

(2 20)

1. (differentiation)
2. (parallel evolution)
3. (gastrovascular cavity)
4. (cnidarians)
5. (dermo-muscular sac)
6. (pseudocoel)
7. (syncytium)
8. (population)
9. (blood sinus)
10. (schizogony)

1 20

1 (E·Haeckel)

2

3

4

5

6

2

7

(6 30)

1 ?

2 ?

3

4

5

(10 30)

1

2 “ ” “ ”

3

(2 20)

1. Nieuwkoop center
2. mosaic development
3. epigenetic information
4. hypoblast
5. monospermy
6. leydig cell
7. embryonic induction
8. morphogenetic determinant
9. endomitosis
10. interkinesis

(10 40)

- 1
- 2 (gastrulation)
- 3 (Preformationism Theory) (Epigenesis Theory)

4

(20 40)

1

3

2

$3 \times 10 = 30$

1

2

3 PM2.5

4

5

6 LC50

7 A/A/0

8

9

10

$5 \times 8 = 40$

1

2

3

4

5

$2 \times 15 = 30$

1

2

“ ”

(1 2 30

)

- 1.
2. $r-K$
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

(10 40)

1. $K=150000$ $r=0.053$ / /
MSY /
- 2.
3. grazing food chain detrital food chain
food web
4. biomass (production)

(15 30)

1. (biodiversity) (ecosystem functioning)
(ecosystem properties) (ecosystem goods)
(ecosystem services)
- 2.

(2 16)

- 1 Innate immunity
- 2 Apoptosis
- 3 Induced pluripotent stem cell
- 4 Metastasis
- 5 Necrosis
- 6 Epigenetics
- 7 Protein methylation
- 8 Tumor suppressor

(6 54)

- 1 CRISPR/Cas9
- 2
- 3 TGF-beta
- 4 DNA
- 5
- 6
- 7 PI3K/Akt
- 8 ChIP .
- 9 Hypoxia

(30 30)

- 1 a novel gene

3 24

- 1.
- 2.

- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

2 28

1. POPs
- 2.
- 3.
- 4.

8 24

- 1.
- 2.
- 3.

2 12 24

- 1.
- 2.
- 3.

(2 20)

1. (Eukaryotic cell microbe)
2. (Protista)
3. (Infection)
4. (Strain)
5. (Contaminate)
6. (Vacuole)
7. (Bacterial lawn)
8. () (Haustorium)

9. (Edible mushrooms)

10. (Interferon)

(5 30)

1.

2. ?

3. ?

4.

5. ?

6. (5)

. (25 50)

1.

2. “ - - ”

(2 20)

1 maternal effect

2 (exon trapping)

3 gene amplification

4 shuttle vector

5 genotype frequency

6 banding pattern

7 epistatic effect

8 leaky mutation

9 reverse genetics

10. postgenomics

(10 40)

1

2 DNA PCR

DNA 1

- a) 2
 - b)
 - c) PCR
- 3 DNA
- 4

(20 40)

1 20

2 CRISPR/Cas9 Clustered regularly interspaced short palindromic repeats/CRISPR associated 9

20

- (2 20)
- 1 index of food selectivity
 - 2 Condition factor
 - 3 sex reversal
 - 4 spawning stock
 - 5 population fecundity
 - 6 floating eggs
 - 7 fish fauna
 - 8 instantaneous growth rate
 - 9 fillness index
 - 10. reproductive strategies

0.5 10

1

2

3.

4.

5. _____

6. _____

(6 30)

- 1.
- 2. daily ration ?
- 3. *Carassius auratus gibelio*
- 4.
- 5.

(20 40)

1

2

(2 30)

- 1
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.

1 10

- 1.
- 2.
- 3.
- 4.

5. D. XII I-13 13
(5 30)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

(migration) (movement)

(10 30)

- 1.
- 2.
- 3.

“ ”

20 10×2

- 1
- 2 PQ
- 3
- 4
- 5
- 6
- 7
- 8 G
- 9
- 10

10 10×1

- 1
- 2 pH _____ pH
- 3 _____ pH _____

4 **40** **5×8** _____

- 1
- 2
- 3
- 4
- 5

30 **3×10**

- 1
- 2
- 3

2