Medical Xpress

Merkel cell originates from skin, not the neural crest: study

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Case Western Reserve University School of Medicine assistant professor of pediatrics, neurosciences and otolaryngology, Stephen M. Maricich, M.D., Ph.D., and his team found that Merkel cells originate in the skin, not the neural crest lineage, as previously speculated.

The study, "Mammalian Merkel Cells are Descended from the Epidermal Lineage", was recently published in the online version of *Developmental Biology* and is slated its future print edition.

"Merkel cells," discovered by Friedrich Sigmund Merkel in 1875, are found in multiple regions of the skin and make contact with specialized never fibers, participating in the perception of touch.

"A real mystery surrounding Merkel cells was their developmental site of origin. Conflicting evidence suggested that these cells arose from either the skin or neural crest lineages, but there was no definitive proof of either origin," said lead author, Dr. Maricich.

Using genetically engineered mouse lines, the researchers were able to delete Atoh1, a gene essential to the formation of Merkel cells, from different areas of developing embryos. This "conditional deletion" of Atoh1 in the neural crest did not affect the Merkel cell population, however using this same technique in the skin lineage resulted in the loss of all Merkel cells.

"Knocking out Atoh1 in the neural crest line caused other problems for

developing embryos, but Merkel cells were completely unaffected. However, loss of Atoh1 expression in the skin deleted all the Merkel cells," said Dr. Maricich. "This showed us that we had specifically targeted the Merkel cells and that Atoh1 expression by skin cells is necessary to their development."

The researchers also fate mapped the cells, a technique used to trace developmental fates of embryonic tissues. This analysis further supported their conditional knockout findings.

"The techniques used in this study will help neuroscientists to further explore the function of Merkel cells, including the behavioral consequences when only Merkel cells have been deleted," said Ellen Lumpkin, Ph.D., a study co-author and assistant professor of neuroscience, molecular physiology and biophysics and molecular and human genetics at the Baylor College of Medicine.

"It is thought that Merkel cells give rise to Merkel cell carcinoma, a rare but aggressive form of skin cancer that responds poorly to current treatments," said Dr. Maricich. "In addition to solving a 130 year-old mystery, our data may be relevant to the understanding of Merkel cell carcinoma, and may provide important clues in the search for novel therapeutic targets."

Source: Case Western Reserve University (news : web)

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