**Behavioral characterization of the Fmr1-KO mouse model of Autism Spectrum Disorder**

Shirin Sharghi1,2, Magdalena Daurer1, Stefanie Flunkert1, Boris Philippe Chagnaud2, Marcello Leopoldo3, Enza Lacivita4 and Birgit Hutter-Paier1

1Department of Neuropsycharmacology, QPS Austria GmbH, Gröbming, Austria; 2Institute of Biology, Karl-Franzens-University of Graz, Graz, Austria;
3Department of Pharmacy, Drug Sciences, University of Bari, Bari, Italy

**BACKGROUND**

Fragile X syndrome is known as a monogenic cause of Autism Spectrum Disorder (ASD) and one of the most common inherited forms of intellectual disability. The Fmr1 Knock-Out (KO) mouse model is a fundamental tool to study ASD and to assess the efficacy of pharmacological compounds ameliorating ASD-like behavior. The aim of the current study was to behaviorally characterize and compare the Fmr1-KO mouse model with C57BL/6JRj (control) animals. Additionally, the effect of a serotonergic compound (LP-211) and the widely used GABAergic drug R-Baclofen was tested in Fmr1-KO mice.

**RESULTS**

The Open Field test revealed significantly higher activity, hyperactivity and distance moved in Fmr1-KO-vehicle-treated mice compared to C57BL/6JRj animals. However, the LP-211 and R-Baclofen treatment did not significantly affect those parameters.

The Grooming test showed significantly higher grooming episodes and duration in Fmr1-KO-vehicle-treated mice compared to C57BL/6JRj animals. R-Baclofen treatment resulted in a significant reduction of these parameters in Fmr1-KO mice.

Three Chamber Social Interaction test was performed in three phases of habituation, approach, and novelty (data from approach and novelty phases are presented here). In the approach phase, impaired social interaction and interest of Fmr1-KO-vehicle-treated animals compared to the control C57BL/6JRj group were detected (Figure 4 A-B). However, in Fmr1-KO mice, the LP-211 treated-Fmr1-KO mice showed a higher interest to a novel mouse in the novelty phase (Figure 4 C-D).

**CONCLUSION**

Increased activity, hyperactivity, and repetitive behavior, as well as decreased social interaction and impaired social communication, were observed in Fmr1-KO-vehicle-treated animals. R-Baclofen treatment could alleviate repetitive behavior of grooming in Fmr1-KO mice. In conclusion, these data propose that the Fmr1-KO mouse model can serve as a useful tool to investigate some core and secondary symptoms of ASD. Therefore, the Fmr1-KO strain could be used to design novel therapeutic approaches as an ultimate goal.