

Open field behaviour and habituation in mice irradiated

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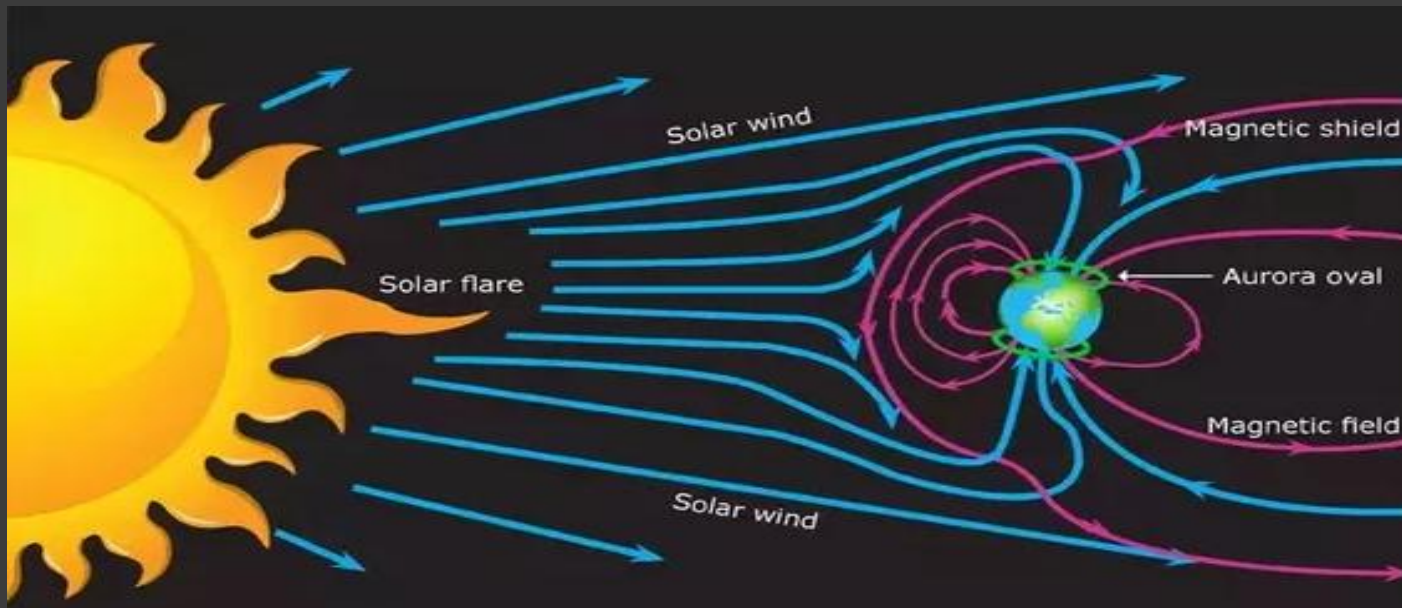
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JOINT INSTITUTE
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Problem of the cosmic radiation

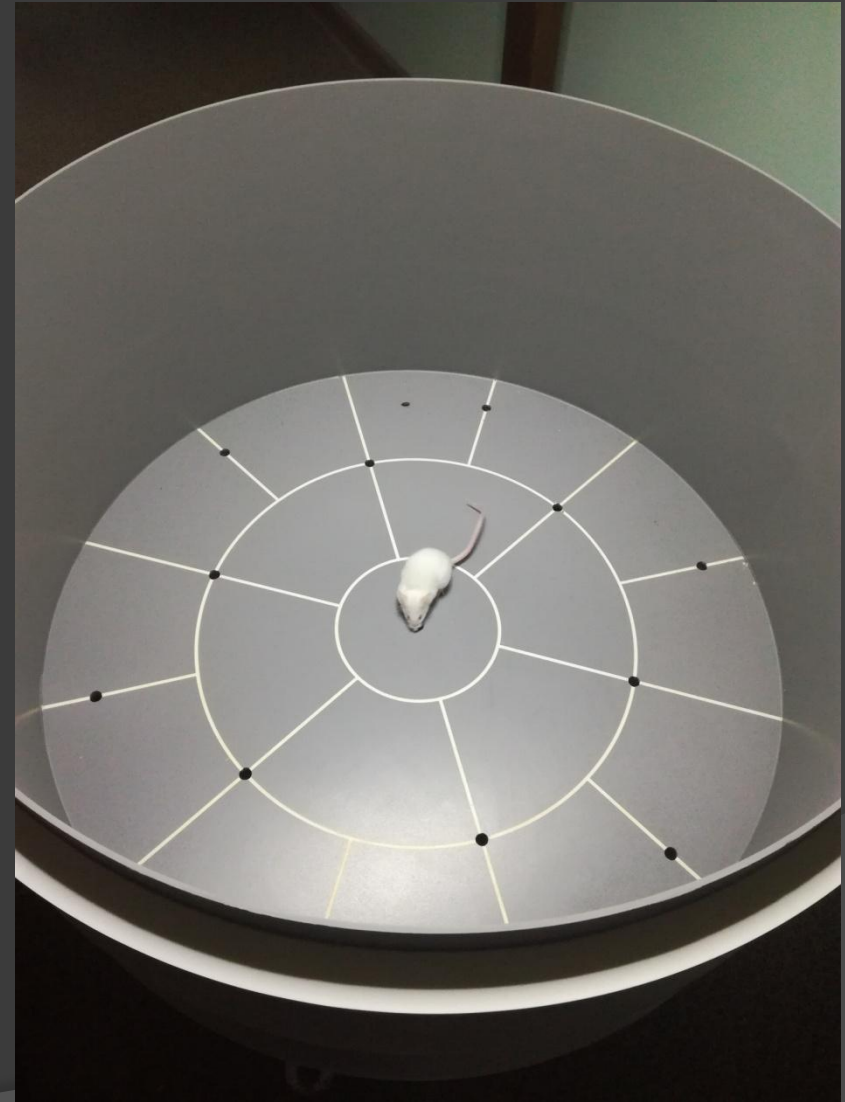
- ⦿ Solar wind
- ⦿ Influence on brain of organisms and their behaviour
- ⦿ Implementation of results into the cosmic programs (safety of astronauts)



(1)

Open field test

- Circular field surrounded by wall
- Holes, divided into sectors by grid
- 3 minutes period
- Line crossing
 - Center square
 - Rearing
 - Hole exploring
 - Grooming
 - Defecation, urination

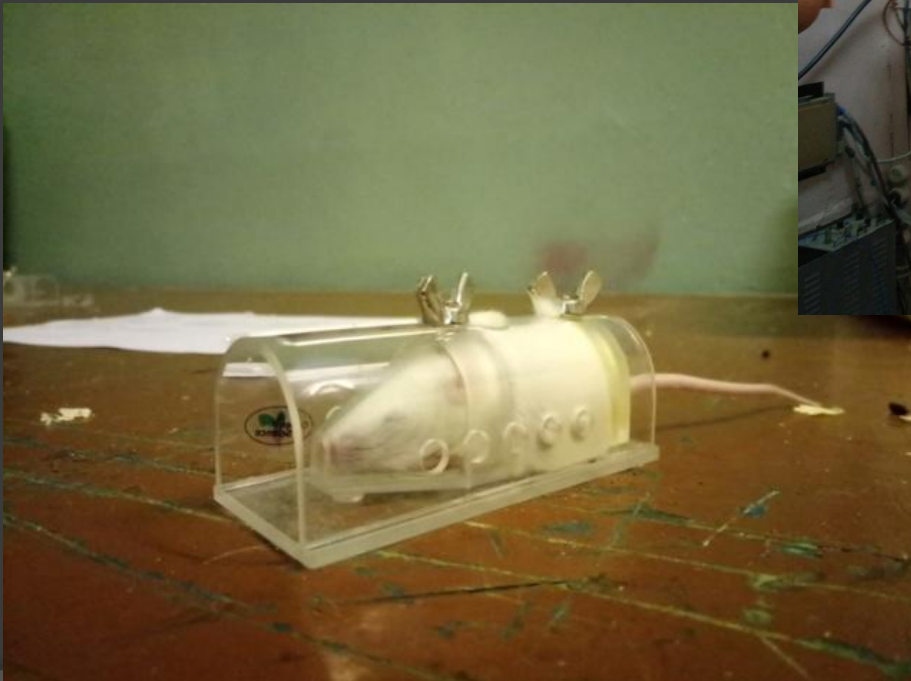


Open field test



Irradiation of mice

- Proton beam (70 MeV)
- Dose: 5 Gy
- Dose rate: 1 Gy/min



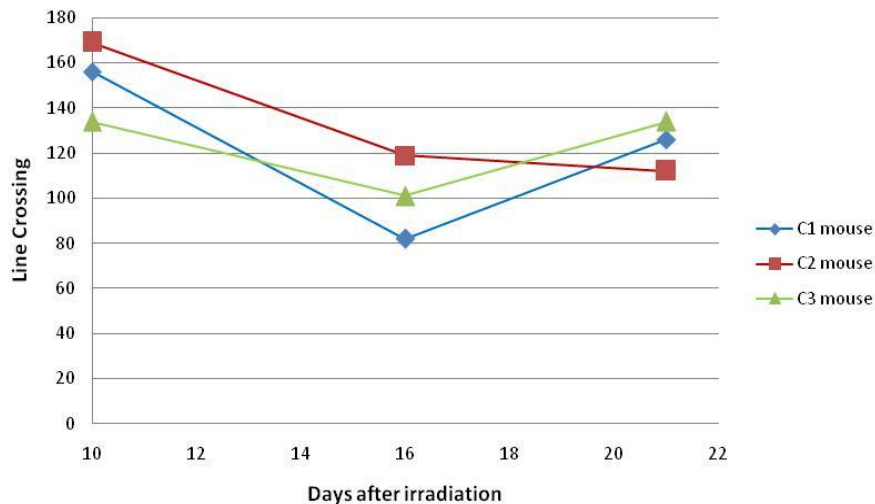
Results

Table 1: Data acquired from the open field tests

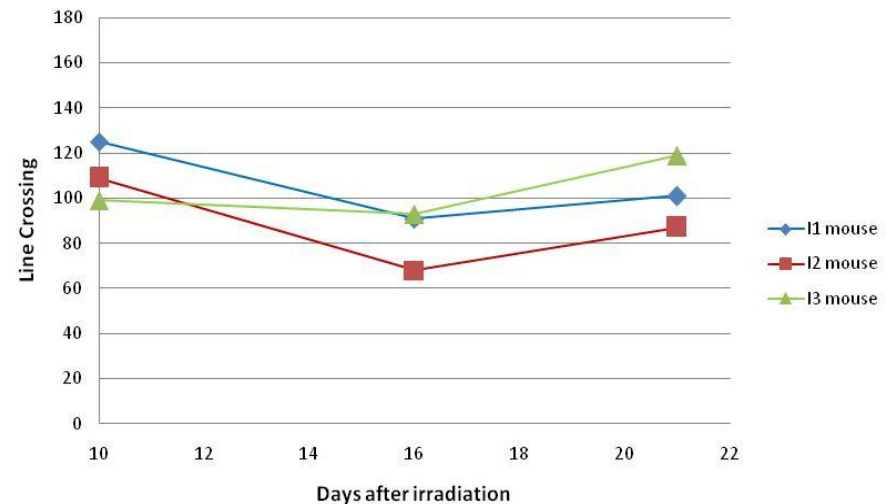
| Group | Parameters (average value) | Days after irradiation | | |
|------------------------------------|-------------------------------|------------------------|---------------------|---------------------|
| | | 10 | 16 | 21 |
| Control | Line crossing | 153,0 ± 43,9 | 100,7 ± 46,0 | 124,0 ± 27,7 |
| | Center | 8,3 ± 3,8 | 3,3 ± 2,9 | 8,0 ± 2,5 |
| | Rearing | 19,0 ± 15,1 | 7,0 ± 2,5 | 21,0 ± 7,5 |
| | Holes | 6,0 ± 6,6 | 12,3 ± 13,7 | 7,3 ± 13,7 |
| | Grooming | 1,0 ± 2,5 | 1,7 ± 2,9 | 0,7 ± 1,4 |
| | Defecation/urination | 2,6 ± 5,2 | 2,7 ± 3,8 | 2,0 ± 2,5 |
| Proton beam 70 MeV, Dose - 5 Gy | Line crossing | 111 ± 32,6 | 84,0 ± 34,5 | 102,3 ± 39,9 |
| | Center | 3,3 ± 3,8 | 1,7 ± 2,9 | 4,0 ± 6,6 |
| | Rearing | 8,3 ± 12,3 | 6,0 ± 14,9 | 13,7 ± 16,5 |
| | Holes | 10,3 ± 2,9 | 13,0 ± 6,6 | 15,7 ± 13,7 |
| | Grooming | 2,0 ± 2,5 | 2,3 ± 2,9 | 1,0 ± 2,5 |
| | Defecation/urination | 1,7 ± 3,8 | 4,0 ± 2,5 | 2,7 ± 1,4 |

Results

Individual dynamics of locomotor activity
(Control group)



Individual dynamics of locomotor activity
(Irradiated group)



Charts 1, 2: Locomotor activity development for individual mice from both irradiated and non-irradiated group

Results

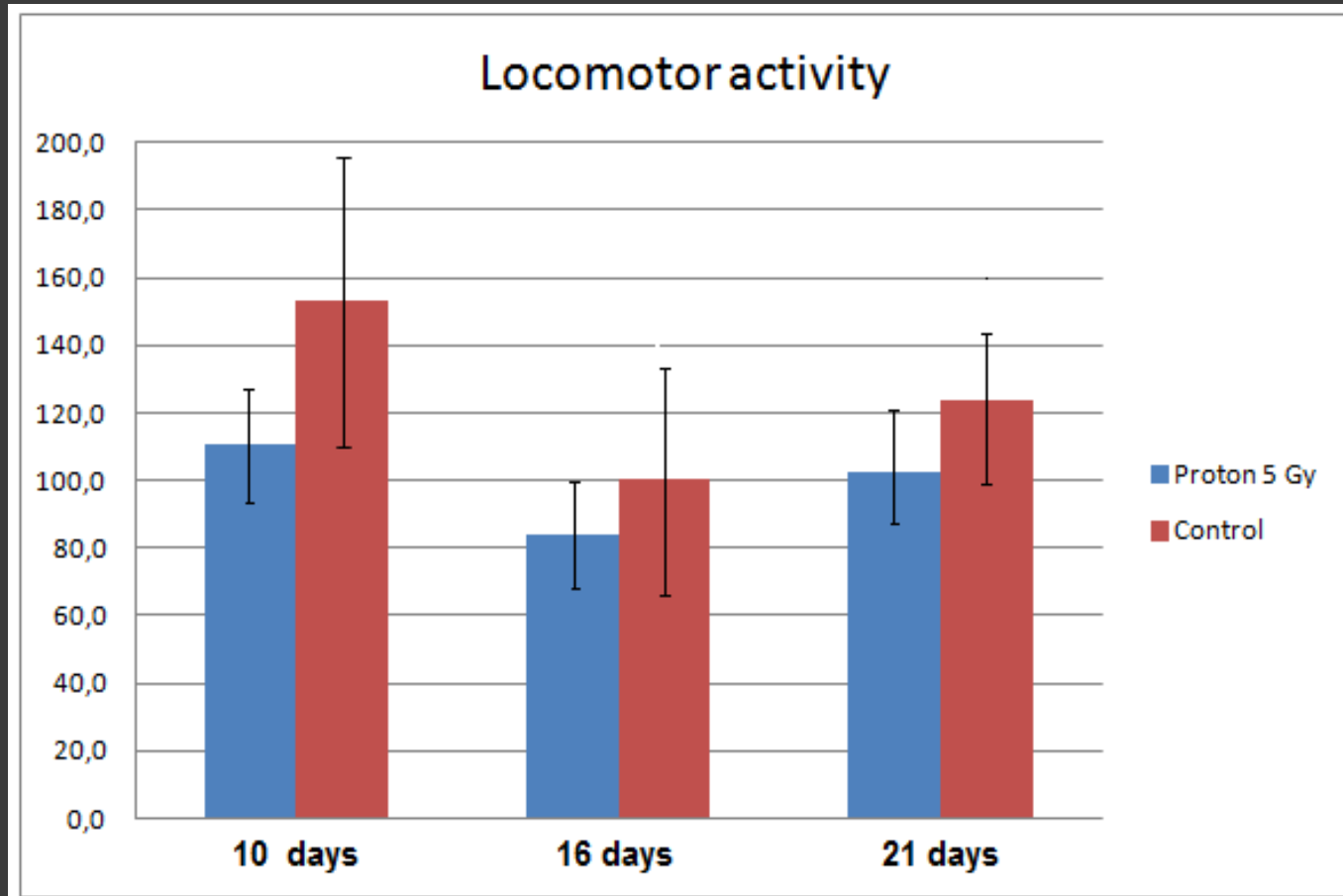


Chart 3: Comparison of average locomotor activity for irradiated and non-irradiated mice

Results

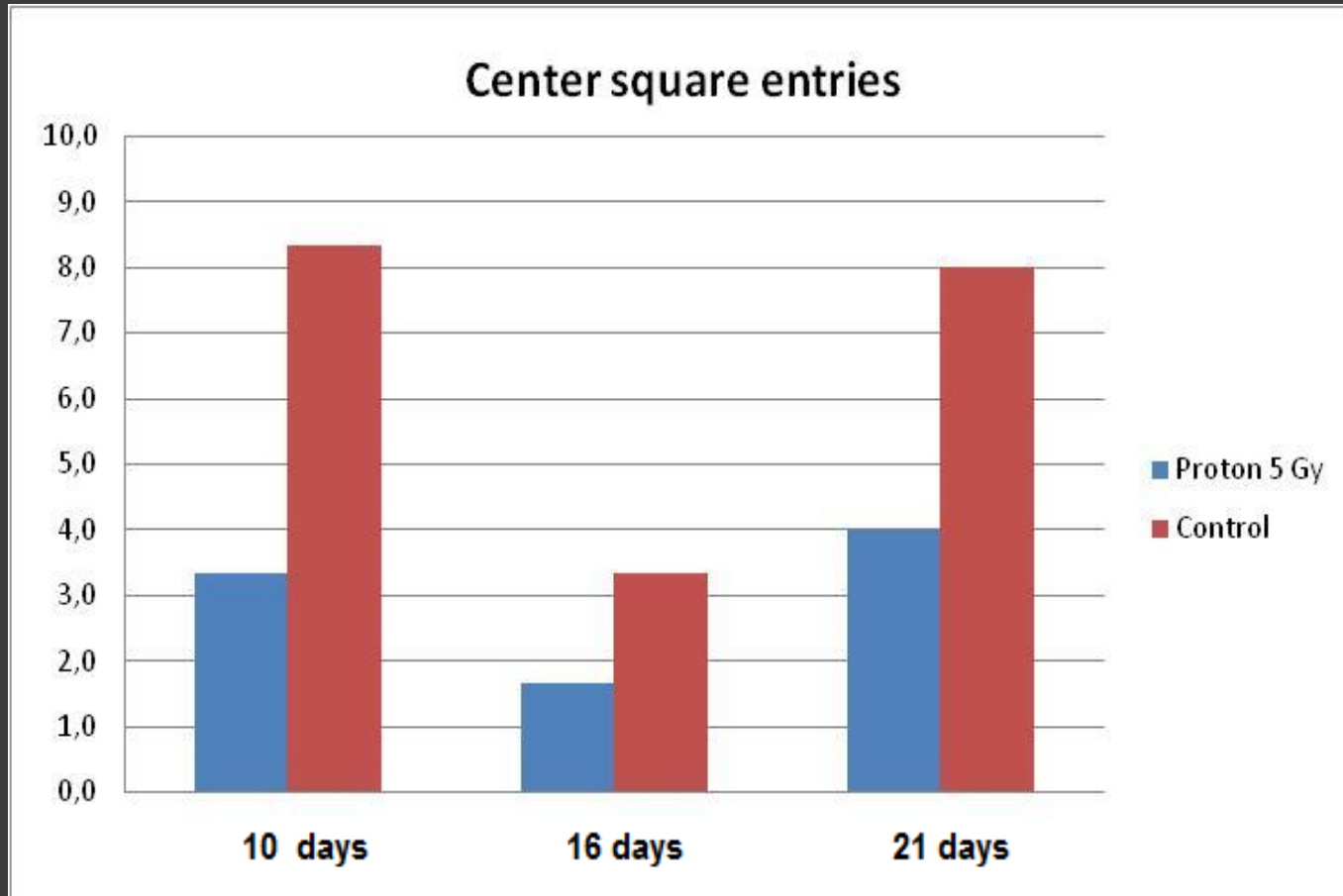


Chart 4: Comparison of average center square entries values for irradiated and non-irradiated mice

Results

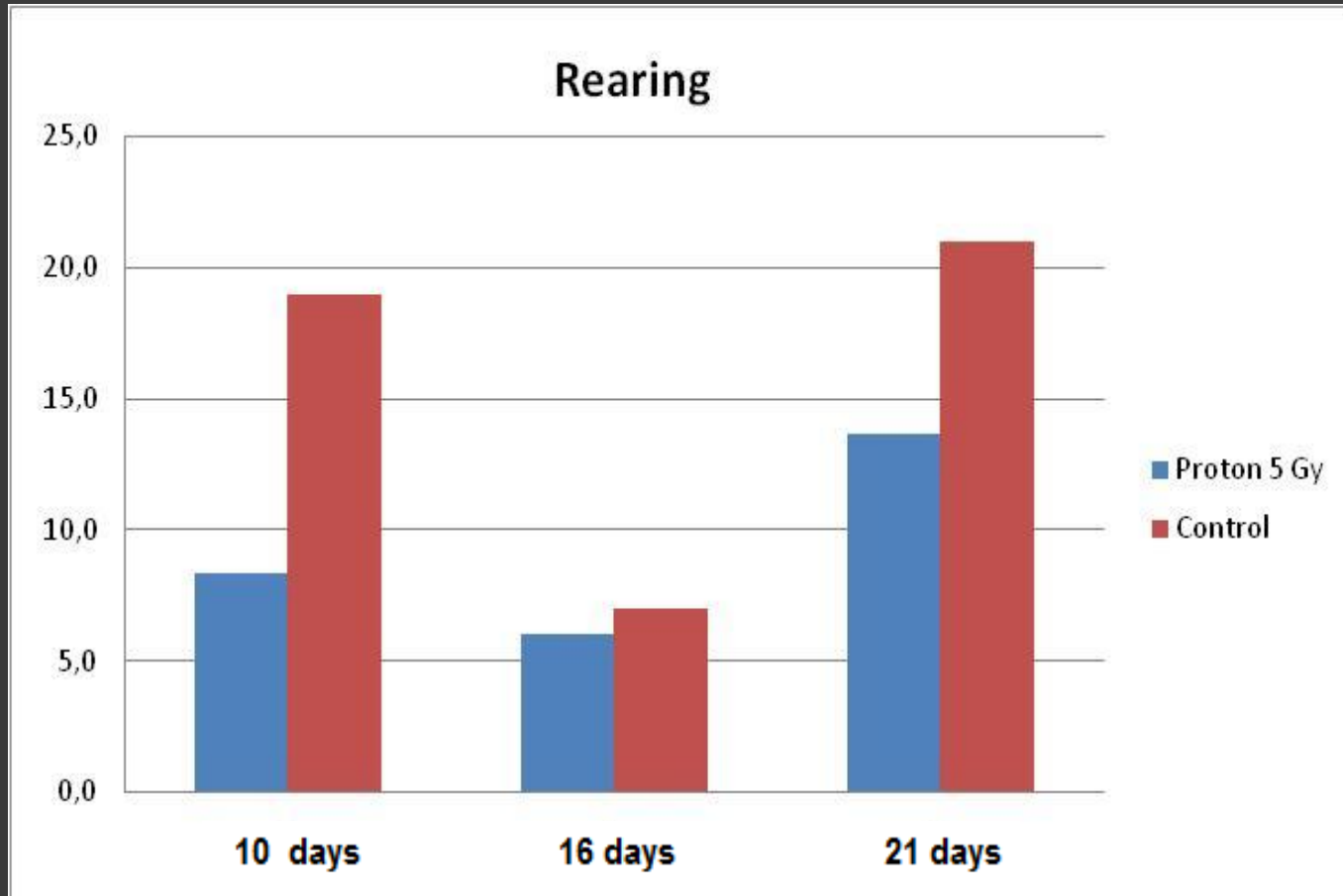


Chart 5: Comparison of average rearing values for irradiated and non-irradiated mice

Conclusions

- ① Influence of irradiation caused by protons on mice's locomotor activity and behaviour can be observed
- ① Activity of control animals tends to be higher in comparison to irradiated ones
- ① Irradiated animals show increased level of anxiety

Thank you for attention



Resources

- ① (1)

University of Waikato, 2014, www.sciencelearn.org.nz