The characteristics of Hatano high- and low-avoidance rats as a model for developmental disorder

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The inbred strain of Hatano high- and low-avoidance animal (HAA and LAA) derived from Sprague-Dawley rats were originally selected and bred on the basis of the performance in shuttle-box task. Previous studies have demonstrated that Hatano rats can be an excellent model for developmental disorder (DD). In this study, their behavioral characteristics associated with DD, such as anxiety and learning performance were investigated as well as genetic contribution by cross-fostering.

Male pups of straight lines and cross-fostered between HAA and LAA dams were subjected to following tests; open field test (OFT), elevated plus maze (EPM), and passive avoidance test (PAT). In OFT and EPM, HAA showed greater anxiety-like behavior than LAA, and this strain differences observed in anxiety-like behavior was attenuated by cross-fostering. In PAT, HAA showed higher performance than LAA, and cross-fostering did not effect on the result.

These results indicated that HAA has anxiety-like characteristics as compared with LAA, and it can be changeable by maternal care. On the other hand, LAA has learning disorder as compared with HAA, and it is strongly contributed by genetic factors. Thus, it was also suggested that the Hatano rats are a useful animal model for the studies on DD.