Keywords to study: blood group antigens, ABO and Rh incompatibility, histocompatibility, transplantation antigens, transplantation principles, transplantation immunity and tolerance, major histocompatibility complex HLA, HLA haplotype, graft versus host disease (GvHD), lessons from experimental immunogenetics: inbred and congenic strains of laboratory animals, syngeneic, allogeneic and xenogeneic transplantation.

Task 1.

Transplantation principles [rules].Two parental inbred strains (P1 and P2) [e.g. of mice] differing in alleles of one histocompatibility locus only.

Results of skin transplantation between P1, P2, F1 [P1 x P2], F2 hybrids are as follows:

Donor		Recipient
P1	**+** →	**P1**
P2	**+** →	**P2**
P1	- →	P2
P1	+ →	F1
P2	+ →	F1
F1	- →	P1
F1	- →	P2
F2	+ →	F1
P1or P2	+ (3/4), - (1/4) →	F2

\+ equals successful graft transplantation, graft is tolerated by recipients
\- equals graft rejection by recipients

According to above given results of skin transplantation explain:
a) genotypes of animals in P1, P2, F1 and F2 generations [for allele symbols use *a* and *b*]
.....
b) what is the genetic relationship of P1 and P2 generation?
.....
c) why are some skin grafts tolerated while the other rejected?
.....
d) explain ¾ tolerance of skin grafts from P1 or P2 on F2 recipients
.....

Worked out by: ..... Group:..... Checked by:.....

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Task 3.,pg.155

Graft versus host disease.

After self-education on pg.155 and 156 fill in following table.
Predict the results of the bone marrow transplantation. See following Table.
The hypothetical difference between bone marrow and recipient is the difference in alleles of one histocompatibility locus only [*a, b* alleles]. Fill in "+", when GvHD is expected and could kill the recipient. Fill in "–" when GvHD is not expected, or would not be lethal. Three types of bone marrow recipients are mentioned in the Table: adult, newborn, adult lethally irradiated.

Adult donors of lymphoid cells		Recipient		Graft versus host reaction (lethal effect)		
Donor	Genotype	Recipient	Genotype	Newborn	Adult	Adult - lethally irradiated
A	*aa*	A	*aa*	-	-	-
B	*bb*	B	*bb*			
A	*aa*	B	*bb*			
B	*bb*	A	*aa*			
F1(AxB)	*ab*	A	*aa*			
F1(AxB)	*ab*	B	*bb*			
A	*aa*	F1(AxB)	*ab*			
B	*bb*	F1(AxB)	*ab*			
F2(AxB)	*aa*	F1(AxB)	*ab*			
F2(AxB)	*ab*	F1(AxB)	*ab*			
F2(AxB)	*ba*	F1(AxB)	*ab*			
F2(AxB)	*bb*	F1(AxB)	*ab*			
A	*aa*	F2(AxB)	*aa*			
A	*aa*	F2(AxB)	*ba*			
A	*aa*	F2(AxB)	*ab*			
A	*aa*	F2(AxB)	*bb*			
B	*bb*	F2(AxB)	*aa*			
B	*bb*	F2(AxB)	*ab*			
B	*bb*	F2(AxB)	*ba*			
B	*bb*	F2(AxB)	*bb*			

Which of these consequences could be expected as a result of curative bone marrow transplantation in man and how could we avoid them or improve the course of GvHD?

……

Task 4.Virtual microscopy.

Lessons from experimental animals as a demonstration of transplantation rules.

VIew pg. 162 -164 for description of microscopic preparations.

Enter the database OlyVIA
Database: BIOLOGIE_GENETIKA
Name: biol_student
Password: student
Database:
Demonstrace transplantačních zákonů **.Demonstration of transplantation principles. 17-22**
17-18b skin
19-20 tumor
21-22 kidney

Task 5.

Rh system genetics repetition

a) Could Rh^- mother and Rh^+ man have Rh^- child?.....
b) Could both Rh^+ parents have Rh^- children?.....

Task 6.

Rh and ABO incompatibility in pregnancy.

Erythroblastosis fetalis because of incompatibility between child and mother in Rh antigens could be seen more often when father is e.g. 0 and mother AB in ABO system and less often when father is e.g. AB and mother 0. Why?

.....

Task 7.

Calculation of allele segregation in ABO and Rh systems.

Give the number and type of gametes of men with blood groups A and Rh^+, whose parents carry AB, Rh^- and 0, Rh^+ blood group antigens.

.....

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