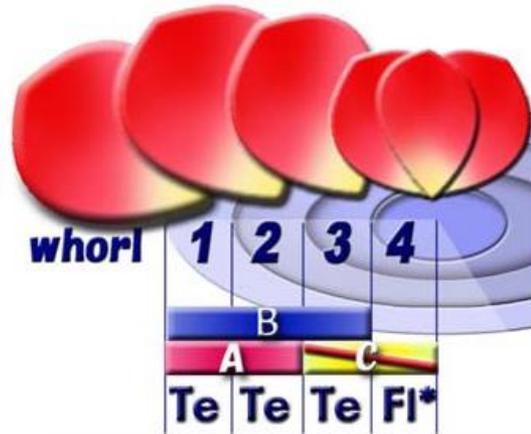




© Kelley Macdonald 2009



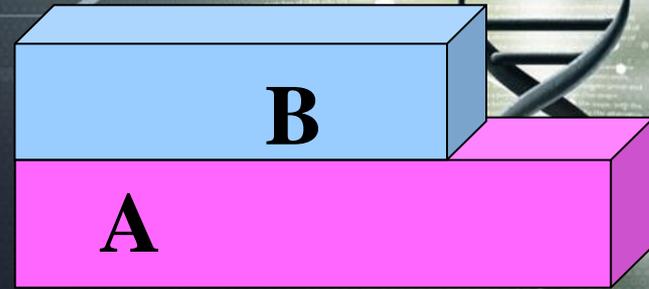
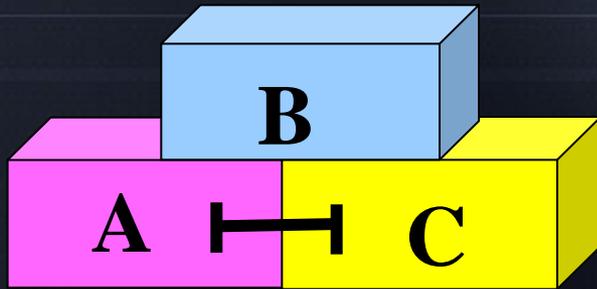
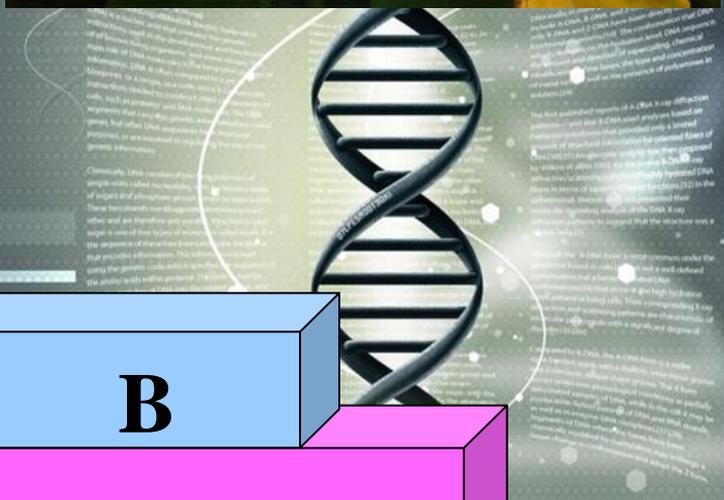
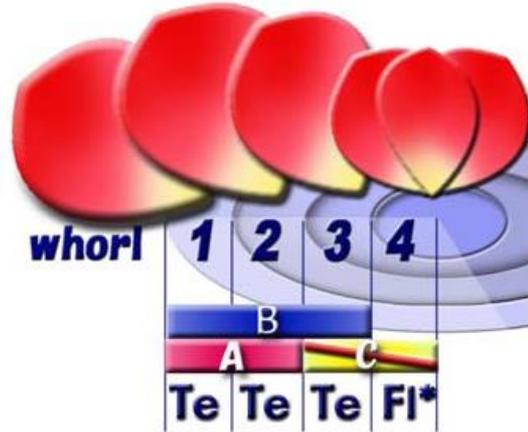
DOI 10.1100/tsw.2007.86



random]plasatd



Chemically, DNA consists of two antiparallel single strands (each made of repeating units of sugars and phosphate groups) joined together by hydrogen bonds between their nitrogenous bases. The structure of DNA is a double helix, with the two strands twisted around each other. The nitrogenous bases are attached to the sugar-phosphate backbone of each strand, and they pair up with each other to form the rungs of the ladder. The sequence of these bases is the genetic code that determines the instructions for building a protein. The structure of DNA is a double helix, with the two strands twisted around each other. The nitrogenous bases are attached to the sugar-phosphate backbone of each strand, and they pair up with each other to form the rungs of the ladder. The sequence of these bases is the genetic code that determines the instructions for building a protein.

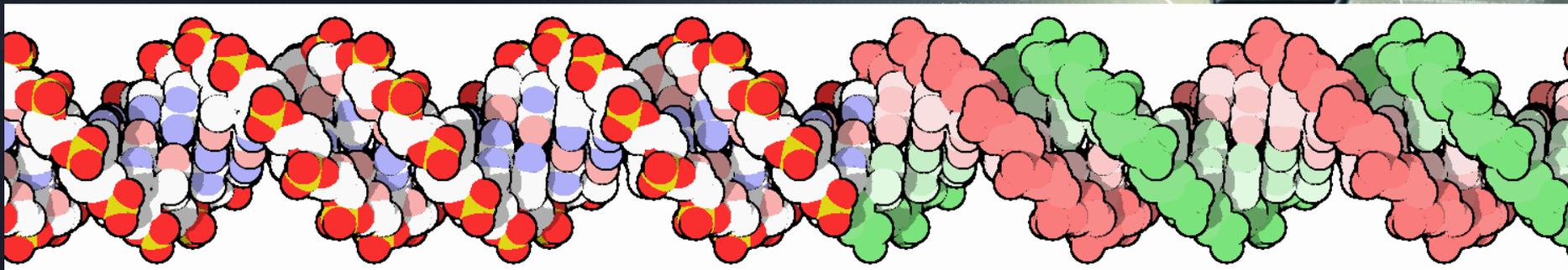
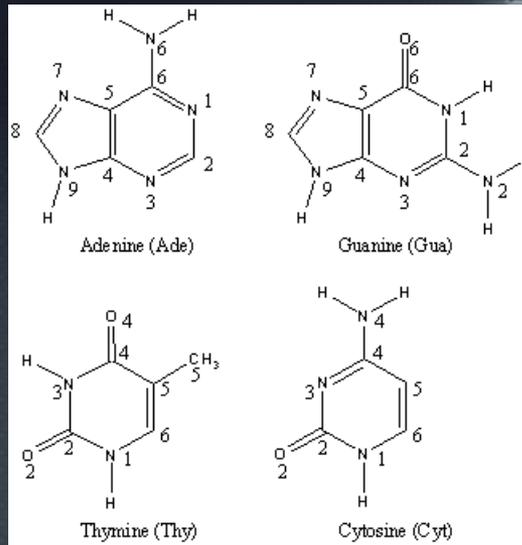
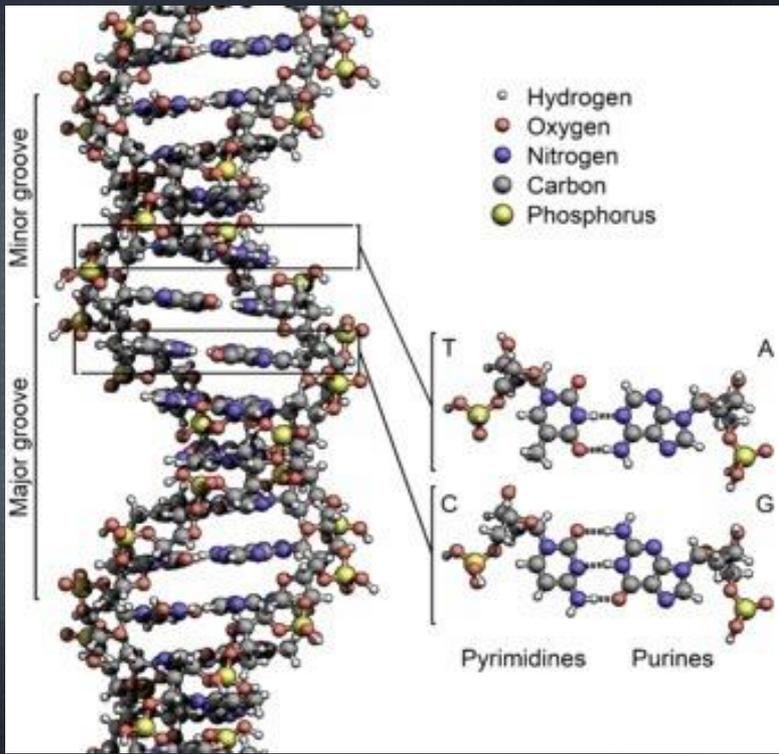




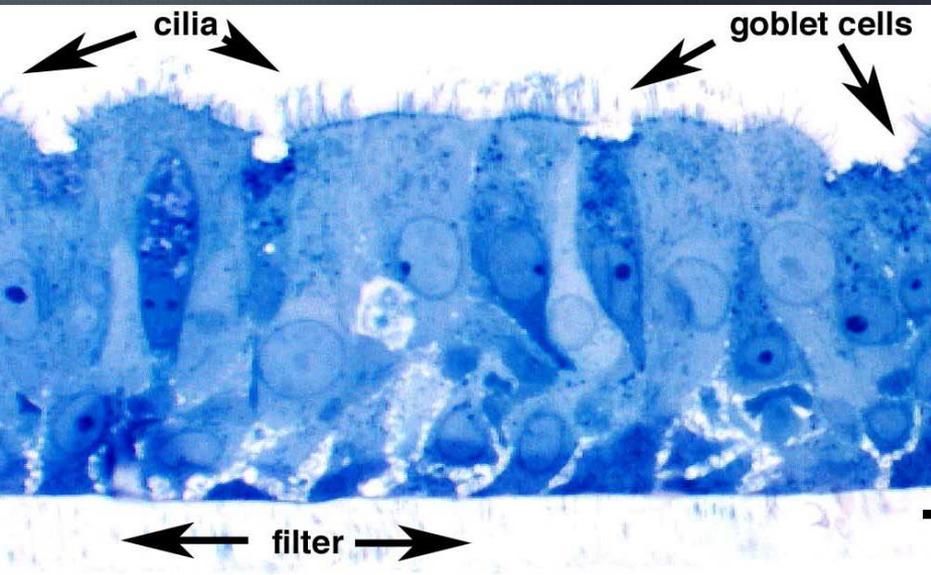
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GTTCGGGTACGGGTGCGTTCCTCCGAGTTCCOTTGGAACTGGGATGCTTCGGGTACGGGTGCGTACTGAGTT  
TTTCGGGTACGGGTTCCTCCGAGTTCCOTTGGAACTGGGACGCCATAAAGGGTGAGAGCCCCGTTCTGG  
GGATGCTTCGGGTACGGGTTCCTCCGAGTTCCOTTGGGATGCTTCGGGTGCGGGTTCCOTTCCGAGTT



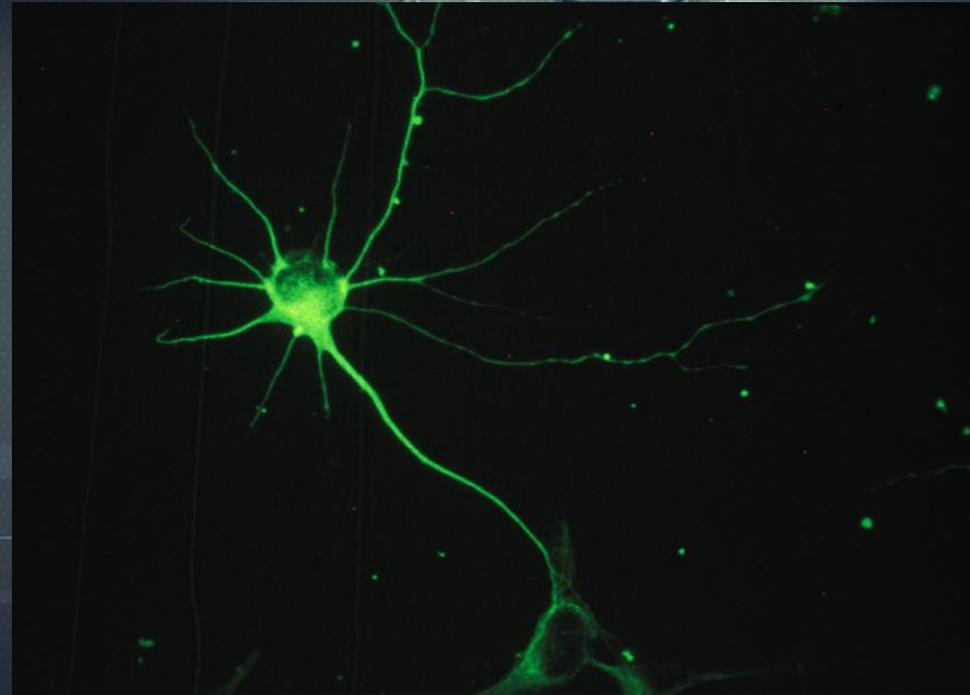
GGATGCGTTCGGGTGCGGGTTCCOTTCCGAGTTCCOTTGGATGCGTTCGGGTACGTTGTCCTACTGAGTTT  
GTTCGGGTACGGGTGCGTTCCTCCGAGTTCCOTTGGAACTGGGATGCTTCGGGTACGGGTGCGTACTGAGTT  
TTTCGGGTACGGGTTCCTCCGAGTTCCOTTGGAACTGGGACGCCATAAAGGGTGAGAGCCCCGTTCTGG  
GGATGCTTCGGGTACGGGTTCCTCCGAGTTCCOTTGGGATGCTTCGGGTGCGGGTTCCOTTCCGAGTT



David Goodsell



Conner Laboratory



© Inserm, G. Barbin

# • ДНК во всех клетках одинаковая, а гены при этом работают разные





# Генетически обусловленные признаки (по данным близнецового анализа):

- Освоение навыков чтения вслух
- Внимательность
- Гиперактивность
- IQ взрослого
- Агрессивность
- Радикализм, авторитаризм
- Склонность к алкоголизму
- Склонность к курению



• ДНК во всех клетках  
одинаковая, а гены при  
этом работают разные

• Эпигенетические  
изменения - не  
затрагивают  
последовательность ДНК



• ДНК во всех клетках  
одинаковая, а гены при  
этом работают разные

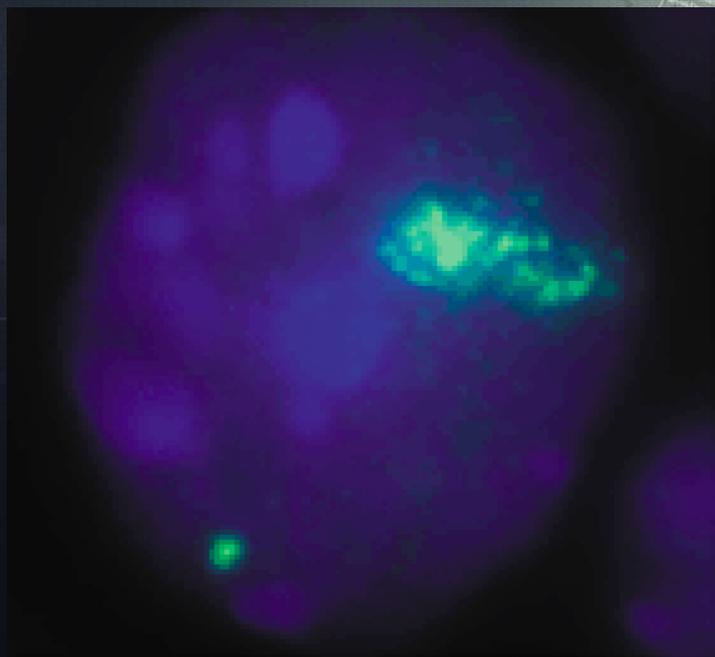
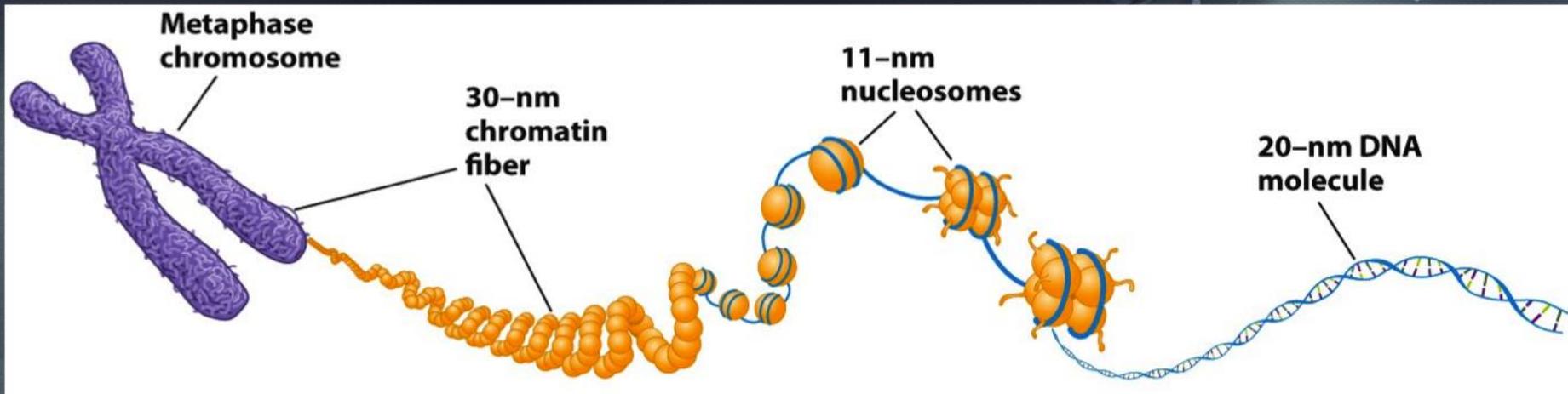
• Эпигенетические  
изменения - не  
затрагивают  
последовательность ДНК

• Большая часть генома  
не кодирует белков,  
которые обуславливают  
проявление признака



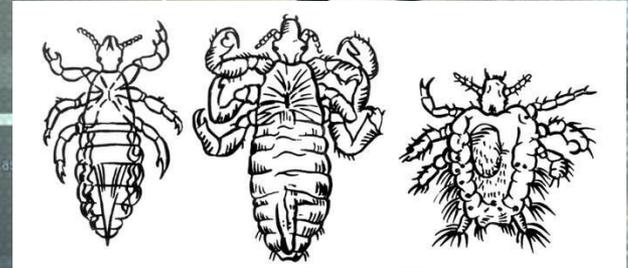






[http://people.na.infn.it/~nicodem/current\\_research.htm](http://people.na.infn.it/~nicodem/current_research.htm)







[http://lenta2012.ru/pulsblog/376109\\_sem-sposobov-vzyatsya-za-um-pamyat-i-vnimanie.aspx](http://lenta2012.ru/pulsblog/376109_sem-sposobov-vzyatsya-za-um-pamyat-i-vnimanie.aspx)