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Statistical Summary Document

Manuscript Title: Sensorimotor integration within the primary motor cortex by selective nerve fascicle stimulation

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Animal model used, if applicable: -

Underlying hypothesis: Selective sensory fiber stimulation evokes a detectable activity in the primary somatosensory cortex and it produces a short-latency inhibitory effect on the output of the primary motor cortex

Definitions of 'n':
Question 1: n = number of tested stimulation sites
Question 2: n = number of stimulation sites evoking sensory perceptions
Question 3: n = number of stimulation sites evoking motor responses
Question 4: n = number of recorded EEG sweeps after peripheral nerve stimulation
Question 5: n = number of recorded EEG sweeps after peripheral nerve stimulation
Question 6: n = number of recorded motor evoked potentials
Question 7: n = number of recorded motor evoked potentials
Question 8: n = number of recorded motor evoked potentials
Question 9: n = number of recorded motor evoked potentials

Statistical summary table:

Experimental question number	Finding/ conclusion	Experimental location/variable	Measure of central tendency (Median)	Dispersion (IQR)	n	Exact P value	Figure/table in which data are presented	Units	Data comparisons	Statistical test	Any other experimental factors	Comments
1. To confirm activation of somatosensory and/or motor fibers by intraneural (IN) and perineural (PN) stimulation at different sites (i.e., electrode contacts)	IN sites selectively activate sensory fibers at low stimulation intensity	Left median nerve - Threshold stimulus intensity for evoking sensory perception and CMAP	-	-	30	-	Table 1, Fig. 3A	μA	-			Observation
2. To compare efficacy of IN and PN stimulation in activating somatosensory fibers	PN stimulation requires higher charge to recruit somatosensory fibers	IM threshold CM threshold	25.60 80.00	16.00 - 48.00 75.00 - 100.00	15 12	**<0.0001**	Fig. 2	nC nC	IM vs CM threshold	Mann-Whitney		
3. To determine efficacy of IN and PN stimulation in activating motor fibers	PN stimulation requires higher charge to recruit motor fibers	CMAP recruitment curve with IM stim. CMAP recruitment curve with CM stim.	-	-	3 12	-	Fig. 3B	mV mV	-			Observation
4. To confim evoked activity in the primary somatosensory cortex (S1) by transcutaneous whole nerve stimulation	Presence of the first cortical potential at ~17 ms	Right central region on the scalp	-	-	>2000	-	Fig. 4A-C	μV	-			Observation
5. Detectable evoked activity in S1 by intraneural (IN) stimulation?	Presence of the first cortical potential at ~16 ms	Right central region on the scalp	-	-	>7000	-	Fig. 4D	μV	SEPs by IN vs transcutaneous stimulation			Observation

6. Short-latency afferent inhibition	MEP inhibited by	► Site: all IN and PN					Fig. 5				Pooled	Individual peak-to-peak MEP
(SAI) of MEPs by invasive nerve	IN/PN afferent	MEP_uncond	0.9480	0.7332 - 1.2463	72			ratio			stimulation sites	amplitudes (mV) normalized to
stimulation?	stimulation	MEP_ISI15-21	0.7135	0.4283 - 0.9607	246	**<0.0001**			vs MEP_uncond	Mann-Whitney	and ISIs	avg unconditioned MEP
	SAI high and	► Site: IM12										amplitude (mV)
	consistent with	MEP_uncond	1.0543	0.8156 - 1.1817	12			ratio				
	IM12 conditioning;	MEP_ISI15-16	0.5216	0.3185 - 0.7512	12	**0.0056**			vs MEP_uncond	Mann-Whitney		
	SAI variable from	MEP_ISI17-19	0.5189	0.2459 - 0.6702	18	**0.0005**			vs MEP_uncond	Mann-Whitney		
	other sites and	MEP_ISI20-21	0.5216	0.3185 - 0.7512	12	**<0.0001**			vs MEP_uncond	Mann-Whitney		
	higher at shorter	► Site: IM16										
	ISIs	MEP_uncond	0.9766	0.6244 - 1.1761	12			ratio				
		MEP_ISI15-16	0.3409	0.3024 - 0.4847	11	**0.0003**			vs MEP_uncond	Mann-Whitney		
		MEP_ISI17-19	0.9608	0.4310 - 1.2687	18	0.6615			vs MEP_uncond	Mann-Whitney		
		MEP_ISI20-21	0.8623	0.5800 - 1.2833	11	0.7399			vs MEP_uncond	Mann-Whitney		
		► Site: CM5										
		MEP_uncond	0.9399	0.5543 - 1.4602	12			ratio				
		MEP_ISI15-16	0.5743	0.4302 - 0.7747	10	0.0804			vs MEP_uncond	Mann-Whitney		
		MEP_ISI17-19	0.8080	0.6734 - 1.2903	18	0.8187			vs MEP_uncond	Mann-Whitney		
		MEP_ISI20-21	0.7766	0.5497 - 1.0217	11	0.6505			vs MEP_uncond	Mann-Whitney		
		► Site: CM5+14										
		MEP_uncond	0.9238	0.7281 - 1.3236	12			ratio				
		MEP_ISI15-16	0.4691	0.2912 - 0.8016	12	**0.0145**			vs MEP_uncond	Mann-Whitney		
		MEP_ISI17-19	0.8294	0.6155 - 0.8890	18	0.2486			vs MEP_uncond	Mann-Whitney		
		MEP_ISI20-21	0.7199	0.4226 - 1.3788	12	0.4428			vs MEP_uncond	Mann-Whitney		
		► Site: CU5										
		MEP_uncond	1.0070	0.7925 - 1.1718	12			ratio				
		MEP_ISI15-16	0.5930	0.4705 - 0.8073	12	**0.0045**			vs MEP_uncond	Mann-Whitney		
		MEP_ISI17-19	0.7285	0.5830 - 0.8265	18	**0.0014**			vs MEP_uncond	Mann-Whitney		
		MEP_ISI20-21	0.9220	0.6540 - 1.3395	11	0.8801			vs MEP_uncond	Mann-Whitney		
		► Site: CU5+14										
		MEP_uncond	0.8810	0.7476 - 1.2036	12			ratio				
		MEP_ISI15-16	0.8925	0.8124 - 1.0975	12	0.9774			vs MEP_uncond	Mann-Whitney		
		MEP_ISI17-19	0.6819	0.5788 - 0.9856	18	0.1038			vs MEP_uncond	Mann-Whitney		
		MEP_ISI20-21	0.8344	0.6683 - 0.8965	12	0.2189			vs MEP_uncond	Mann-Whitney		
	Control condit.: no	► Site: IM12										
	MEP inhibition at	MEP_uncond	0.9360	0.5368 - 1.2820	14			ratio				
	an ISI shorter than	MEP_ISI8	1.1450	0.6937 - 1.4997	12	0.4940			vs MEP_uncond	Mann-Whitney		
	the physiological											
	range											
7. SAI magnitude at different IN and	SAI is different	SAI_IM12	0.3830	0.2506 - 0.6523	42	**<0.0001**	Fig. 6A	ratio	SAI_IM12 vs	Kruskal-Wallis		
PN stimulation sites?	between	SAI_IM16	0.7019	0.3640 - 1.2173	40				SAI_IM16 vs			
	stimulation sites	SAI_CM5	0.7441	0.5377 - 1.0230	39				SAI_CM5 vs			
		SAI_CM5+14	0.7277	0.4155 - 1.0525	42				SAI_CM5+14 vs			
		SAI_CU5	0.7110	0.5440 - 0.9090	41				SAI_CU5 vs			
		SAI_CU5+14	0.8406	0.6206 - 0.9917	42				SAI_CU5+14			
	SAI_IM12 >	SAI_IM12				**0.0010**		ratio	SAI_IM12 vs	Mann-Whitney		
	SAI_IM16	SAI_IM16							SAI_IM16			
	SAI_IM12 >	SAI_IM12				**<0.0001**		ratio	SAI_IM12 vs	Mann-Whitney		
	SAI_CM5	SAI_CM5							SAI_CM5			
	SAI_IM12 >	SAI_IM12				**0.0007**		ratio	SAI_IM12 vs	Mann-Whitney		
	SAI_CM5+14	SAI_CM5+14							SAI_CM5+14			
	SAI_IM12 >	SAI_IM12				**<0.0001**		ratio	SAI_IM12 vs	Mann-Whitney		
	SAI_CU5	SAI_CU5							SAI_CU5			
	SAI_IM12 >	SAI_IM12				**<0.0001**		ratio	SAI_IM12 vs	Mann-Whitney		
	SAI_CU5+14	SAI_CU5+14							SAI_CU5+14			

8. SAI magnitude at different ISIs by invasive (IN and PN) afferent stimulation?	SAI depends on ISI	SAI_ISI15-16 SAI_ISI17-19 SAI_ISI20-21	0.6388 0.7766 0.8068	0.3591 - 0.8373 0.4960 - 0.9639 0.4276 - 1.0353	69 108 69	**0.0374**	Fig. 6B	ratio	SAI_ISI15-16 vs SAI_ISI17-19 vs SAI_ISI20-21	Kruskal-Wallis		
	SAI_ISI15-16 > SAI_ISI17-19	SAI_ISI15-16 SAI_ISI17-19				**0.0171**		ratio	SAI_ISI15-16 vs SAI_ISI17-19	Mann-Whitney		
	SAI_ISI15-16 > SAI_ISI20-21	SAI_ISI15-16 SAI_ISI20-21				**0.0362**		ratio	SAI_ISI15-16 vs SAI_ISI20-21	Mann-Whitney		
9. SAI magnitude at different muscle targets by transcutaneous whole-nerve stimulation?	SAI is lower in the amputated side	SAI_BB.R+MFM.R SAI_BB.L+MFM.L	0.4341 0.6724	0.3189 - 0.5359 0.6100 - 0.7288	60 60	**<0.0001**	Fig. 7	ratio	SAI.R vs SAI.L	Kruskal-Wallis		
	SAI_BB.R > SAI_BB.L	SAI_BB.R SAI_BB.L	0.4837 0.6517	0.4238 - 0.6526 0.6039 - 0.7106	30 30	**0.0005**		ratio	SAI_BB.R vs SAI_BB.L	Mann-Whitney		
	SAI_MFM.R > SAI_MFM.L	SAI_MFM.R SAI_MFM.L	0.3893 0.6860	0.2955 - 0.4854 0.6258 - 0.7386	30 30	**<0.0001**		ratio	SAI_MFM.R vs SAI_MFM.L	Mann-Whitney		
	SAI not significantly different between arm and forearm muscles	SAI_BB.R+L SAI_MFM.R+L	0.6097 0.5609	0.4874 - 0.7053 0.3940 - 0.6997	60 60	0.3611		ratio	SAI_BB vs SAI_MFM	Kruskal-Wallis		
	SAI not significantly different between arm, forearm, and hand muscles of the intact side	SAI_BB.R SAI_MFM.R SAI_OP.R	0.4837 0.3893 0.4460	0.4238 - 0.6526 0.2955 - 0.4854 0.2835 - 0.5934	30 30 30	0.0816		ratio	SAI_BB.R vs SAI_BB.L	Kruskal-Wallis		