Coordinate transformation is first completed downstream of primary motor cortex.

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Abstract:

It was suggested previously that the transformation of action to muscle-based coding is completed in the primary motor cortex (M1). This is consistent with a predominant direct pathway leading from M1 to motoneurons. Accordingly, spinal segmental interneurons that are located downstream to M1 are expected to show muscle-like coding properties. We addressed this hypothesis using simultaneous recording of cortical and spinal activity in primates performing an isometric wrist task with multiple targets and two hand postures. Here we show that while the motor cortex follows an intermediate coordinate frame, spinal interneurons already follow a muscle-like coordinate frame. We thus suggest that the final steps in coordinate transformation of motor commands take place downstream of M1 via corticospinal interactions.

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