A new novel object recognition task based on stationary and moving 2D shapes applied to mice and zebrafish.

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Selective attention can be assessed in rodents with the novel object recognition (NOR) test (1). In the standard version of this test, the selection of objects to be used is critical. To overcome the limitation of NOR, we firstly created a modified version of NOR, the virtual object recognition test (VORT) in mice where 3D objects were replaced with stationary geometrical 2D shapes and presented on two Ipod 3.5-inch widescreen displays (2). A comparable discrimination index as NOR was shown in VORT. Notably, we identified some 2D shapes that could be highly discriminated and some which could not. Mice were also able to distinguish among different movements (horizontal , vertical, oblique).The shapes previously found not distinguishable when stationary were better discriminated when moving.

Secondly, we focused our attention on zebrafish, a teleost fish, belonging to *Cyprinidae.* which have a good capability to learn (3). Based on this capability and because no data are available about the object recognition test on zebrafish, our aim was to investigate, in VORT, if the fish were able to discriminate different geometrical 2D shapes (circle, square or triangle), when presented on two Ipod-screens, placed at the sides of a water tank. To evaluate the possibility that moving 2D shapes increased the attention of zebrafish, specific movements (vertical, horizontal or oblique) were applied to the same geometrical shapes. We found that zebrafish, like mice, were able to discriminate different geometrical 2D shapes both stationary and different movements. The discrimination index of shapes, previously not discriminated, increased when they were moving.

Finally, we investigated if memory performance could be improved by treatment with nicotine (0.1 mg/kg ip for mice and 0.02 mg/kg for zebrafish) or worsened by scopolamine (0.25 mg/kg for mice and 0.025 mg/kg for zebra fish) or by mecamylamine (1 mg/kg). Nicotine improved discrimination index for stationary shapes previously not. Anticholinergic drugs impaired episodic memory in both species.

Taken togheter, these findings indicate that VORT, based on virtual 2D stationary shapes, gives a rapid information on attentional memory. The introduction of motion is a strong cue that makes the task more valuable to study attention in both mice and zebrafish.

References

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