



Abstract

Intrinsic and Extrinsic Factors in the Bizarre Patterns Elicited in the Open-Field Test in Male and Female Mice with Normal and AD-Pathological Aging under Social or Isolated Housing Conditions [†]

Lydia Giménez-Llort ^{1,2,*}  and Miguel Llauradó-Sánchez ^{1,2}

¹ Institut de Neurociències, Universitat Autònoma de Barcelona, 08193 Barcelona, Spain

² Department of Psychiatry and Forensic Medicine, School of Medicine, Universitat Autònoma de Barcelona, 08193 Barcelona, Spain

* Correspondence: lidia.gimenez@uab.cat

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Abstract: Bizarre behaviors (BB) are elicited in animals during stressful conditions and represent behavioral markers of disease/sickness relevant to animal welfare. These behaviors are disregarded in most experimental screenings due to their low incidence and short duration, despite their translational value mimicking disruptive behaviors associated with neurological/psychiatric diseases. However, we previously reported experimental conditions with conspicuous BB incidence: (1) 3xTg-AD mice for Alzheimer's disease vs. wild-types; (2) the open-field test (OF) vs. other tests; (3) +6 months of age; (4) female sex; (5) older age (+13 months) male 3xTg-AD mice also exhibit more circling behavior (BB-CB) than control mice; (6) early neonatal handling reduces BB; whereas (7) BB are enhanced by d-galactose-induced accelerated aging. In the present work, we studied the BB patterns elicited in the OF using a longitudinal design with sixty-six 13-month-old male/female mice with normal/AD-pathological aging under social/isolated housing conditions, and aimed to explore the effects of intrinsic (genotype, sex) and extrinsic (environment) factors (n = 7–8/group). BB were recorded in 39% of animals. Sex, re-testing at an older age, and genotype factors differentiated two BB patterns: higher circling behavior (BB-CB, n = 12) in wild-types and males, but higher backward movements (BB-BM, n = 14) in 3xTg-AD, female, and older age mice. Isolation increased the incidence of freezing, mostly in 3xTg-AD mice, and exerted a modulatory role in BB, but interaction effects with other factors led to a residual significance. The results point to BB-BM as the most pervasive BB pattern in this animal model, which is also sensitive to the progress of aging/disease.

Keywords: bizarre behaviors; animal welfare; Alzheimer's disease; aging; social isolation; gender perspective

Supplementary Materials: The presentation material of this work is available online at <https://www.mdpi.com/article/10.3390/IECBS2022-13506/s1>.

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