

Introduction to Biology. Lecture 17

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Outline

- 1 Where we are?
- 2 Questions and answers
 - Exam 2
- 3 Where we are?
 - Nucleus, introns and telomerase



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Questions and answers

Exam 2



Results of Exam 2: statistic summary

Summary:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.	NA's
30.00	50.00	54.00	57.24	66.00	100.00	13

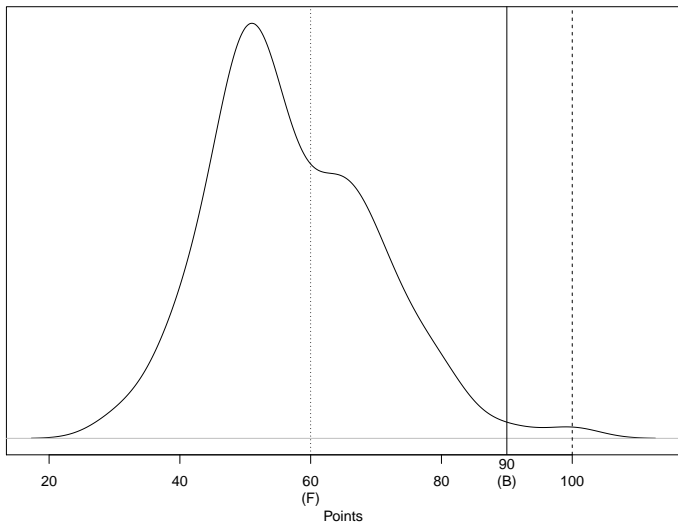
Grades:

F	D	C	B	max
< 60	< 70	< 80	< 90	100



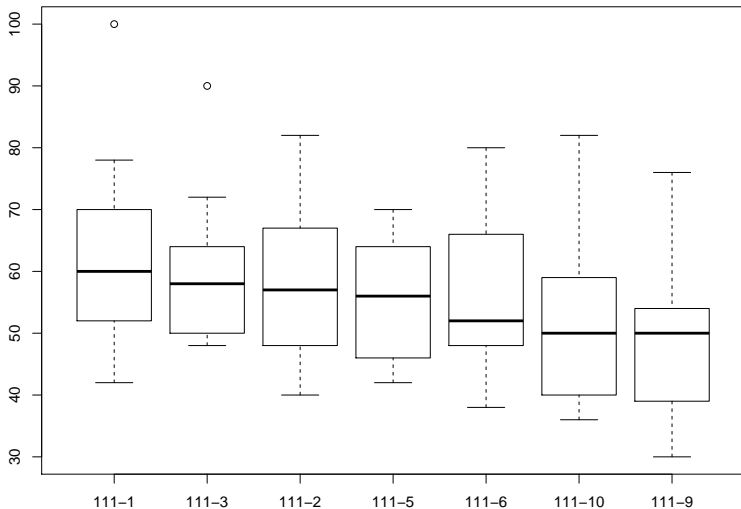
Results of Exam 2: the curve

Density estimation for Exam 2 (Biol 111)



Results of Exam 2: sections

Competition between Biol 111 sections (Exam 2)



Results of Exam 2: two questions

4. To make lipids from carbohydrates, plants need:

- A **To recombine atoms in molecule**
- B To add phosphorous
- C To add phosphorous and nitrogen

45. What is the horizontal transfer of DNA?

- A Transfer of DNA from mother to daughter cells
- B **Transfer of DNA between cells of different species**
- C Transfer of DNA between cells of one tissue



Where we are?

Nucleus, introns and telomerase



The logic of acquiring nucleus

- In bacterial mat, many bacterial groups coexist
- Due to the evolution, they become more and more dissimilar
- However, **horizontal transfer** of DNA continued
- To prevent the transfer of alien genes, some cells “decided” to separate DNA with membranes



Nuclear envelope

- There are many ways to create nucleus-like structures. For example, it could be guarded with one membrane but then pores will be impossible
- Eukaryote ancestors created the *nuclear envelope from ER*

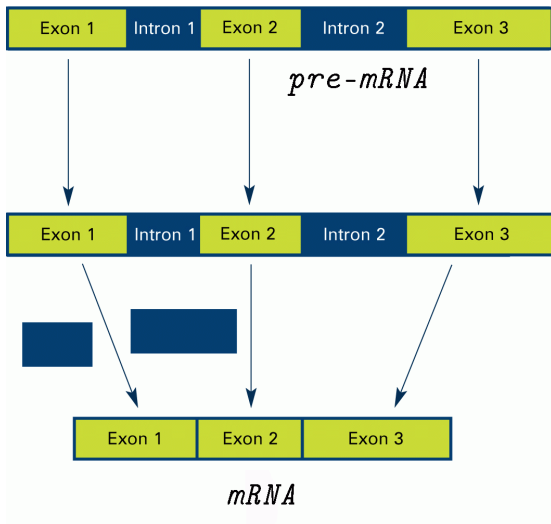


Introns

- Creating a nucleus run the cascade of consequences. First of all, cell now may keep much more DNA
- Some of this DNA may now contain insertions—**introns** which are removed before mRNA go through the nuclear pore
- Introns increase the variability of DNA and allow to make many variants of proteins



Introns and exons



Only archebacteria and eukaryotes have introns



Linear DNA

- Big circular (as opposed to small circles) molecules of DNA are harder to keep, difficult to enlarge and slower to duplicate
- Eukaryotes changed circular DNA into linear
- Every linear DNA molecule is “I-chromosome”



Telomerase and aging

- Unfortunately, replication of linear DNA has a problem: with every replication, the very end of DNA molecule *is not replicated*
- **Telomerase** adds some nonsense DNA to the telomere and thus prevent the shortening of DNA molecule
- Unfortunately, sometimes telomerase is not working well and DNA was cut... This is one of main reasons of **aging**



Summary

- Introns, linear DNA molecules and telomere/telomerase system differ eukaryotes from most prokaryotes



For Further Reading



Introns.

<http://en.wikipedia.org/wiki/Intron>

