Start-up assessment

Total Questions: 20

Most Correct Answers: **#10**

Least Correct Answers: **#16**

1. The Review by Michael Levine was made available on Saturday, March 3, asking you to read it.
Please, express in "percent" your comprehension of the concepts exposed

Daniele

70%

Carina Cojocaru

95%

Lombardi, Danilo

70%

Francesca Luca

80%

Mammadli Valeh

80%

Ossola, Chiara

90%

Federica

70%

Vladimir Nosi

70%

Elena Doria

80%

Elisa Damo

70%

Luca

80%

Tasca, Laura

70%

Fabiola Varese

70%

Cecilia

80%

Alessia Fucini

70

Cecilia

80%

Lucia

70%

Elisa Bono

85%

Ivana

80%

Marta Forcella

85%

Cipollina, Giada

80%

Sciulli lelio

70

FRANCESCA CAVALLO

70%

Ele

80%

Carlo

70%

Basile Cristina

80%

Silvia Bianchi

80%

Alessia

80

2. What do you associate to the term "real-time" ?

Daniele

✓ PCR

Carina Cojocaru

✓ PCR

Lombardi, Danilo

✗ Real-time Pcr, or something measured/observed when the process is happening

Francesca Luca

✓ PCR

Mammadli Valeh

✓ PCR

Ossola, Chiara

✓ PCR

Federica

✗ q-PCR

Vladimir Nosi

✓ pcr

Elena Doria

✓ PCR

Elisa Damo

✗ to the PCR assay

Luca

✗ To something that can be followed while it is happening

Tasca, Laura

✓ PCR

Fabiola Varese

✓ PCR

Cecilia

✓ pcr

Alessia Fucini

✗ To have the result during the experiment

Cecilia

✓ PCR

Lucia

✓ PCR

Elisa Bono

✓ PCR

Ivana

✓ PCR

Marta Forcella

✓ PCR

Cipollina, Giada

✓ pcr

Sciulli lelio

✓ PCR

FRANCESCA CAVALLO

✓ PCR

Ele

✓ PCR

Carlo

✓ PCR

Basile Cristina

✗ I associate it to techniques which results can be analysed when the experiment is still going on.

Silvia Bianchi

✓ Pcr

Alessia

✓ PCR

3. A miRNA is a synthetic molecule that scientists use to silence genes

10/29 A True

18/29 B False

4. How many protein-coding genes are there in the Human Genome ?

0/29	A	50,000
0/29	B	5,000
3/29	C	2,000
24/29	D	20,000
1/29	E	220,000
0/29	F	500,000
0/29	G	500

5. How many genes that do not encode for proteins are there in the Human Genome?

1/29	A	More or less one thousand
3/29	B	More or less ten thousand
3/29	C	Up to one million
10/29	D	Not yet defined but at least 20 thousand
0/29	E	Quite few: we know only the rRNA, tRNA and other small RNA genes
11/29	F	Not yet defined but at least 200 thousand

6. What does the Sanger sequencing method allow researchers?

17/29	A	Sequencing small DNA fragments if cloned
6/29	B	Sequencing DNA fragments of theoretically unlimited length, provided they are cloned
4/29	C	Sequencing small DNA fragments also in complex mixtures
1/29	D	Sequencing unlimited length DNA also in complex mixtures

7. What are DNA microarray mostly used for ?

26/29	A	Assessing the expression of genes genome-wide.
1/29	B	Measuring the levels of histone modification genome-wide
1/29	C	Re-sequencing a known Genome in new individuals
0/29	D	Evaluating the different post-translational modifications that proteins may undergo

8. The commonly used NGS technologies show the following features:

10/29 (A) No need of cloning and isolating fragments

4/29 (B) The uninterrupted sequence of very long stretches of DNA can be obtained

19/29 (C) very high throughput (in the order of hundreds million reads in parallel)

4/29 (D) Different samples can me mixed before sequencing thanks to zipcodes

2/29 (E) RNA is commonly sequenced without converting it to cDNA

9. Do Human genes undergo alternative splicing ?

1/29 (A) It is a quite limited phenomenon and may concern only 3-5% of human genes

15/29 (B) It is a common phenomenon, virtually all exons can be included or not in the final mRNA

11/29 (C) It concerns up to 95% of human genes but limitedly to few exons per gene

1/29 (D) It is a unusual phenomenon that is seen only in Fungi and some primitive Plants.

10. siRNA means:

26/29 (A) short interfering RNA

0/29 (B) small intergenic RNA

0/29 (C) synthetic interfering RNA

2/29 (D) silencing intermediate of RNA

11. What is a Mammalian Expression Vector ?

Daniele

Plasmid

Carina Cojocaru

virus

Lombardi, Danilo

A vector that could be used to express a gene inside a mammalian model

Francesca Luca

plasmid

Mammadli Valeh

An expression vector is usually a plasmid or virus designed for gene expression in cells.

Ossola, Chiara

It is a plasmid that allows the expression of a construct in mammalian cells.

Federica

plasmid

Vladimir Nosi

a vector used to express an exogenous protein in a mammalian enviroment.

Elena Doria

virus

Elisa Damo

Iit is a circular strand (plasmid) of cDNA that it is used to express a gene in the mammalian genome.

Luca

pGEX

Tasca, Laura

An expression vector that works in mammals (therefore contains all the sequences required for the expression in a mammal models such as promoter, introns ecc)

Fabiola Varese

It is a vector used for expression of proteins in mammalian cells, with specific eukaryotic promoter and polyA sequence following the gene.

Cecilia

a sequence of Dna that we can insert into mammalian cells to express proteins

Alessia Fucini

Plasmid

Cecilia

It is an expression vector (generally a plasmid) that presents promoters and regulative sequences that can be recognized by mammalian proteins.

Lucia

It is a plasmid used for the expression of mammalian proteins in bacteria

Elisa Bono

Plasmid

Ivana

plasmid

Marta Forcella

a plasmid

Cipollina, Giada

a virus

Sciulli Ielio

Is a vector used to express genes in mammalian cells

FRANCESCA CAVALLO

it is a structure in which it is possible to include a specific mammalian sequence. they are in general plasmid or viruses so that iti is possible to induce their exression in the different organisms.

Ele

plasmid

Carlo

yeast

Basile Cristina

It's a plasid that can expresses genes in mammals.

Silvia Bianchi

Vector

Alessia

pcDNA3.1

12. The ENSEMBL database contains all the sequences of genes and transcripts of almost all the organisms sequenced and can be accessed in a completely free manner

24/29 (A) True

4/29 (B) False

13. Which of the following terms is a method to evaluate the genes that are differentially expressed in a clinical or experimental setting ?

13/29 (A) PCA

7/29 (B) Chi-square

1/29 (C) Hallen-Birckman

4/29 (D) Poisson

3/29 (E) Bonferroni

14. What does the term Polycomb tell you ?

23/29 (A) An epigenetic repressor protein complex

1/29 (B) A Drosophila mutant with aberrant phenotype

1/29 (C) An instrument to set electophoretic gels

3/29 (D) Never heard

15. To what does the term "Bicoid" associate in your mind ?

26/29 (A) Morphogen gradients in Drosophila embryo

1/29 (B) A signal transducer with double specificity

0/29 (C) An alternative splicing phenomenon of a developmentally important gene in Drosophila

1/29 (D) Never heard

16. Have you ever heard the term "chromosomal territory" ?

12/29 (A) Yes

14/29 (B) No

2/29 (C) can't say

17. What is the ChIP-seq technique for?

5/29 (A) Mapping proteins that interact with DNA

20/29 (B) Mapping genomic DNA sequences that interact with a given protein

0/29 (C) Resolving accessible regions of chromatin

1/29 (D) Mapping methylated CpG in the genome

2/29 (E) Obtaining pieces of chromatin that are nucleosome-free

18. Give a short definition of "Mediator"

Daniele

Multifactorial complex that allow interaction between enhancers and promoters

Carina Cojocaru

complex which mediated the interaction between enhancer and promoter

Lombardi, Danilo

Protein complex that interacts with TFs and promoters

Francesca Luca

complex allowing the contact between enhancer and promoter

Mammadli Valeh

mediator is a protein subunit complex that mediates interacion from enhancer to promoter

Ossola, Chiara

Mediator is a big protein complex that mediates the interaction between enhancers and promoters.

Federica

multisubunit complex mediating interaction of factors between enhancer and promoter

Vladimir Nosi

a complex that mediates interaction between promoter and enhancer

Elena Doria

complex that interact with enhancer and promoter

Elisa Damo

It is a protein that is able to make in contact the distal enhancers with the promoters

Luca

A protein able to mediate the interaction berween enhancers annd promoters

Tasca, Laura

The mediator is a protein that acts a bridge between different proteins belonging to the trascription machinery, such as the TF bound to a enhancer and the PIC complex, creating a sort of loop and indirectly connecting distal regions of DNA

Fabiola Varese

Multisubunit complex making interaction between promoter and enhancer possible.

Cecilia

multienzymatic complex that mediates the interaction of TF and enhancer with RNA pol

Alessia Fucini

Protein complex that interacts with Transcription Factors between promoters and enhancers

Cecilia

The Mediator is a protein complex that connect the PIC complex positioned on the promoter region with Transcription factors present on cognate enhancers.

Lucia

A complex of proteins that mediates the interaction between enhancers and protmoters

Elisa Bono

Large protein complex that mediates the interaction between enhancer and promoter

Ivana

The mediator is the complex that mediates the interaction between enhancer and promoter.

Marta Forcella

The mediator is a multisubunit complex that mediates interaction between PIC and transcription factors at enhancers

Cipollina, Giada

The mediator is a protein complex that is able to allow the interaction between an enhancer and its target promoter.

Sciulli Ielio

Is a complex which mediates interaction between enhancer and promoter

FRANCESCA CAVALLO

it is a structure that is able to mediate the interaction between the enhancer and promoter of a gene

Ele

co acrivator that mediates the association of enhanvers to promoters

Carlo

multisubunit complex which links promoter and enhancer

Basile Cristina

It'a bog complex that can have different conformations accprdingo to the transcription factor it's associated with. It mediates the enhancer/promoter interaction.

Silvia Bianchi

Complex which mediates interaction with enhancer and promoter

19. In your Textbook G (Levine 2014) in Figure 1C there is a scheme of the HoxD cluster. What are Hox clusters ?

25/29 A Loci encoding important master regulators for embryonic development

0/29 B Loci encoding several enzymes related to the oxidative pathway

2/29 C A cluster of regulatory regions

0/29 D A cluster of elements binding cohesin complexes in chromatid pairing

20. In the same figure 1C, "C-DOM" and "T-DOM" flank the HoxD cluster. Give a short explanation of what C-DOM and T-DOM are.

Daniele

They are enhancers: c-dom is for hand formation and t- dom is for arm formation

Carina Cojocaru

C-dom regulate digits and hands formation
t-dom regulate forearm formation

Lombardi, Danilo

Domains at C or N terminal

Francesca Luca

regulatory regions with enhancers

Mammadli Valeh

T-DOM - telomeric TAD
C-DOM - centromeric TAD
TAD-Topologically Associating Domains

Ossola, Chiara

They are super enhancers that control the expression of HoxD in different conditions.

Federica

are clusters of enhancers regulating the same gene, HoxD. all together are present in the same TAD

Vladimir Nosi

they are 2 TADs, domains of enhancers regulating different regions of the body

Elena Doria

they are domini that contai ehancers

Elisa Damo

C-DOM e T-DOM are telomeric TAD that regulate the Hoxd genes. T-DOM regulates the developing of arm and forearm. the C-ODM regulates the expression in the hand and the digits.

Luca

They are enhancers able to modulate the expression of HoxD in different times of the development.

Tasca, Laura

These two regions are two TADs, the telomeric TAD (T-DOM, that regulates linked Hoxd genes in the developing arm and forearm), and the centromeric TAD (C-DOM, that regulates expression in the hand and the digits)

Fabiola Varese

They are TADs containing enhancers activated in different phases (early and late) of development and regulating the expression of Hoxd cluster.

Cecilia

they are domains that contain different enhancers

Alessia Fucini

Group of enhancers

Cecilia

C-DOM (centromeric TAD) and T-DOM (telomeric TAD) are two regulatory regions controlling the expression of HoxD. Generally, each gene is comprehended inside a single regulatory region, but this gene is located between two regions to consent differential regulation of its expression in the proximal and distal part of limbs.

Lucia

domains that regulate the expression of HoxD gene, on the left and on the right respectively.

Elisa Bono

They are topological associated domains, one centrometic (C-DOM) and one telomeric (T-DOM). C-DOM regulates Hoxd genes in hands and digits while T-DOM in arm and forearm

Ivana

They are series of flanking enhancers, located before and after the HoxD gene. T-DOM are telomeric enhancer that regulate the develop of
arm and forearm, whereas the centromeric C-DOM regulates expression in the hand and the digits.

Marta Forcella

Two different regulatory regions for the regulation of Hoxd genes

Cipollina, Giada

c-dom: centromeric
t-dom: telomeric

Sciulli lelio

C-Dom and T-dom are specific domains of the gene activated in different time

FRANCESCA CAVALLO

they are telomeric TAD that regulating HoxD genes. T-DOM regulates linked HoxD genes in developing arm and forearm, while C-DOM regulates the expression of hand and digits

Ele

chromosoaml domains in which interagtion gene- lenhanvers is possible

Carlo

they are regulatory regions of the HoxD cluster

Basile Cristina

They're super enhancers.

Silvia Bianchi

Domains that contains several enhancers