

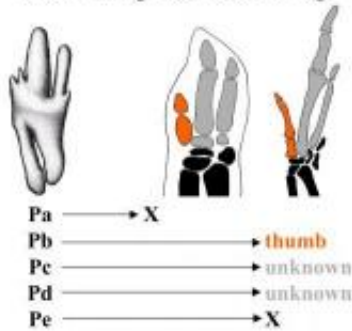
# Researchers solve mystery of disappearing bird digit

September 4 2011

Standard Five-Fingered Hand



Three-Fingered Bird Wing



A genomic analysis shows that precursor cells pb that form index finger in five-fingered vertebrates can form the "thumb" (in orange) or first digit in three-digit bird wing Credit: courtesy Yale University

Evolution adds and subtracts, and nowhere is this math more evident than in vertebrates, which are programmed to have five digits on each

limb. But many species do not. Snakes, of course, have no digits, and birds have three.

Yale scientists now have a good handle on how these [developmental changes](#) are orchestrated in the embryo, but there is still one outstanding debate on birds: Which digits are they: a thumb with index and middle fingers, or the index, middle and [ring fingers](#)?

In five-digit vertebrates, the thumb comes from the precursor stem cells labeled pa. While birds have a digit that looks like a thumb, pa precursor cells die off during development and never produce a digit in adults. As a result, scientists have wondered whether [precursor cells](#) in pb can make a thumb.

Yale scientists have completed a [genomic analysis](#) of birds that reveals the answer (shown in orange on illustration). It is a hands down "yes" — even though the first bird digit develops where the index finger on a five-finger vertebrae should be.

The results are published online Sept. 4 in the journal *Nature*.

Provided by Yale University

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