

Jurassic Park

Partie 1 : Etude de l'extrait de Jurassic Park expliquant comment les dinosaures sont créés :

Lien vers la vidéo Youtube : <https://www.youtube.com/watch?v=h58IRIVHhGc>

1) What is the purpose of Jurassic Park scientists ?

Make clones of dinosaurs

2) Where does the DNA come from ?

From a drop of blood

3) Where did the scientists find dinosaur blood ?

In mosquitoes

4) How can dinosaur blood be preserved ?

The mosquito can be trapped in tree sap. The tree sap will get hard and become fossilized, preserving the mosquito and the blood inside.

5) Why can't the dinosaur's DNA be directly used ?

It is full of gaps

6) How can Jurassic Park scientists see the gaps in the DNA sequence ?

They use virtual reality displays to see the gaps in the DNA sequence

7) How do Jurassic Park scientists complete the DNA ?

They use the DNA of a frog

8) What parts of the video seem realistic to you ? What's pure science fiction ? What's partly true ?

Realistic :

- extract DNA from blood and use it to make clones of an animal

Pure science fiction :

- Dinosaur DNA can not be preserved that long, it will be degraded

- you can't use a virtual reality display to look at gaps in DNA :-)

Partly true :

- Fill the gaps in DNA of one species with DNA of an other species :

it is possible to express DNA of one species into another. If the species are very close, this can be done without in vitro modification of DNA (for instance : donkey and horse).

If the species are very distant, it is necessary to modify the DNA in vitro before insertion into the other species' genome. Without modification, it won't be expressed (for instance : human and yeast)

You can fill "gaps" in the DNA of one species with DNA of an other species only if :

- The DNA comes from a very related species

- the missing sequence is known, so it is replaced with similar DNA from the other species

Frogs and dinosaurs are very distant species, so you can't just put DNA of a frog in a dinosaur without modification : the DNA won't be expressed.

The dinosaurs of Jurassic park would be has much frog as dinosaur

Partie 2 : Jurassic Park : what is true ?

Vidéo <https://www.youtube.com/watch?v=GyHUTSrzKNY>

A) Can we resurrect species by cloning ? 5:11- 10:10

Q1) Cite two examples of extinct animals that could be resurrected :
woolly mammoth and Tasmanian tiger

Q2) What do you need to make a clone ?
One adult somatic cell

Q3) What's the first animal cloned ?
The sheep Dolly

Q4) Why is cloning of extinct animals incredibly difficult ?
Because their DNA is damaged : some parts are missing

Q5) How must DNA be stored to be preserved ?
It must be stored at a low temperature

Q6) Buttercup was a female mammoth. Why would the cloning of Buttercup be possible ?
Because this mammoth was frozen for thousands of years

Q7) Why would it be easier to clone a Tasmanian tiger ?
Because its extinction is more recent

Q8) What animal can be used to clone a Tasmanian tiger ?
A close relative to the Tasmanian tiger, like the Tasmanian devil

Q9) What do we need to resurrect an extinct animal ?
- Some DNA of the extinct animal
- an egg and a womb of a close relative of the extinct animal

Q10) Is it possible to clone dinosaurs ? Why ?
The youngest dinosaur went extinct around 65 000 000 years ago, so all the dinosaurs' DNA is degraded. Amber is not sufficient to protect DNA. DNA doesn't survive more than 5 000 000 years.

B) Can we fill gaps in the DNA of a species with DNA of an other species ?

Let's suppose that some DNA survived to degradation....

10:10-15:55

Q1) What's the DNA buffer method ?
You fill the gaps in the DNA of one species with DNA of the closest relative

Q2) What DNA would be used to repair mammoth's DNA ?
The DNA of elephants

Q3) Can the DNA buffer method be used with very degraded DNA ?

No

Q4) Would the hybrid organism created by using the “buffer method” be like the organism you want to resurrect or like the buffer ?

It will have traits of both organisms

Q5) How must the “buffer organism” be selected ?

It must be closely related to the extinct animal

Q6) Is it possible to find a “buffer organism” for dinosaurs ?

No : they don't have a close enough relative living

Q7) In the movie Jurassic Park, what organism do they use as a buffer ? Is that a good choice ?

They choose frogs instead of birds (birds = closest relative for dinosaurs)

Q8) Conclude : is it possible to resurrect dinosaurs ?

No