

## Supplementary Materials for

### **Spinal motoneurons of the human newborn are highly synchronized during leg movements**

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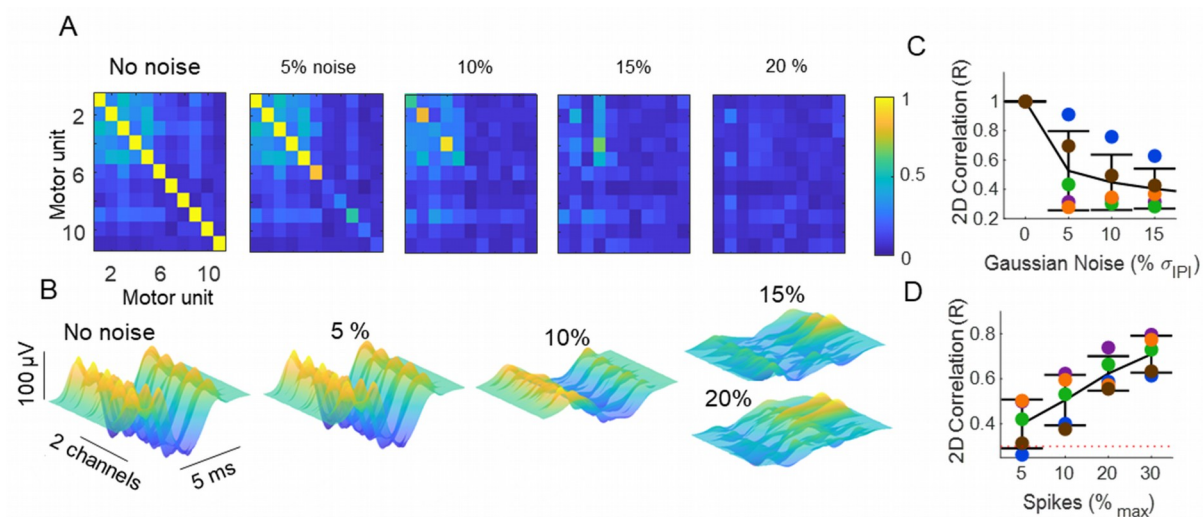
#### **The PDF file includes:**

Figs. S1 and S2  
Legend for video S1

#### **Other Supplementary Material for this manuscript includes the following:**

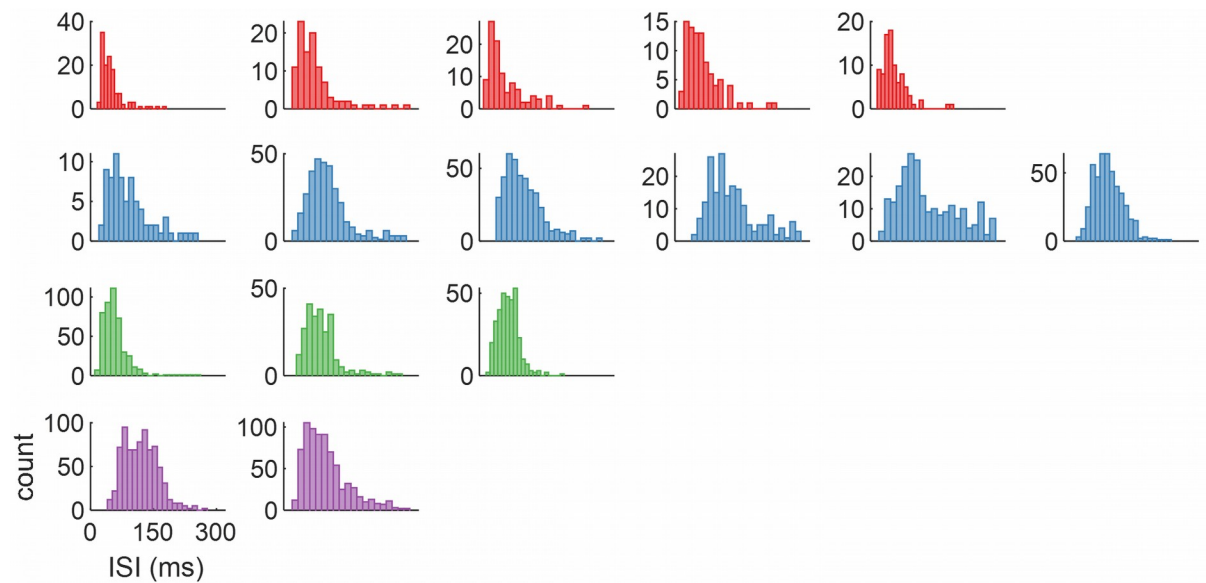
(available at [advances.sciencemag.org/cgi/content/full/6/47/eabc3916/DC1](https://advances.sciencemag.org/cgi/content/full/6/47/eabc3916/DC1))

Video S1



**Figure S1. | Validation of decomposition and motor unit analysis.** **A** We performed 2D cross-correlation analysis among the identified motor units within all the identified motor unit pool and after injecting noise levels in the motoneuron discharge timings corresponding to different percentages of the average interpulse interval (IPI) for the motor unit pool. Note that the 5% conditions correspond to an average injected noise ranging from 30 to -30 ms that followed a gaussian distribution centered at zero. **B** The effect of noise injection on a representative motor unit action potential. **C** The average 2D correlation value across the five newborns as a function of the injected noise in the motoneuron discharge timings. **D** We obtained the representative motor unit waveform across all the motoneuron discharge times in a trial. We then randomly selected across the contraction a percentage of spikes and cross-correlated these values with the representative motor unit waveform. It is well known that by increasing the number of spikes the averaging process remove the baseline noise in the waveform. Note that the red-line represents the 2D correlation value that can be obtained by

chance (random spike-trigger average obtained with a significant number of motoneuron discharges).



**Figure S2. | Motor unit interspike interval distribution.** The motor unit interspike interval for the 4 neonates (color-coded) and motor units (columns) identified during the spontaneous movements. Note the similar histogram distribution for the motor unit belonging to a specific neonate which may indicate the uniform distribution of neural and muscular properties of the neonatal neuromotor system.

**Video 1 – Neonatal spontaneous movements, kinematics, EMG and motor unit spiking activity**