Lack of consistent differences between female and male mice during place navigation in the water-maze

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The water-maze place navigation task is one of most frequently used paradigms to assess cognitive function in mice. Many studies use only male subjects because female mice are thought to perform more poorly and to be more variable due their estrous cycle. That experimental manipulations of the hormonal status affect water-maze performance has been documented in several studies, but systematic gender comparisons under routine laboratory conditions are missing. During the period 1987-2005, we have been using the same standardized place navigation protocol and have tested 218 experimental groups that contained both female and male mice (total 4891 mice, median group size 19). In our routine procedures female subjects are tested regardless of their cycle state. Experimental animals are housed in the same room which favors synchronization. Retrospective comparison of female and male performance levels in this data set confirms a small but significant trend with male mice performing overall slightly better than females, both during training and in probe trials. However, this trend accounts for only about 1% of the variability in the data with gender differences remaining unpredictable at the level of the single study. Systematic comparison of variances in female and male subgroups does not reveal consistent differences. Overall, probe trial scores tend even to be less variable in females than in males. Taken together, these data indicate that female and male mice are equally suitable test subjects for place-navigation tasks in the water-maze. When phenotyping mutant mice it is thus advisable to test animals of both sexes which permits to catch gender-dependent mutation effects.