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Microscopic and submicroscopic gradient variation of olfactory systems among six *Sinocyclocheilus* species living in different environments

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The fish genus *Sinocyclocheilus* contains many different species and they inhibit diverse natural environments, such as surface water layer, cave or intermediate. Thus, there are some differences in their sensory systems. Microscopic and submicroscopic structures of olfactory systems in six representative species of *Sinocyclocheilus* were studied, including one surface-dwelling species - *S. grahami*, two intermediate species - *S. jii* and *S. macrophthalmus*; and three cave-dwelling species - *S. brevibarbatus, S. anshuiensis*, and *S. tianlinensis*. Due to adaptive evolution under extreme environmental conditions, cave-dwelling species have more developed olfactory systems. We observed that comparing with surface-dwelling species, the whole olfactory sac of cave-dwelling *Sinocyclocheilus* species have the following characteristics: higher density of cilia, greater length of sensory cilia, and with many other special structures (micro-ridge, olfactory islet, rod cilia). The results showed different developmental level of olfactory system, and we agree that cave-dwelling species have more developed olfactory system than intermediate species and surface-dwelling species. In conclusion, for different *Sinocyclocheilus* species, when considering the types, number and length of cilia, such as sensory, nonsensory, or rod cilia, typical cave-dwelling *Sinocyclocheilus* species evolved more powerful olfactory organs to adapt dark surroundings. Furthermore, microscopic and submicroscopic structure of olfactory systems showed gradient variation among six *Sinocyclocheilus* species living in different environments: olfactory system of cave-dwelling species is more developed than intermediate species, and intermediate species is more developed than surface-dwelling species.

Biography

Xiaoyan Zhang have done PhD and graduated from National university of Singapore (NUS). Currently he is working in Yunnan University. His Research Field is about Fish & Evolution, Biomonitoring of Water Contamination by Transgenic Zebrafish, applying of Fish in Drug Screening.

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