

In the 'neck' of time: Scientists unravel another key evolutionary trait

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By deciphering the genetics in humans and fish, scientists now believe that the neck - that little body part between your head and shoulders gave humans so much freedom of movement that it played a surprising and major role in the evolution of the human brain, according to New York University and Cornell University neuroscientists in the online journal *Nature Communications* (July 27, 2010.)

Scientists had assumed the pectoral fins in fish and the forelimbs (arms and hands) in humans are innervated - or receive nerves - from the exact same <u>neurons</u>. After all, the fins on fish and the arms on humans seem to be in the same place on the body. Not so.

During our early ancestors' transition from fish to land-dwellers that gave rise to upright <u>mammals</u>, the source for neurons that directly control the forelimbs moved from the brain into the <u>spinal cord</u>, as the torso moved away from the head and was given a neck. In other words human arms, like the wings of bats and birds, became separate from the head and placed on the torso below the neck.

"A neck allowed for improved movement and dexterity in terrestrial and aerial environments," says Andrew Bass, Cornell professor of <u>neurobiology</u> and behavior, and an author on the paper. "This innovation in biomechanics evolved hand-in-hand with changes in how the nervous system controls our limbs."

Bass explained that this unexpected level of evolutionary plasticity likely



accounts for the incredible range of forelimb abilities - from their use in flight by birds to swimming by whales and dolphins, and playing piano for humans.

More information: The research, "Ancestry of motor innervation to pectoral fin and forelimb," was authored by Leung-Hang Ma (first author) and Robert Baker (corresponding author).

Provided by Cornell University

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