Придумайте необычное трансгенное животное.

И опишите элементы трансгенной конструкции для его создания.

Стратегии активного трансгенеза

CRE/loxP система интеграции фага P1

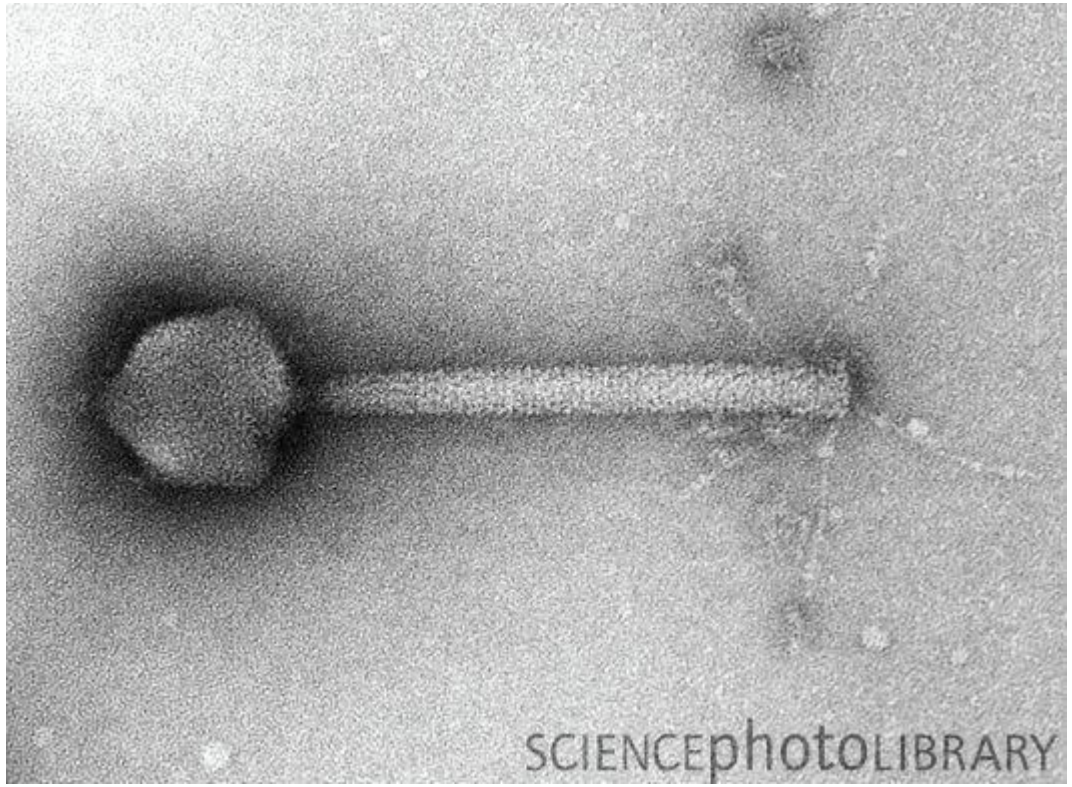
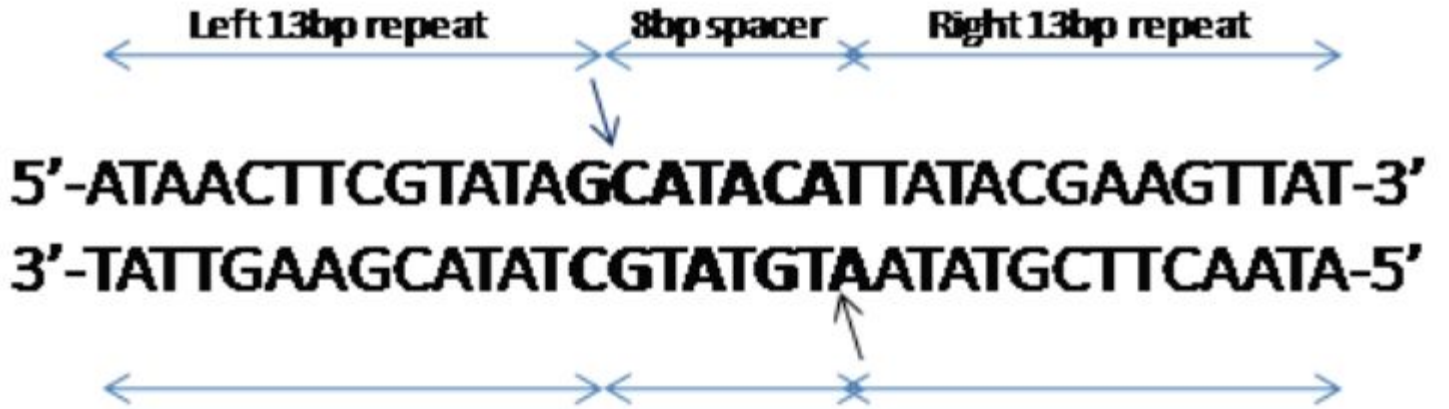
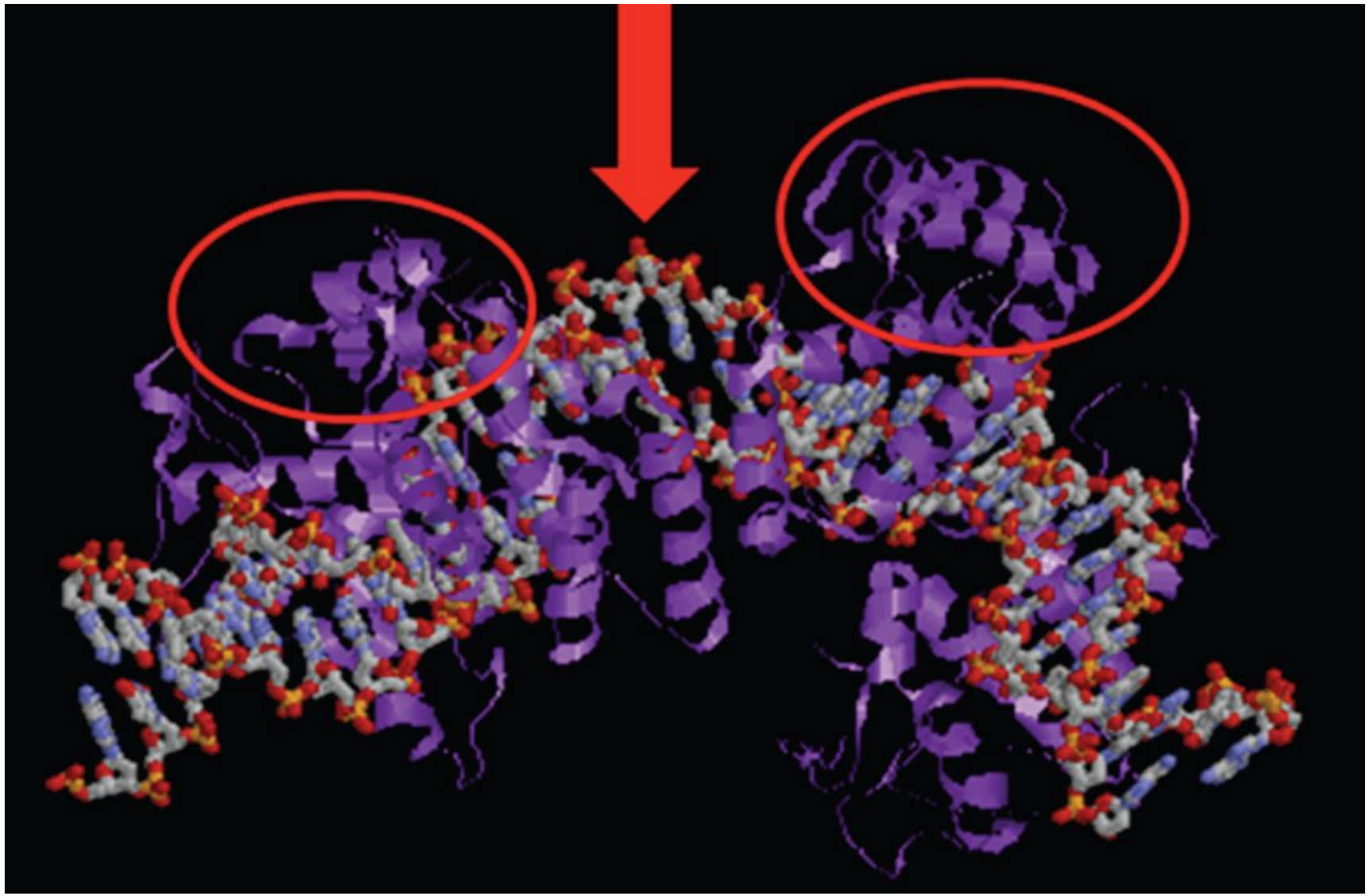


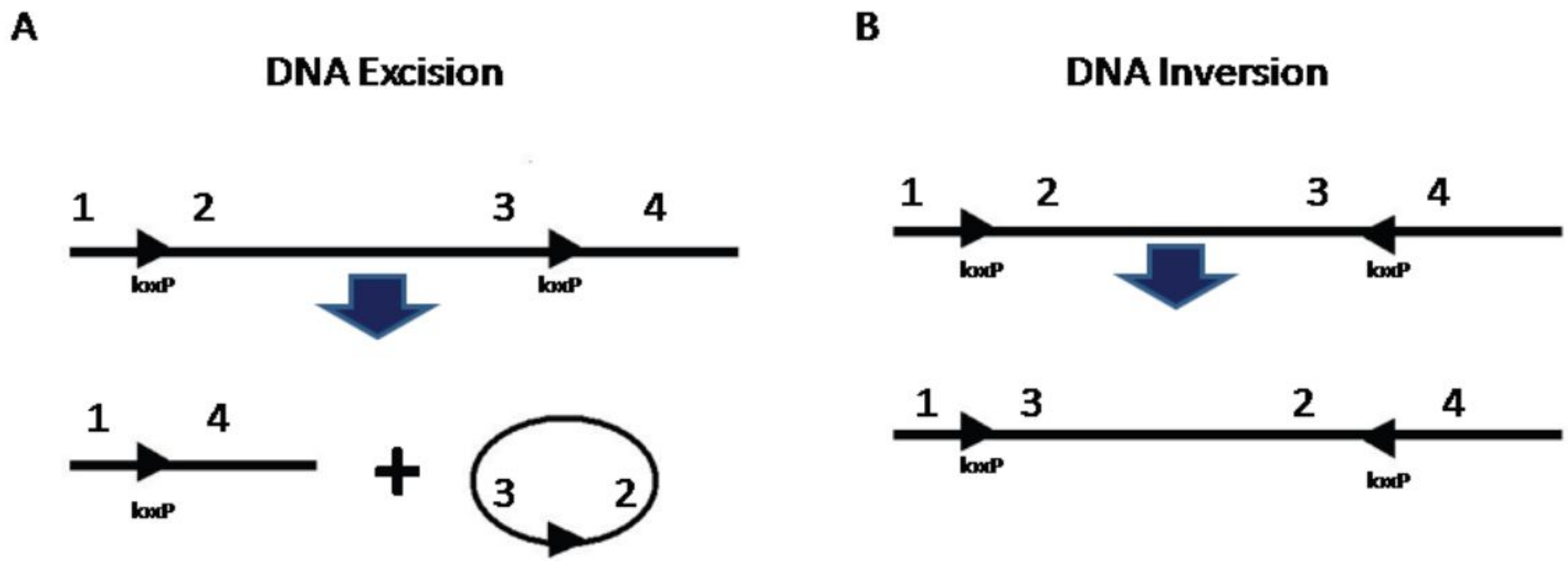
Схема loxP сайта

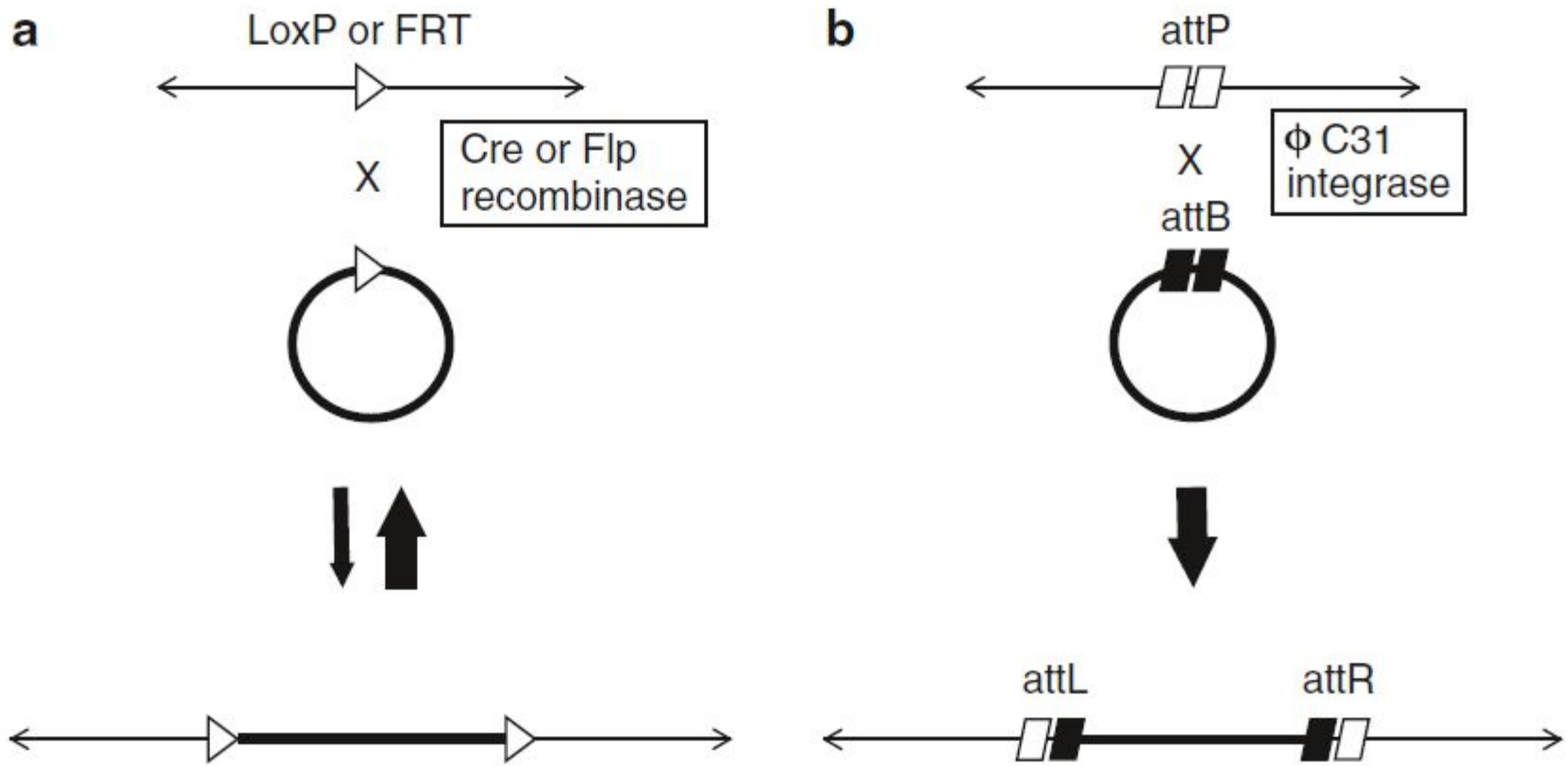
34 bp: 8-bp последовательность фланкирована 13-bp инверитрованными повторами

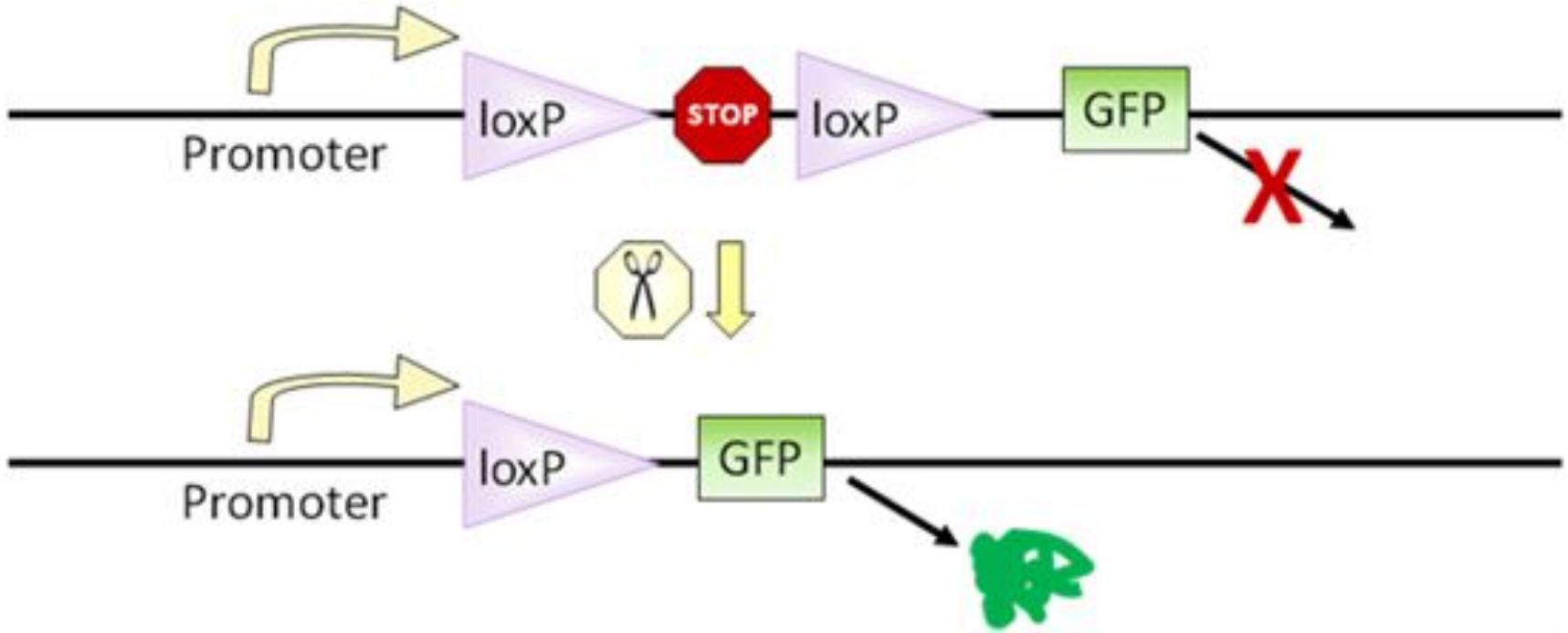

Left 13bp repeat
8bp spacer
Right 13bp repeat
5’-ATAACTTCGTATAGCATACATTATACGAAGTTAT-3’
3’-TATTGAAGCATATCGTATGTAATATGCTTCAATA-5’

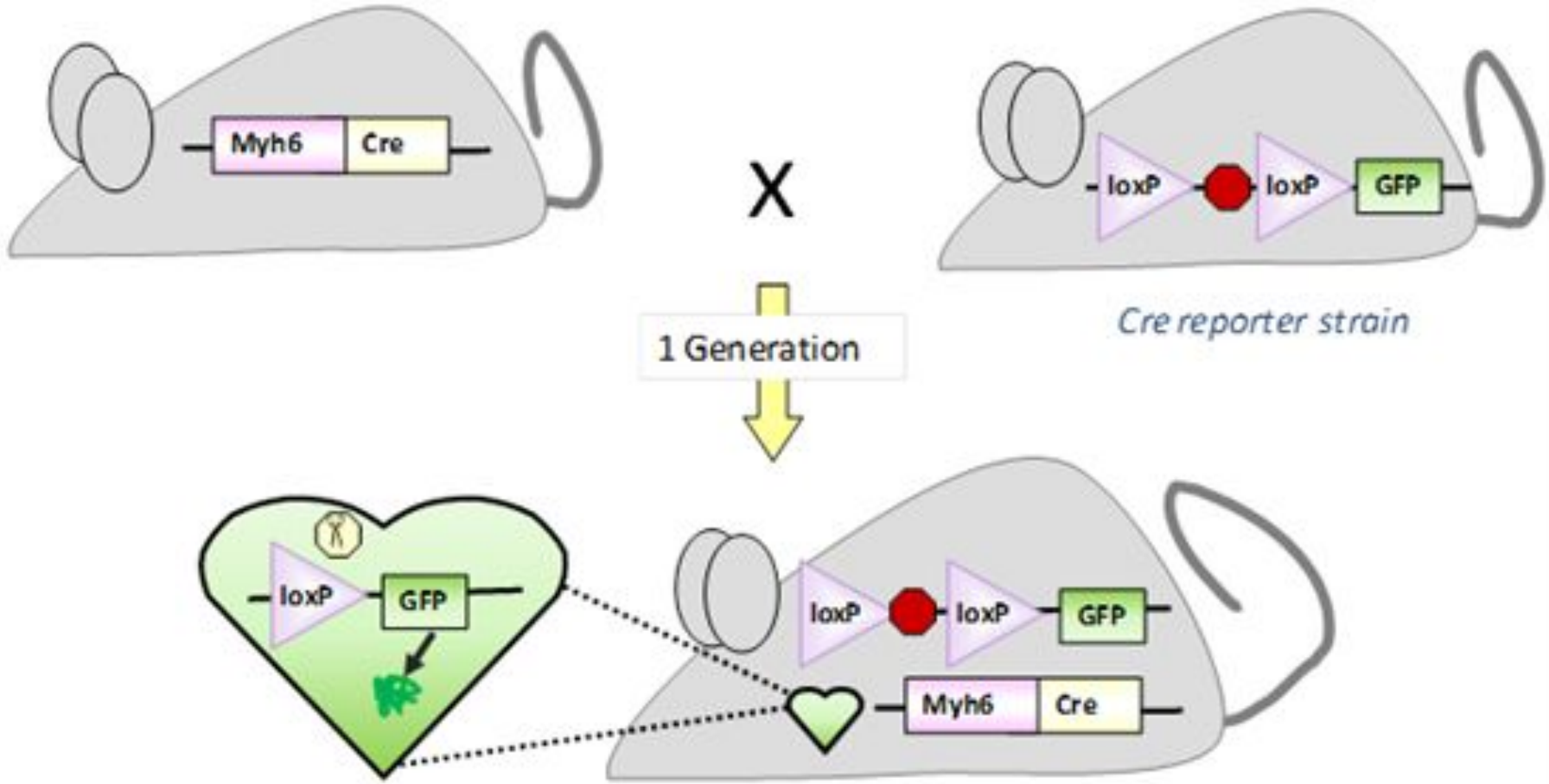

cre
cre
5’-A
CGTATAGCATACATTATACGA
-3’
3’-TA
AGCATATCGTATGTAATATGCT
A-5’




A
DNA Excision
1
2
3
4
loxP
loxP
1
4
loxP
+
3
2
B
DNA Inversion
1
2
3
4
loxP
loxP
1
3
2
4
loxP
loxP

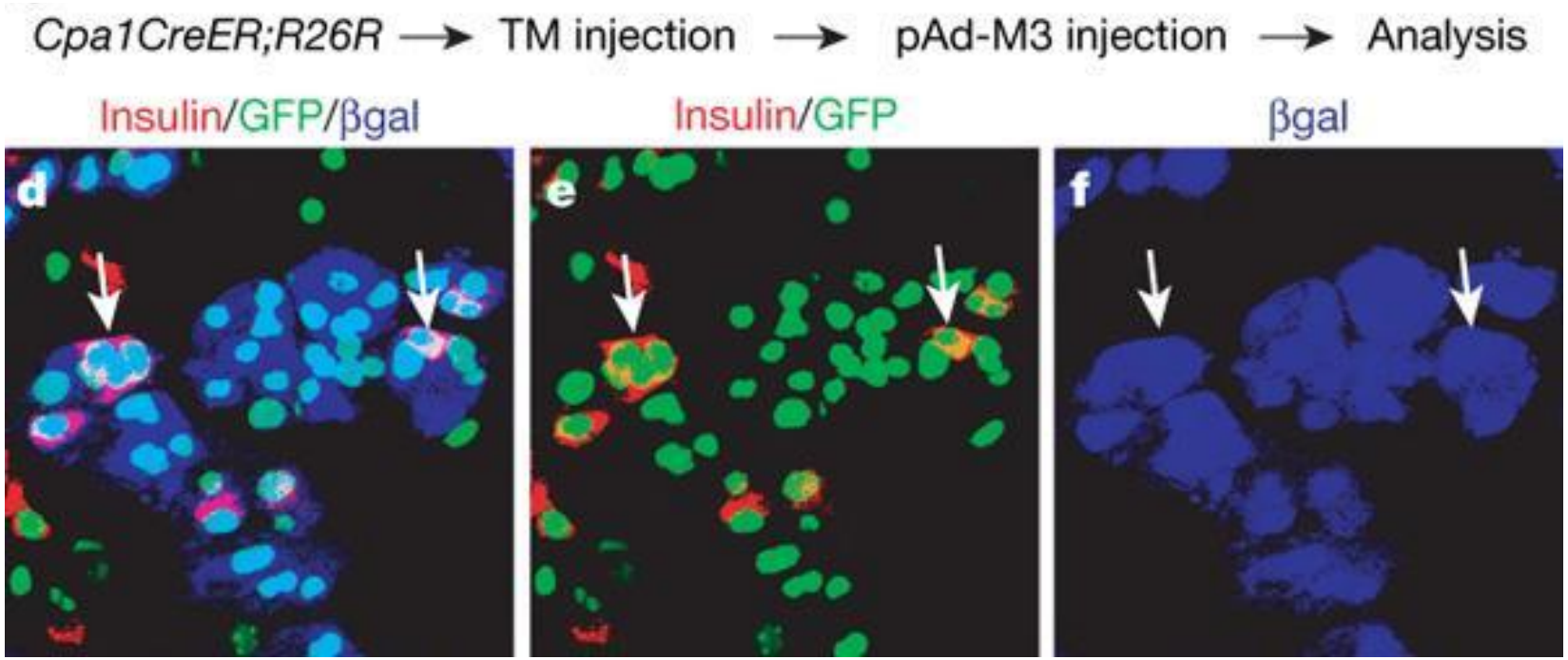

a
LoxP or FRT
X
Cre or Flp
recombinase
b
attP
X
attB
ϕ C31
integrase
attL
attR


Promoter
loxP
STOP
loxP
GFP
X
Promoter
loxP
GFP



GFP fluorescence confirms Cre activity in expected tissues

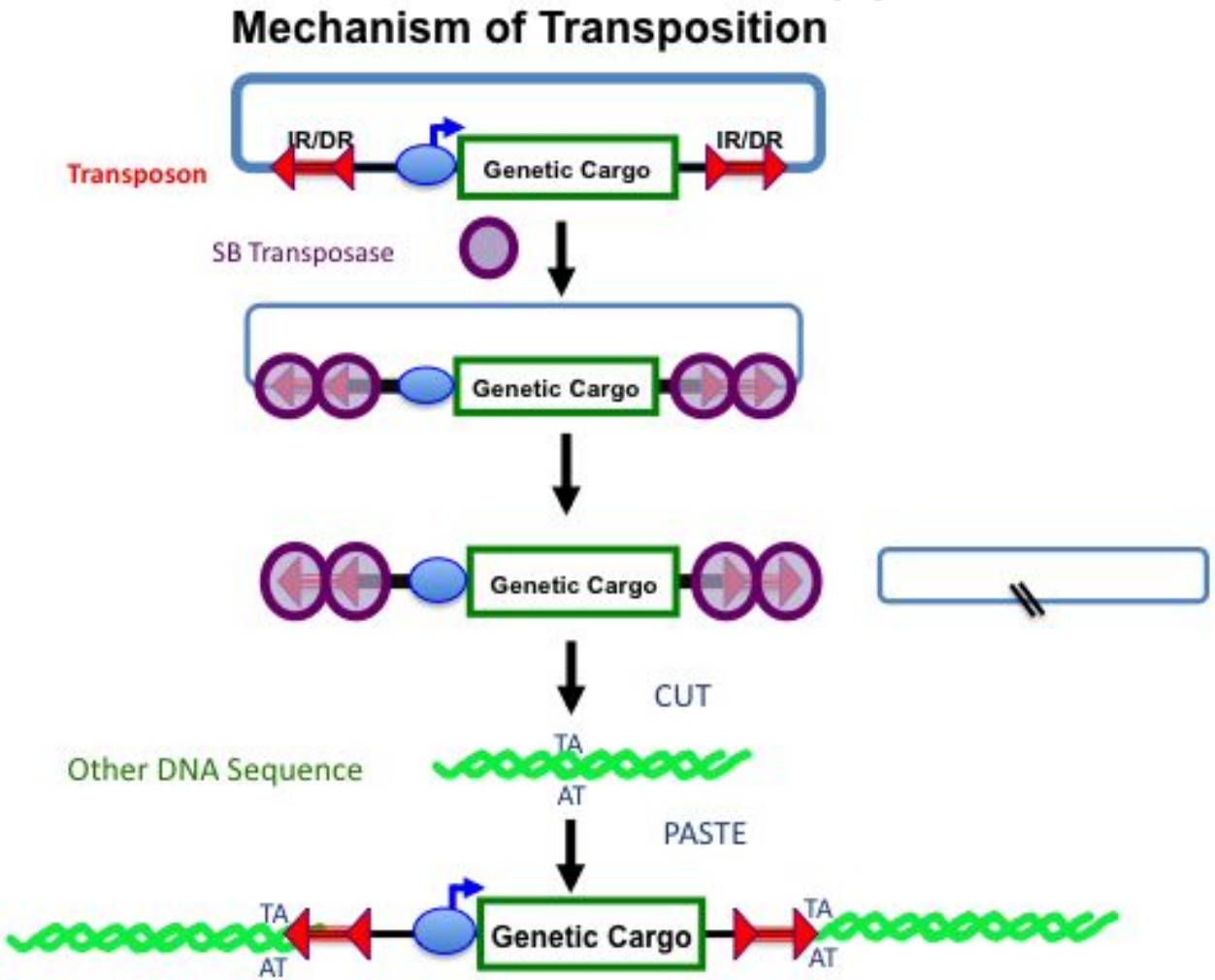
Induced new b-cells originate from differentiated exocrine cells.



Q Zhou *et al. Nature* **000**, 1-6 (2008) doi:10.1038/nature07314

nature

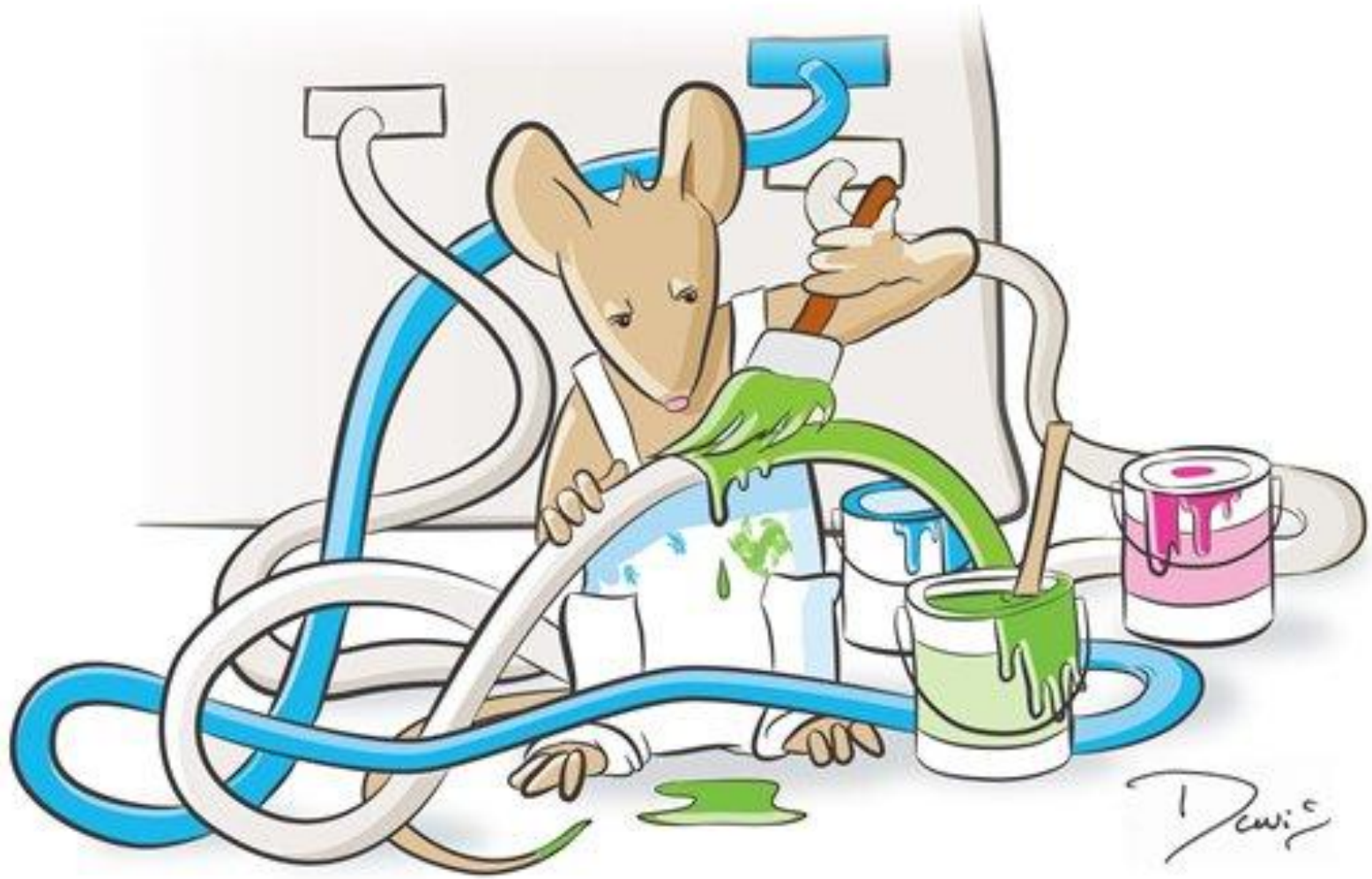
Транспозон спящая красавица (*Sleeping Beauty*) не оставляет «следов»



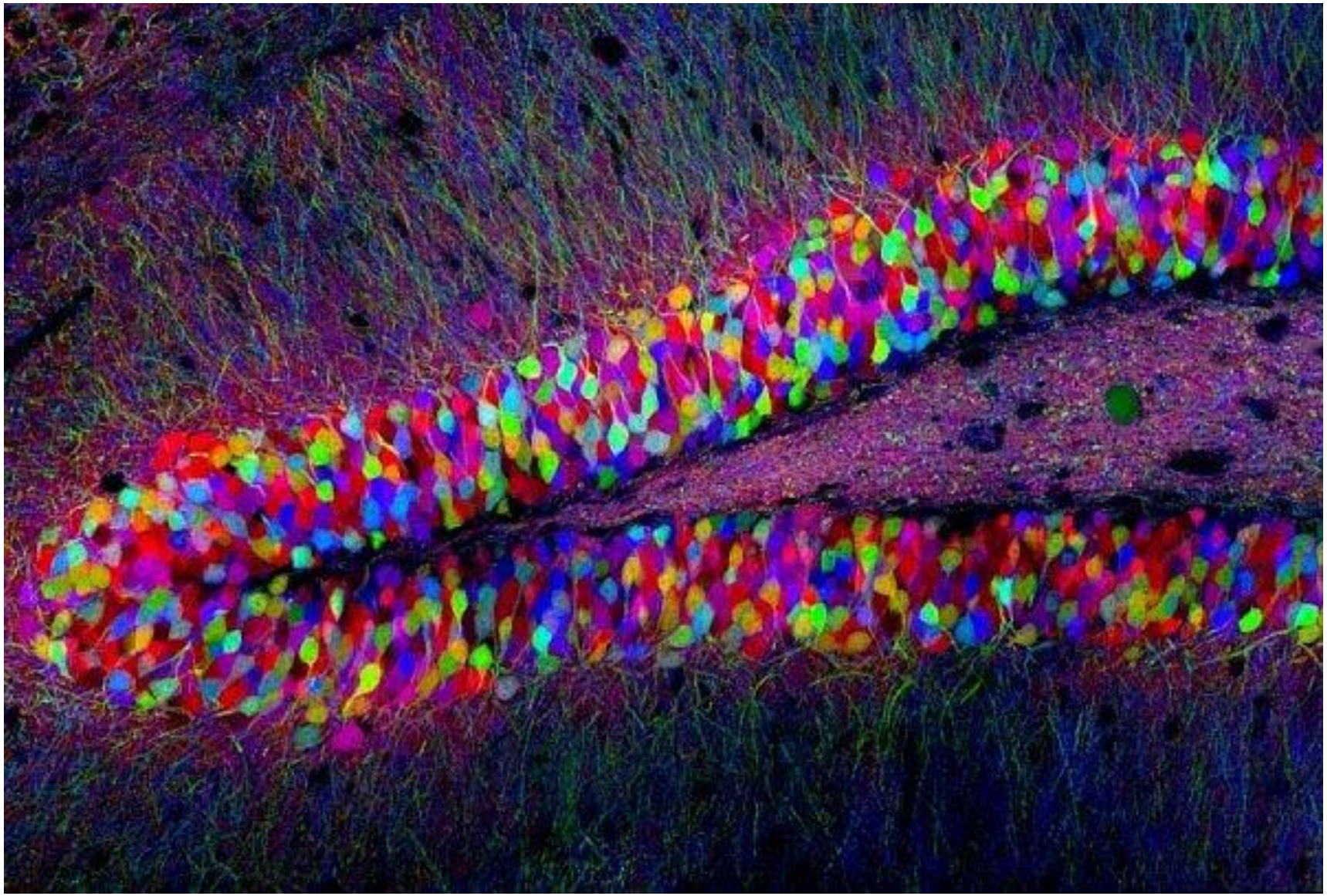
Sleeping Beauty transposon system

Frog Prince transposon system

Транспозон леопардовой лягушки
Rana pipiens

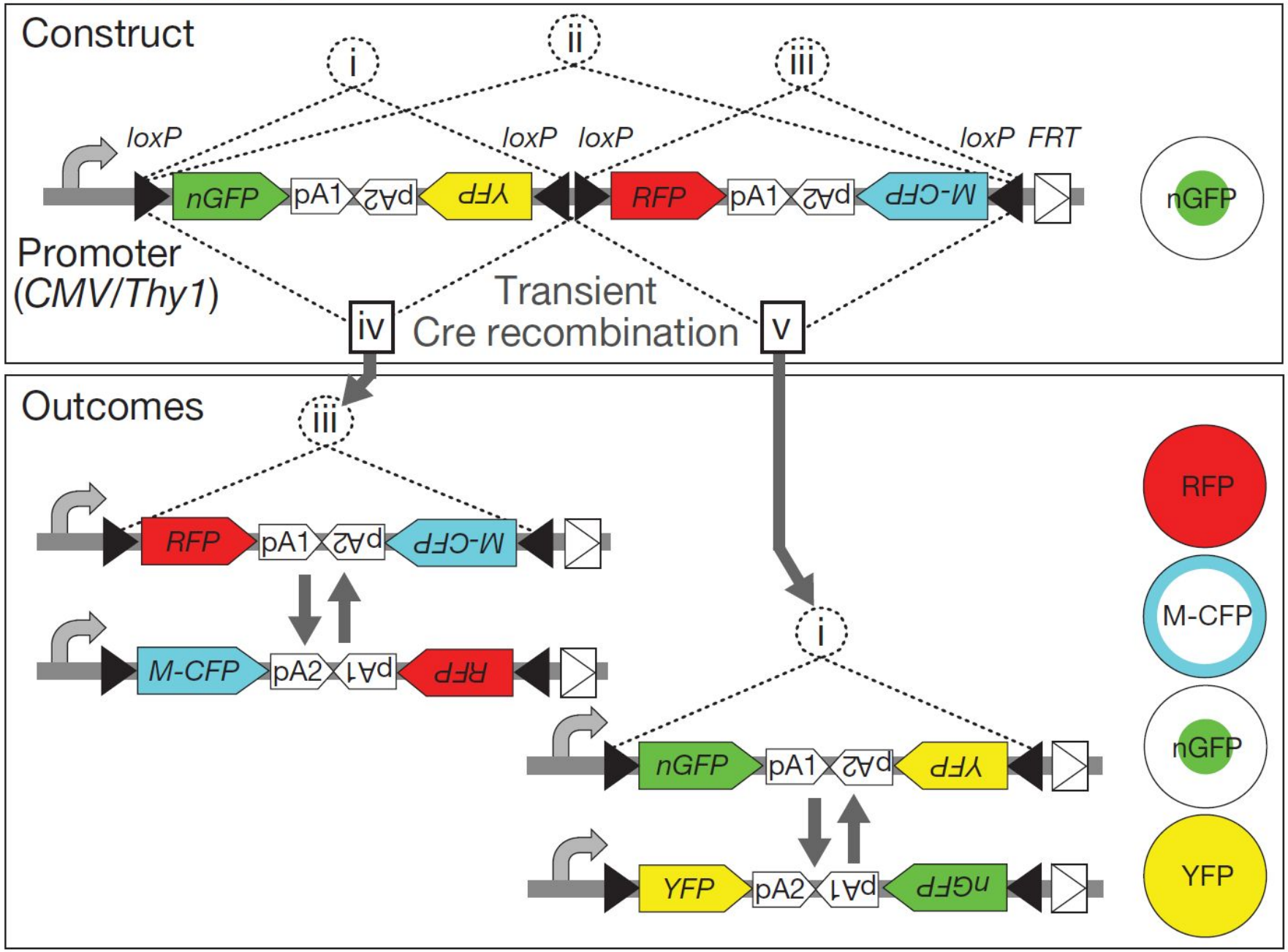


Brainbow мыши



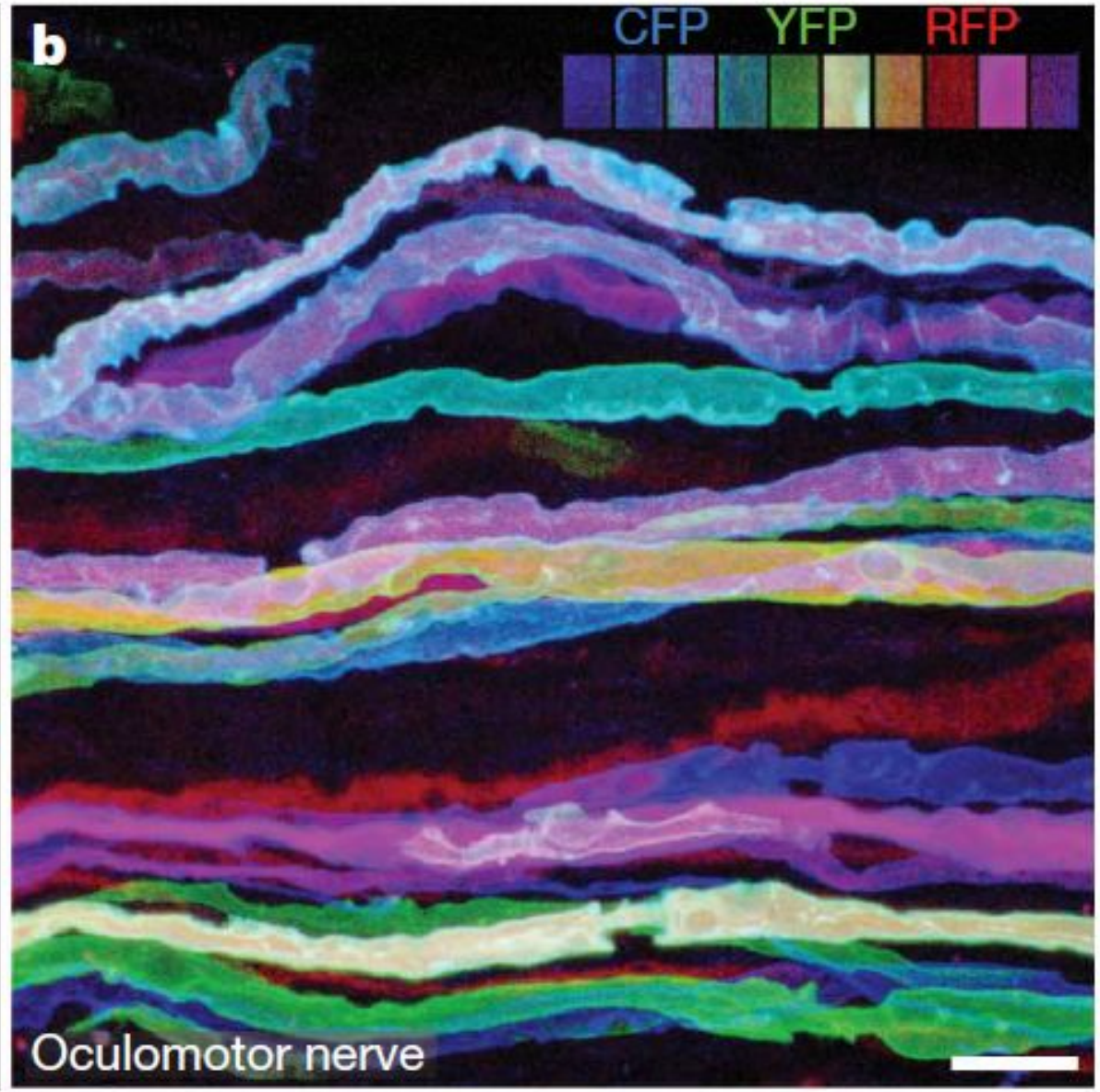
Из чего состоит трансген?
Комплектация люкс

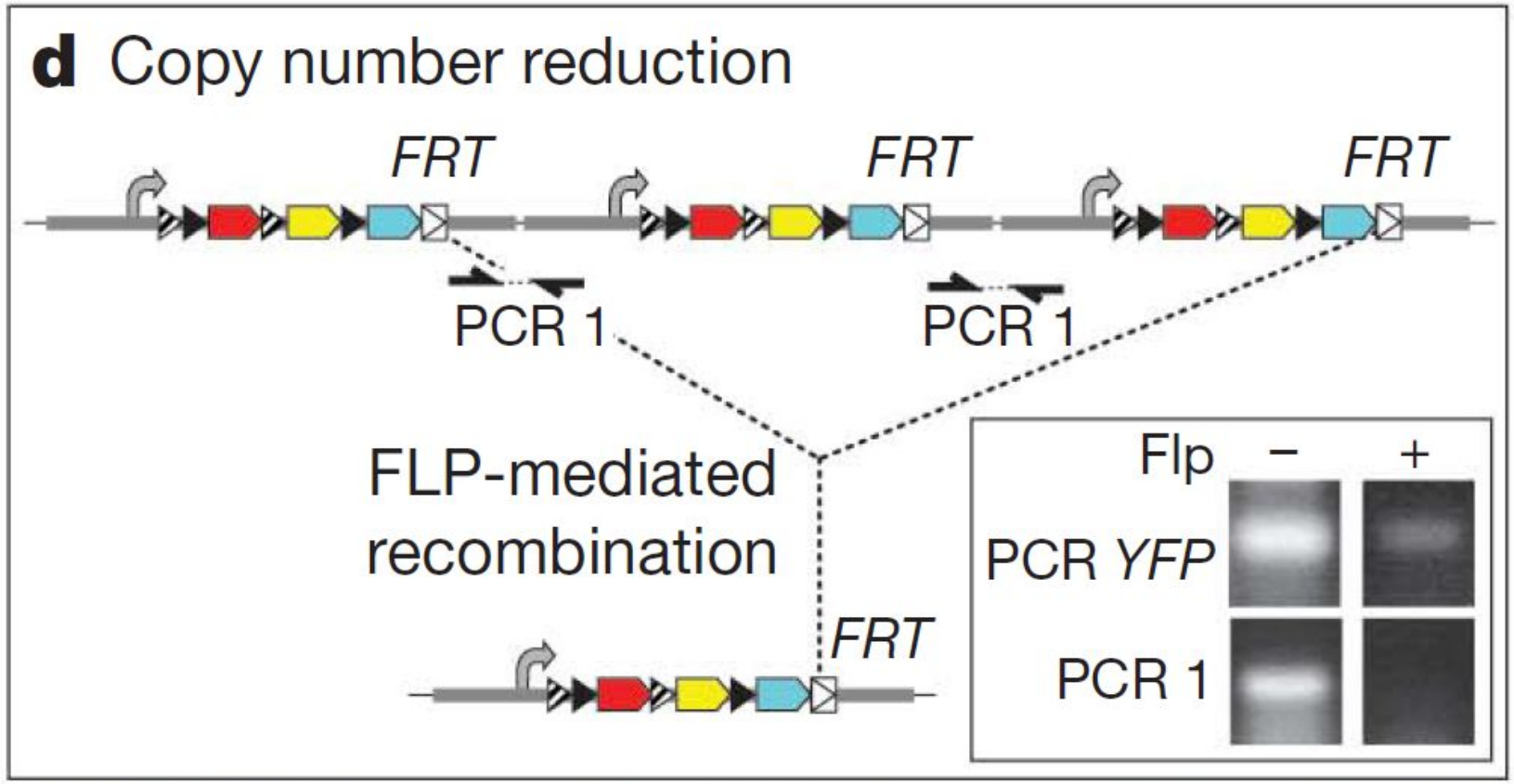
c *Brainbow-2.1*

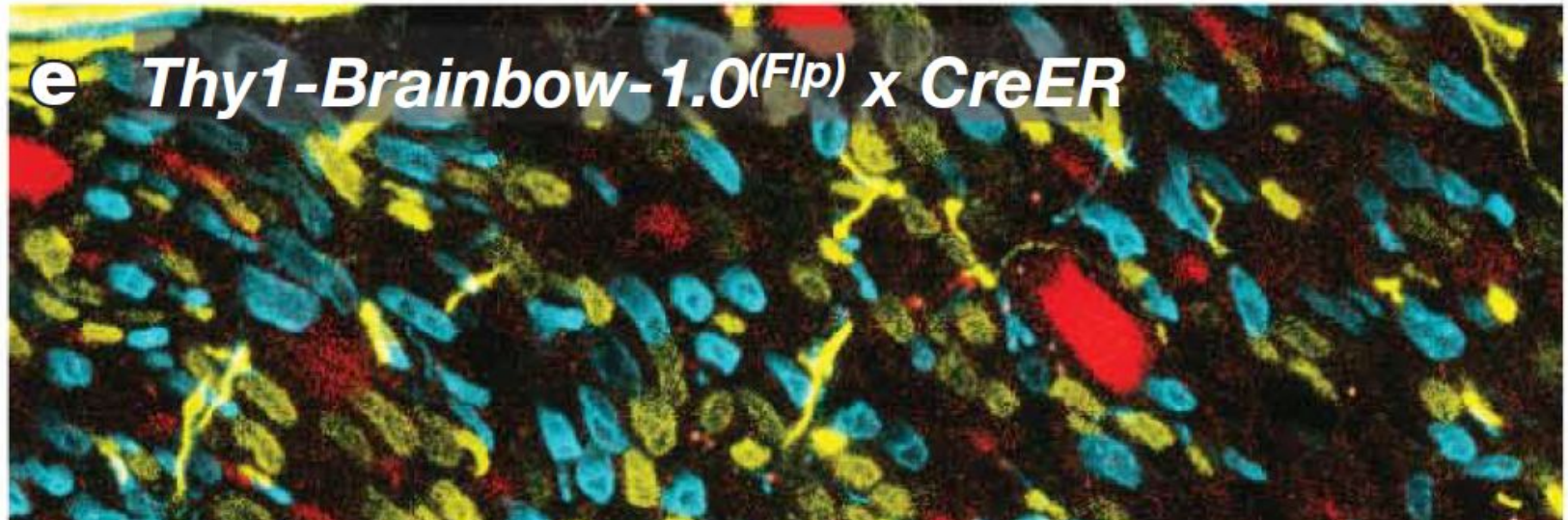


a XFP combinations

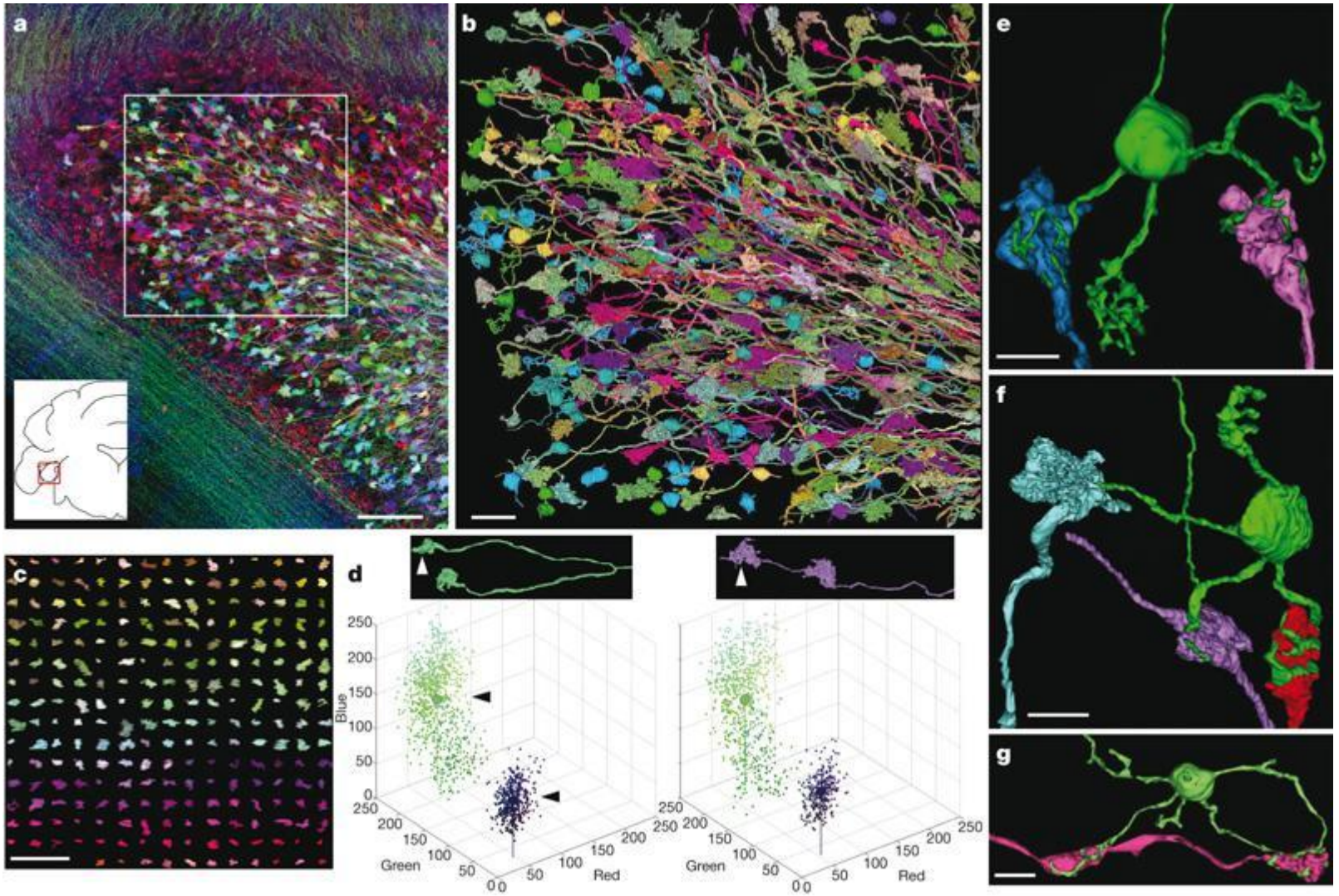
Outcome for each copy			Resulting colour
1	2	3	
C	C	C	Blue
C	C	Y	Light blue
C	Y	Y	Blue-green
Y	Y	Y	Green
Y	Y	R	Light green
Y	R	R	Orange
R	R	R	Red
R	R	C	Magenta
R	C	C	Purple
R	C	Y	Grey



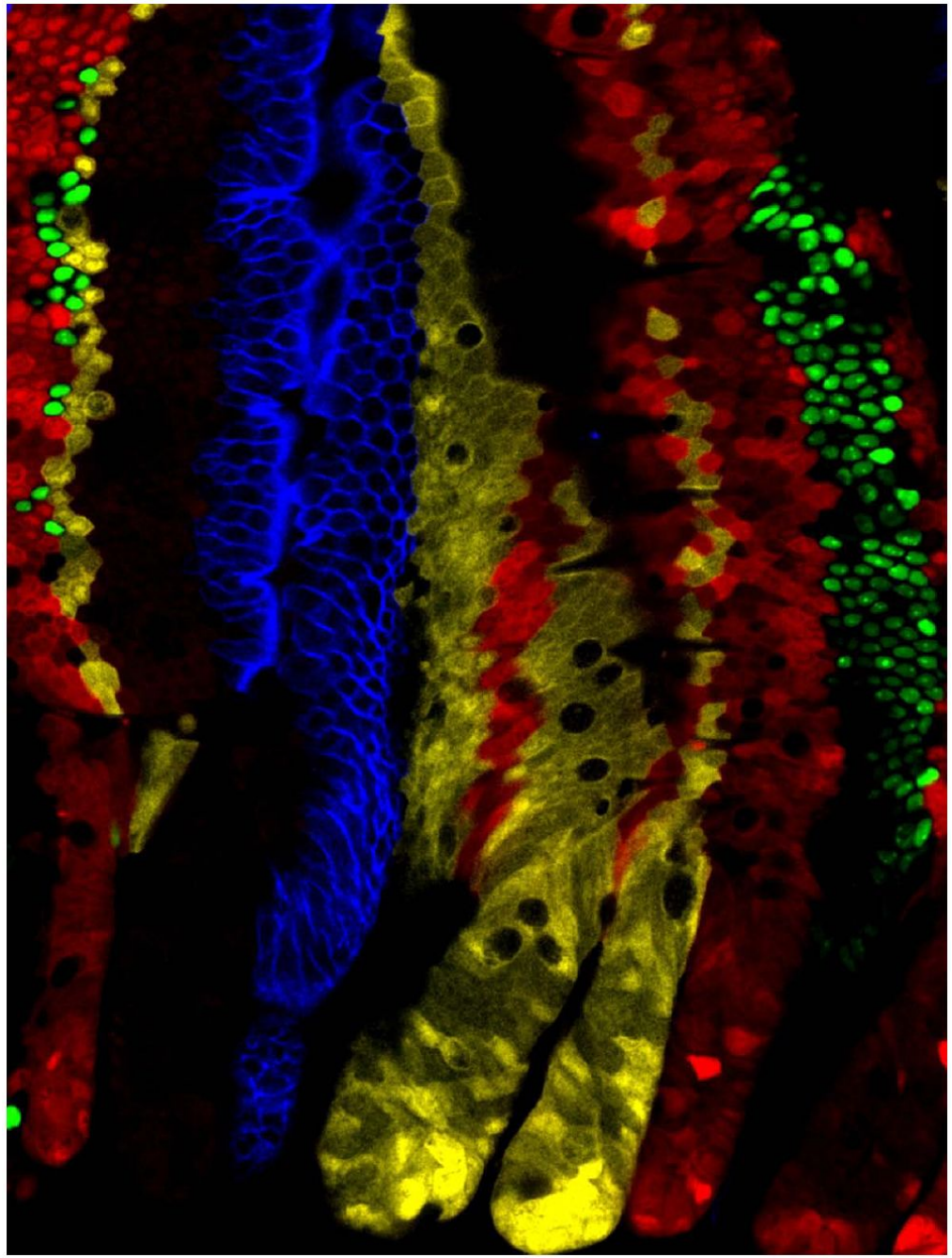

d Copy number reduction
FRT
FRT
FRT
PCR 1
PCR 1
FLP-mediated
recombination
FRT
Flp
–
+
PCR YFP
PCR 1


e Thy1-Brainbow-1.0(Flp) x CreER

Трехмерная реконструкция отдельных клеток

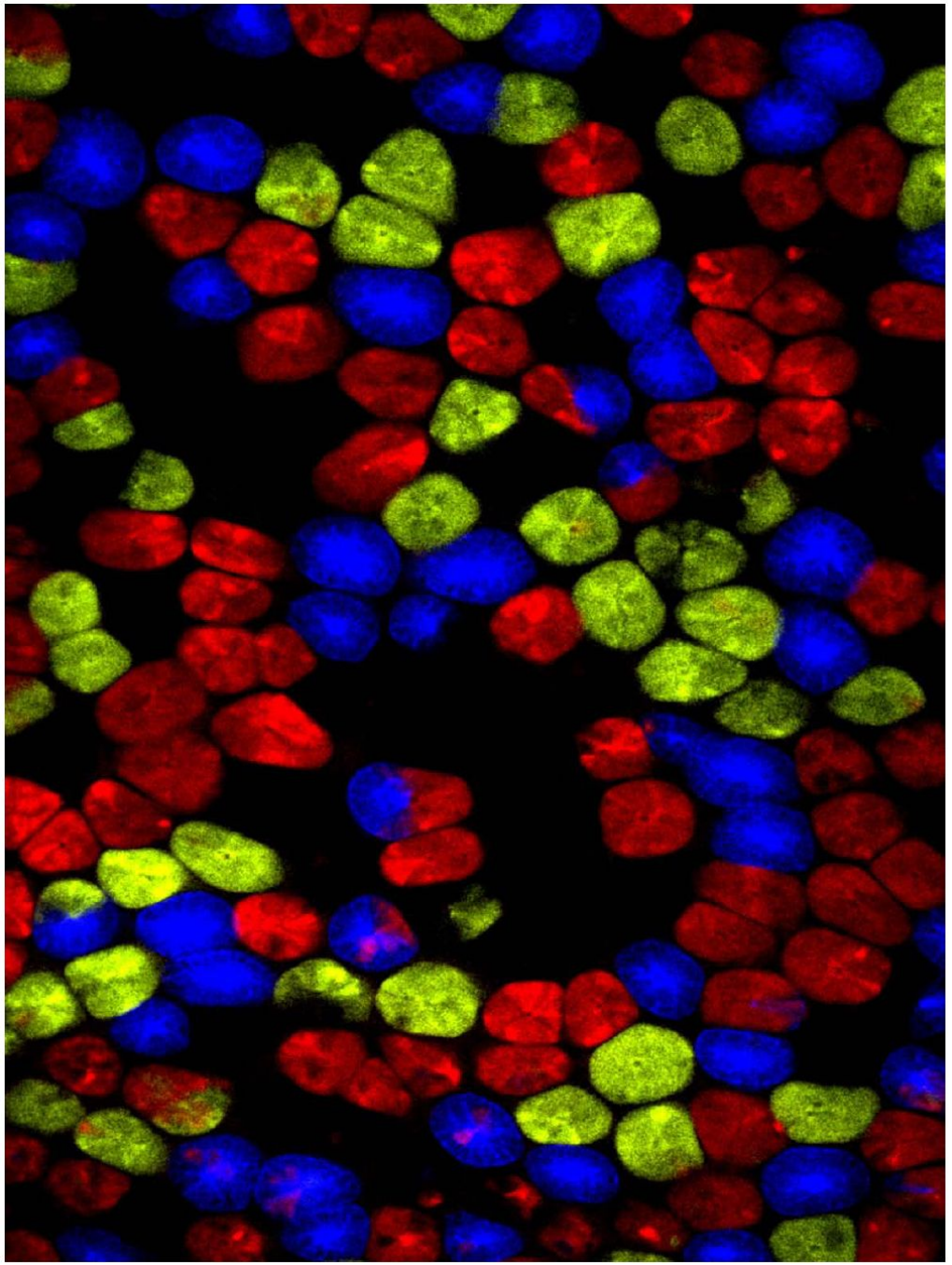


Картина Джексона Полока, авангардный экспрессионизм

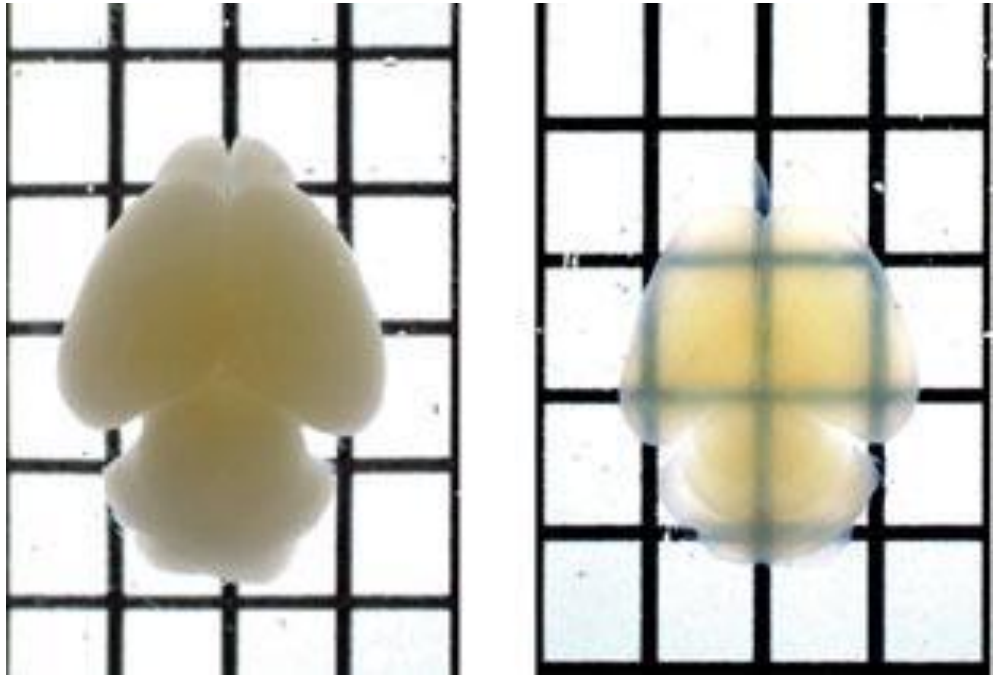


Крипты тонкого кишечника
у мышей, несущих конструкцию
конфети

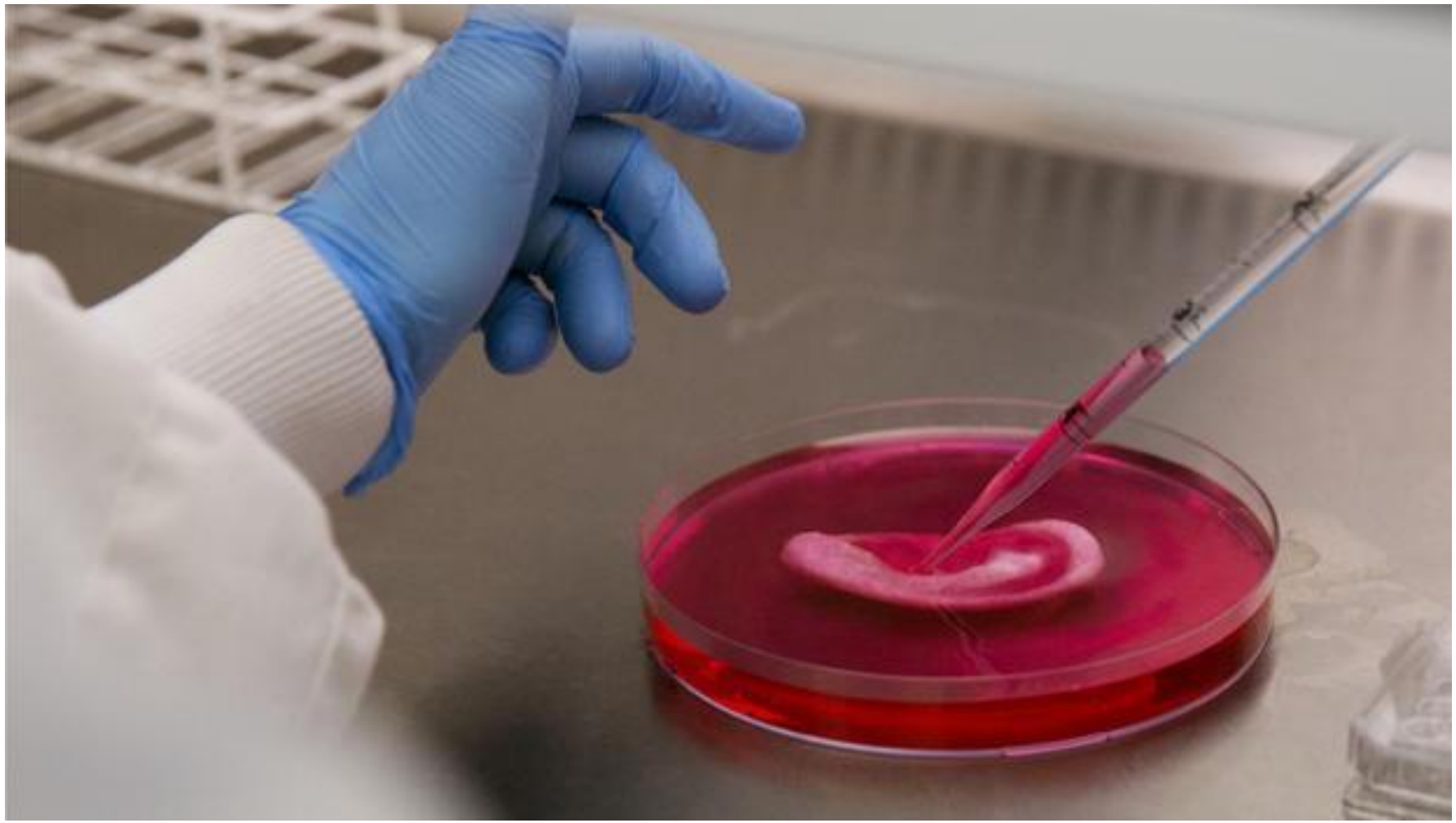
Ворсинки тонкого кишечника
у мышей, несущих конструкцию
конфети



CLARITY (**C**lear, **L**ipid-exchanged, **A**natomically **R**igid, **I**maging/immunostaining compatible, **T**issue h**Y**drogel)



Почему стволовые клетки не используются повсеместно уже сейчас?



The burger, which cost more than $380,000 to develop, is made from 20,000 strips of cultured meat mixed together with lab-grown animal fat.


COURTESY DAVID PARRY / PA

Dubbed the "Frankenburger", it was mixed with breadcrumbs and egg powder to emulate the normal flavor of a burger. To give it a beefy color, red beet juice and saffron were added.

Synthetic meat, here being grown at Maastricht University, could also help reduce greenhouse gas emissions and address animal welfare problems.

Что мешает повсеместному применению стволовых клеток в медицине?

Стволовые клетки взрослого организма

Как и куда вводить стволовые клетки?

Иммунологическое отторжение трансплантированных клеток (отторжения реципиента)

:om/before_and_after_photos.html

NN STEM CELL LIFT®

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- Benefits of Stem Cell Lift®
- Weekend Face Lift
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Stem Cell Lift® Articles

Lichen Sclerosus Treatment Review & Experience With the Stem Cell Lift® Procedure

An Update on This New, Promising and Natural Treatment for Lichen Sclerosus

New Hope in Treatment of Lichen Sclerosus Et Atrophicus

Stem Cell Lift® Joint Renewal

Stem Cell Lift® vs. PRP

Stem Cell Lift® FAQ's

Stem Cell Lift® Procedure

Stem Cell Lift® - Post Cancer Reconstruction

Scar Free Stem Cell Lift® Face Sculpting

The Stem Cell Butt Lift

Before and After Photos

Before | After 17 days post procedure

Before | After 7 Months

Атаксия – телеангиэктазия (синдром Луи - Бара)

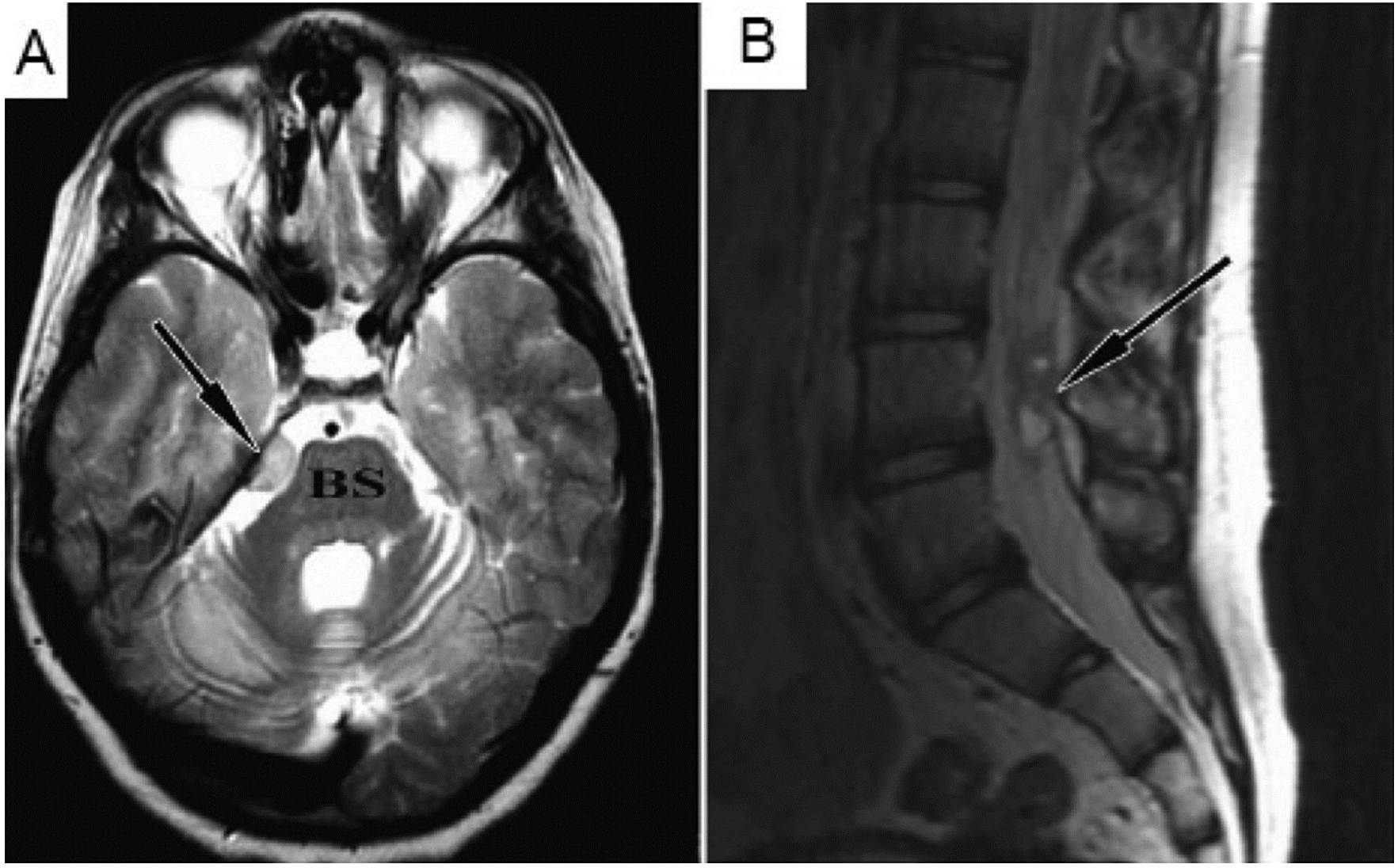
аутосомно-рецессивное заболевание, характеризующееся следующими синдромами: мозжечковой атаксией (расстройством координации движений), телеангиэктазами (локальным чрезмерным расширением мелких сосудов), различными формами иммунодефицита и предрасположенностью к онкологическим заболеваниям.

Частота атаксии-телеангиэктазии составляет от 1 на 40 000 - 100 000 человек. Пациенты с синдромом Луи-Бар, как правило, не доживают до 50 лет.

In May 2001 at the age of 9 y, in March 2002 at the age of 10 y, and in July 2004 at the age of 12 y, he was taken by his parents to be treated in Moscow with repeated transplantation of fetal stem cells (see Text S1 for details as supplied to the parents by the patient's physicians in Moscow). The treating team at the Sheba Medical Center was not involved in this treatment.

MRI performed in February 2005 to investigate the headaches revealed a right infratentorial lesion slightly compressing the brain stem and another lesion at the cauda equina (Figure 1A and 1B). The lesions grew slowly as evidenced by repeat MRIs in June and July 2006. In September 2006 at the age of 14 y, surgery was performed and a tumor localized at L3–4 level attached to the cauda equina nerve roots was removed. Additional “satellite” lesions were identified attached to nerve roots rostral to the main lesions (Figure 2A and 2B).

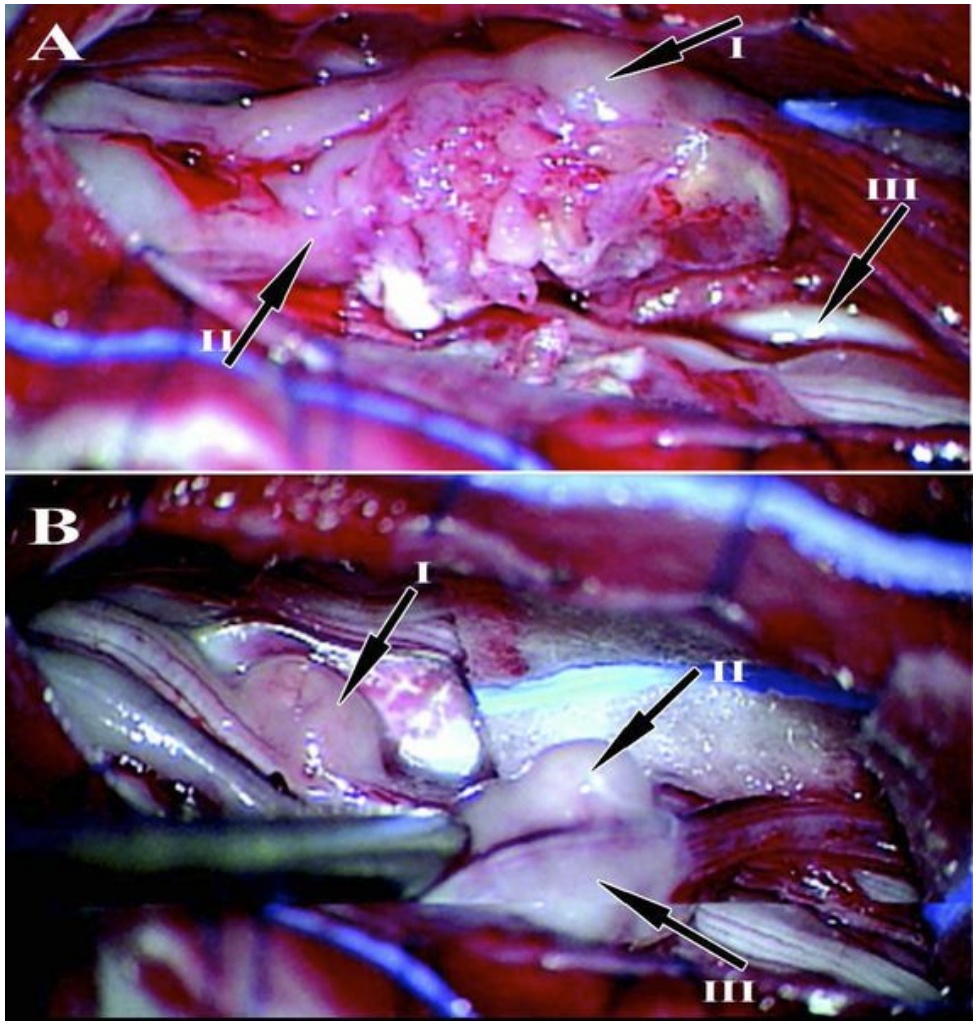
Figure 1. Pre-Operative MRI



Amariglio N, Hirshberg A, Scheithauer BW, Cohen Y, et al. (2009) Donor-Derived Brain Tumor Following Neural Stem Cell Transplantation in an Ataxia Telangiectasia Patient. PLoS Med 6(2): e1000029. doi:10.1371/journal.pmed.1000029
http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029

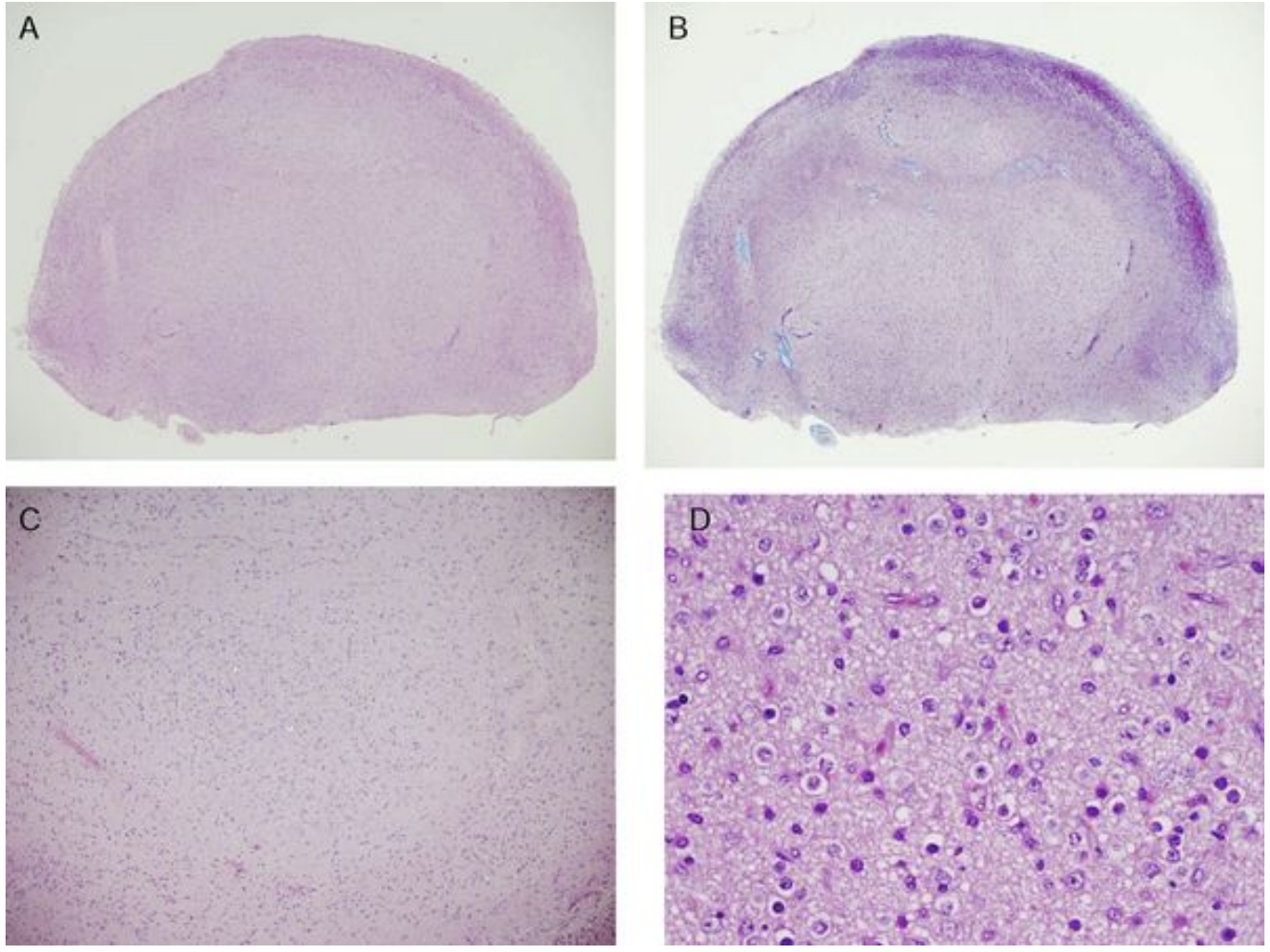
PLOS | MEDICINE

Figure 2. Intra-Operative View



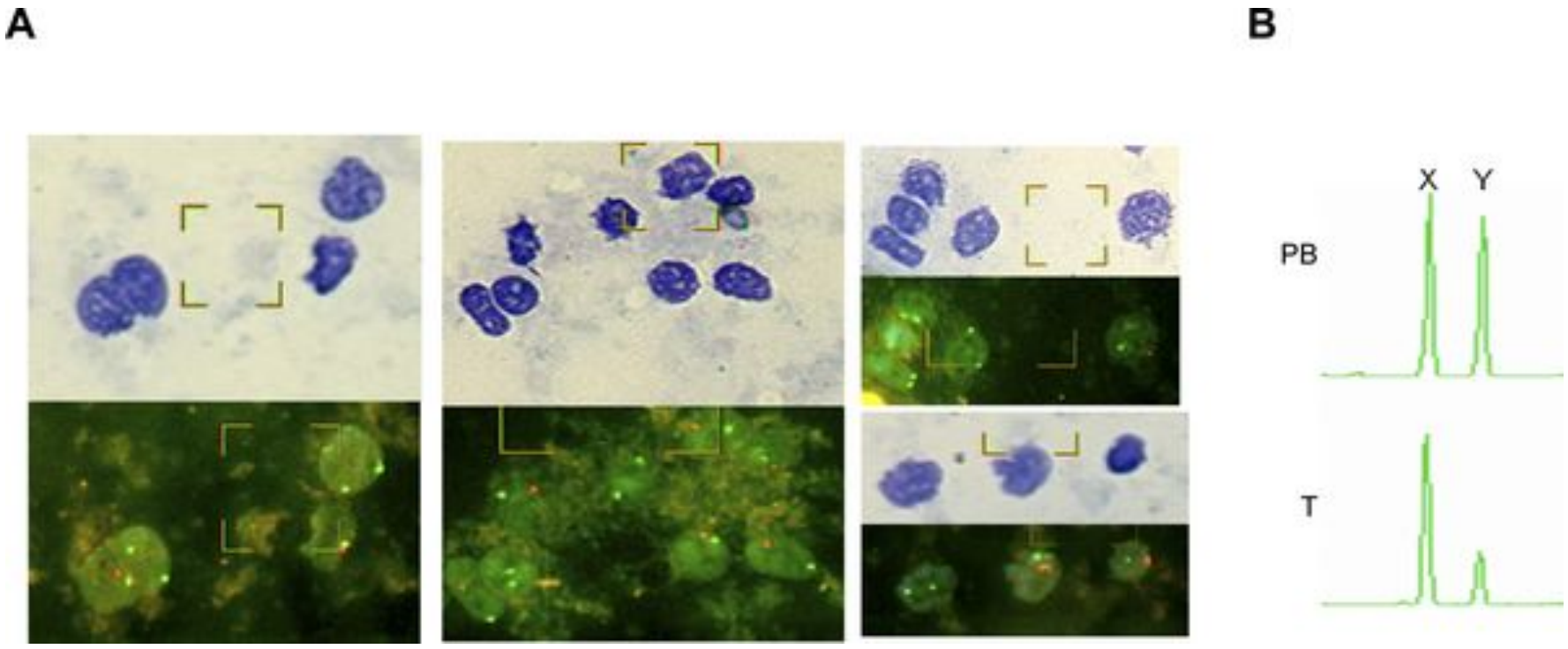
Amariglio N, Hirshberg A, Scheithauer BW, Cohen Y, et al. (2009) Donor-Derived Brain Tumor Following Neural Stem Cell Transplantation in an Ataxia Telangiectasia Patient. PLoS Med 6(2): e1000029. doi:10.1371/journal.pmed.1000029
http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029

Figure 3. Hematoxylin–Eosine Staining of the Tumor



Amariglio N, Hirshberg A, Scheithauer BW, Cohen Y, et al. (2009) Donor-Derived Brain Tumor Following Neural Stem Cell Transplantation in an Ataxia Telangiectasia Patient. PLoS Med 6(2): e1000029. doi:10.1371/journal.pmed.1000029
http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029

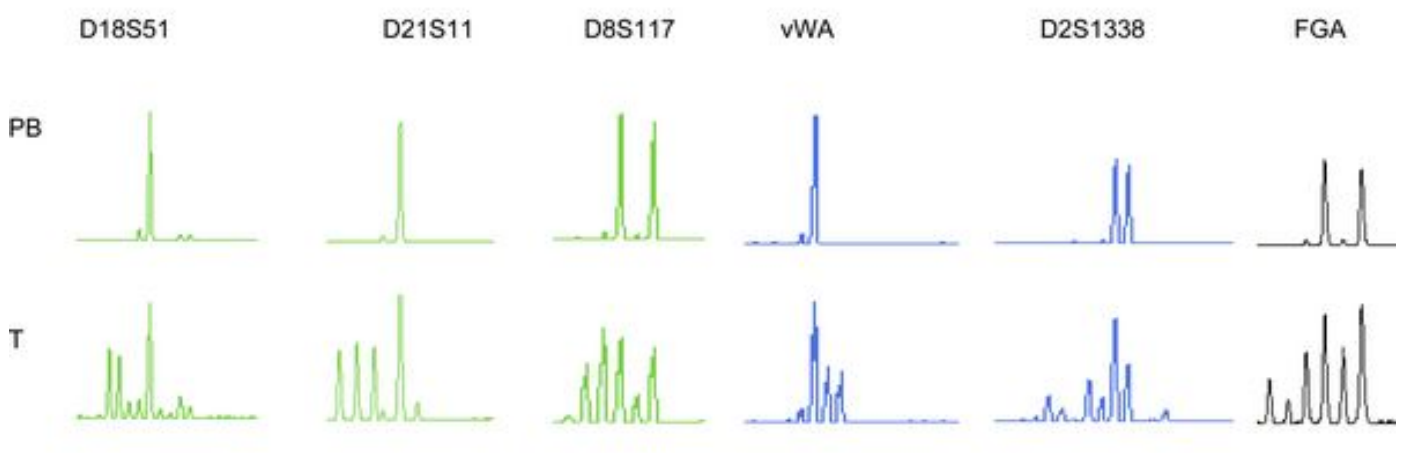
Figure 6. Analysis of X and Y Chromosomes of the Tumor Cells Using I-FISH and PCR Analysis of the Amelogenin X- and Y-Specific Alleles Showing the Presence of Female Cells in the Tumor



Amariglio N, Hirshberg A, Scheithauer BW, Cohen Y, et al. (2009) Donor-Derived Brain Tumor Following Neural Stem Cell Transplantation in an Ataxia Telangiectasia Patient. PLoS Med 6(2): e1000029. doi:10.1371/journal.pmed.1000029
http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029

Figure 8. Analysis of DNA Tetranucleotide Repeats by Fluorescent PCR and Indicating the Origin of Tumor Cells from at Least Two Donors

A

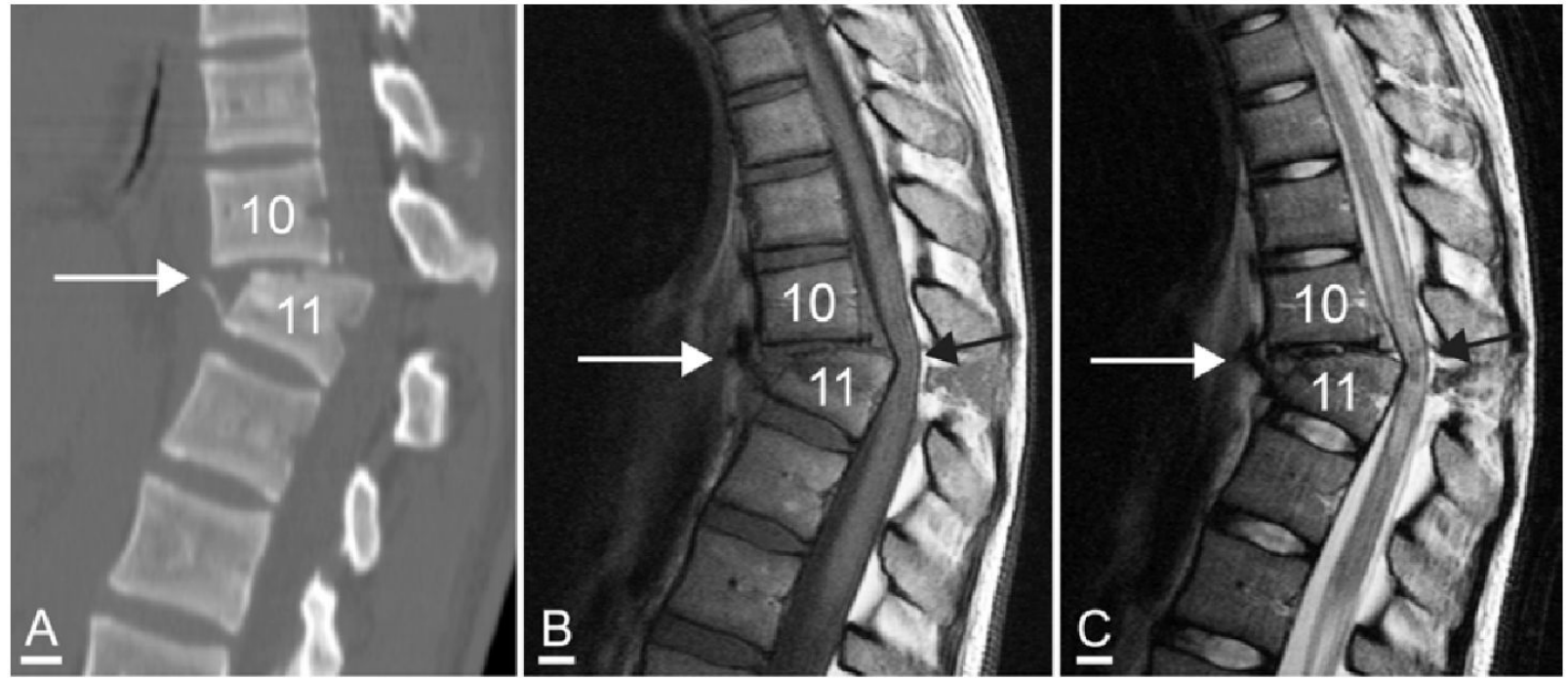


B

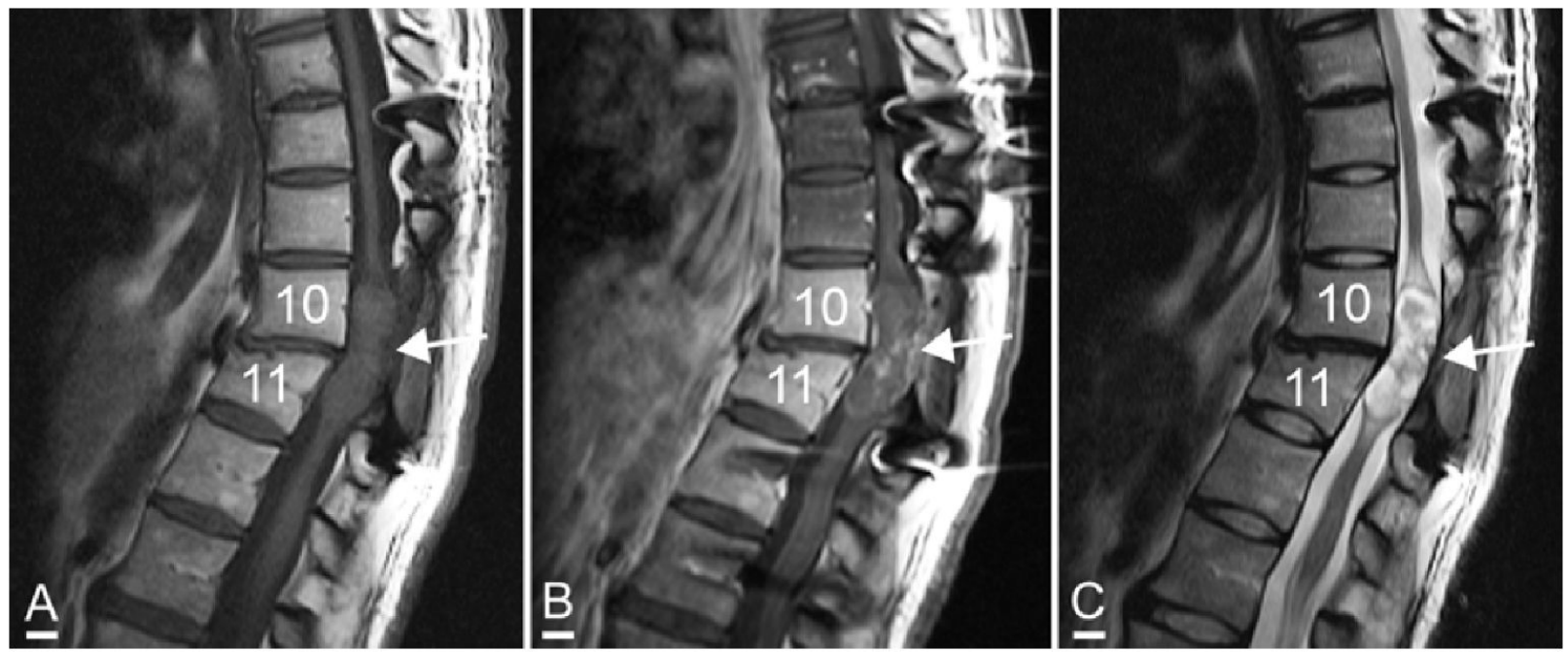
	HLA A*	HLA B*	HLA DRB1*
Patient -PB and BS	01, 33	14, 49	01, 07
Tumor	01, 33, 02, 68	14, 49, 38, 39, 40, 1509(70)	01, 07, 04, 11, 13, 15

Amariglio N, Hirshberg A, Scheithauer BW, Cohen Y, et al. (2009) Donor-Derived Brain Tumor Following Neural Stem Cell Transplantation in an Ataxia Telangiectasia Patient. PLoS Med 6(2): e1000029. doi:10.1371/journal.pmed.1000029
http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000029

до



после



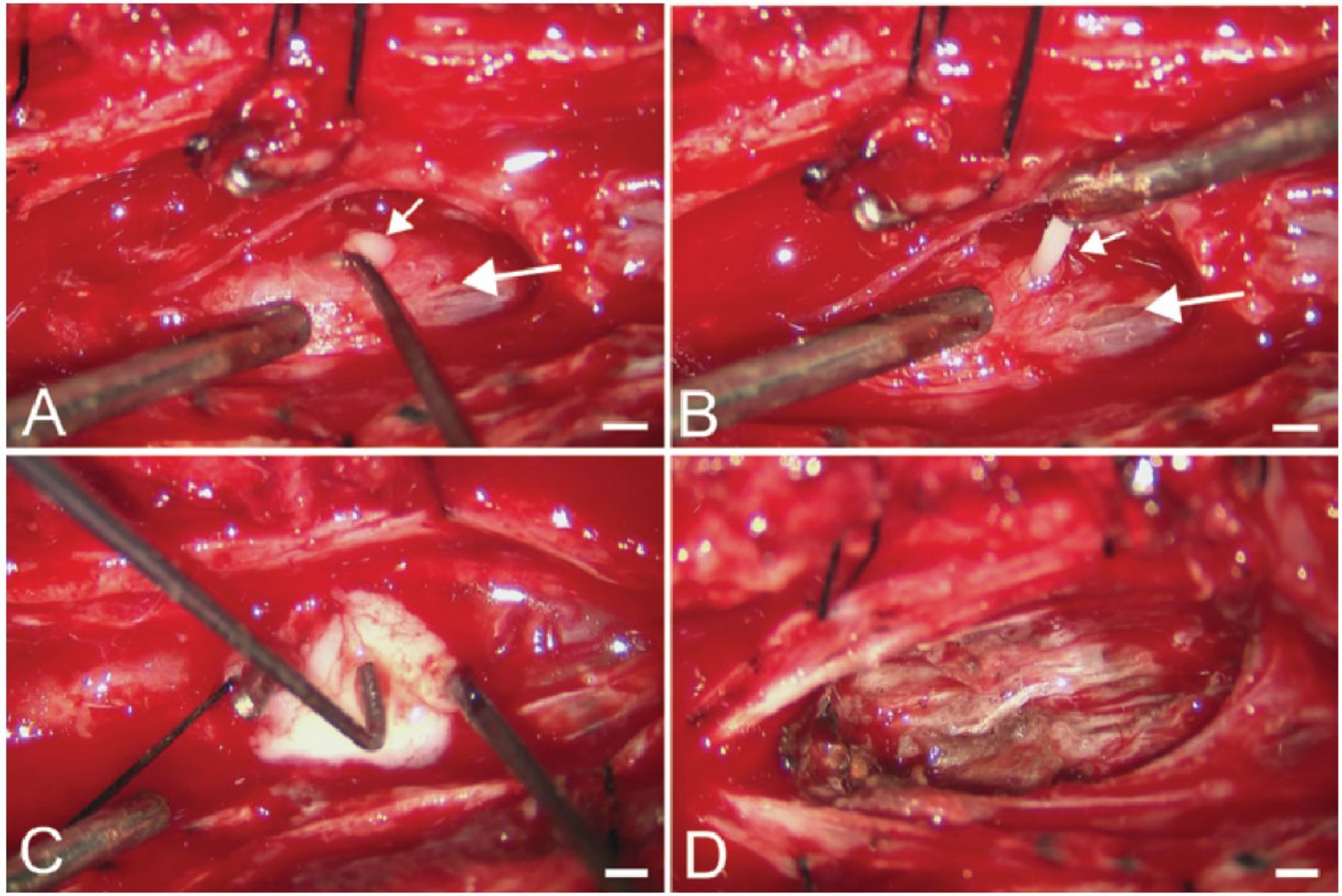

A
B
C
D

Table 1. Examples of deaths and complications following unproven stem cell interventions reported in academic and media publications. Note that causation has not always been established.

Case details	Country (treatment)	Reference
An observational study of patients that received cell treatments from Dr Hongyun Huang at a clinic in Beijing found that 5 of 7 patients had complications, including three that had contracted meningitis. Patients did not gain clinically useful sensorimotor, disability, or autonomic improvements.	China	55
A Chinese man, 27, died after receiving a stem-cell injections in the spine and buttocks at the Chinese Army's 455 PLA Hospital in Shanghai to treat disabilities from a previous minor stroke.	China	56
A Chinese woman, 61, died after her medication was discontinued in preparation for stem cells to "regrow" liver tissue to treat late-stage liver cirrhosis from a long-term hepatitis B infection.	China	56
Two Koreans died following stem cell interventions in China and in Japan.	China, Japan	51
Two patients have died under the care of Dr. Zannos Grekos of Florida, USA, after traveling to the Dominican Republic to receive cells extracted in the US.	Dominican Republic	57
An 18-month Romanian boy died of internal bleeding at XCell-Center in Dusseldorf following the injection of stem cells into the brain.	Germany	58
A 10-year old Azerbaijan child almost died of complications following stem cell injections at XCell-Center in Dusseldorf.	Germany	58
The death of three Philippine politicians is being investigated by the Philippine Medical Association (PMA) following their deaths within one year of receiving stem cell interventions in Germany for liver cancer, pneumonia and heart disease.	Germany	59
A patient was found after death to have lesions in her kidney after receiving renal stem cell injections for lupus nephritis.	Thailand	60
A boy with ataxia telangiectasia, aged 10, developed donor-derived tumors on his brain and spinal cord from injected neural fetal stem cells received at a clinic in Moscow. The cells of the tumor were from at least two donors.	Russia	61
A patient required surgery to correct facial drooping and to remove bone fragments that developed six months after receiving adipose-derived stem cell injections around the eyes to diminish appearance of wrinkles.	United States	62

The global industry for unproven stem cell interventions and stem cell tourism


I DIED WAITING FOR EMBRYONIC STEM CELL RESEARCH TO FIND A CURE. WHAT ABOUT YOU?
I WAS THE EMBRYO

Ретино-пигментный эпителий выращенный из стволовых клеток пациента

1,3 x 3 мм

Что мешает повсеместному применению стволовых клеток в медицине?

Плюрипотентные клетки

Туморогенность

Что мешает повсеместному применению стволовых клеток в медицине?

Плюрипотентные клетки

Иммунологическая не совместимость

Что мешает повсеместному применению стволовых клеток в медицине?

Плюрипотентные клетки, ИПСК

Необходимость модификации генома