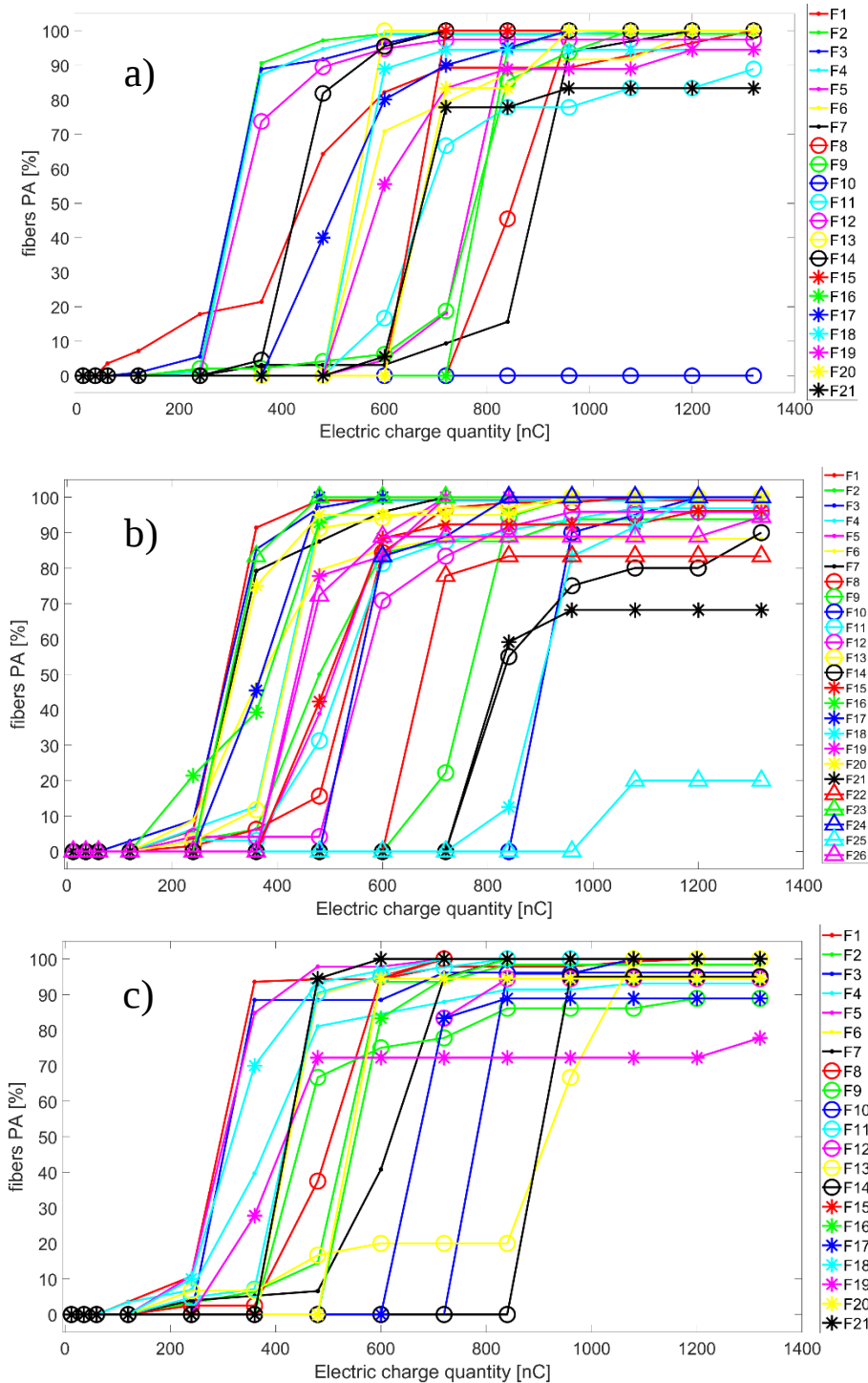


Supplementary Materials

Percentage of activated fibers vs Electric charge

In Figure S1, the Percentage of activated fiber for different fascicles in each nerve model with Cuff electrode are shown. The electric charge values are in the range from 12 nC to 1320 nC, which includes the values used in the experimental trials (from 60 nC to 1200 nC). The intensity steps are arbitrary chosen according to the variation of percentage of activated fibers between an electric charge value and the subsequent, the first three values are closer and subsequent values are more spaced to observe an evident variation in the Percentage of activated fibers.



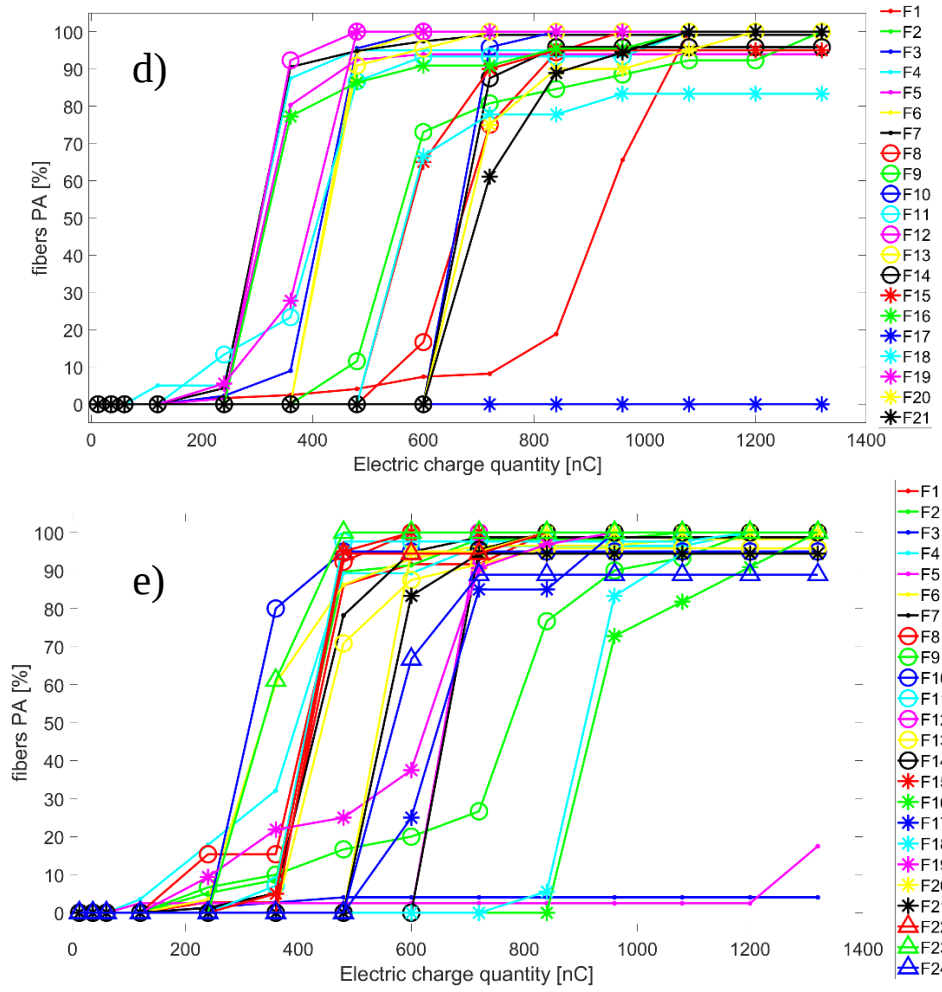


Figure S1: Percentage of activation (PA) vs Electric charge quantity, for different fascicles in the computational nerve models. Subfigures a) to e) correspond to the computational nerve models developed in Comsol and shown on the right in Figure 3 a) to e) of the research paper

In Figure S2, the variation of the Percentage of Activation when the electric charge intensity increases for the computational models with the ds-FILE electrode is shown. The electric charge values are in the range from 0.3 nC to 198 nC, which includes the one used in the experimental trials from 7nC to 192 nC. The increasing steps of electric charge are arbitrarily chosen according to the Percentage of Activation variation between an intensity value and the subsequent. As shown in Figure S2, for each model with ds-FILE electrode, to reduce computational time, a small number of fascicles is considered to evaluate the PA starting from the fascicle where the active site is located. The PA is evaluated in other fascicles moving away from the fascicle with the active site to observe the behavior at different distances from it.

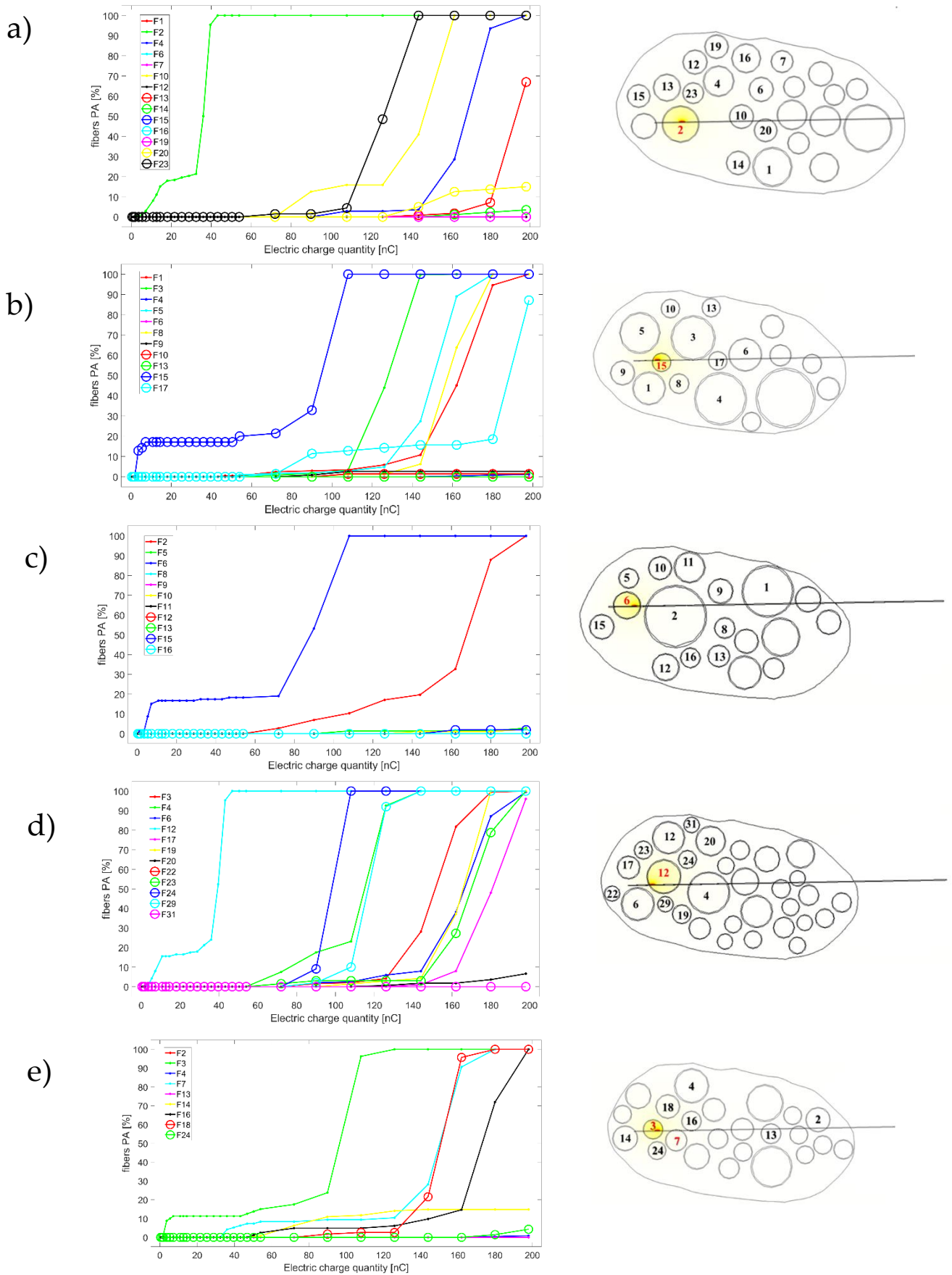


Figure S2: Percentage of Activation variation when the electric charge quantity increases for fibers in different fascicles of five computational models, from a) to e), with ds-FILE electrode. Images on the right show the corresponding fascicles labels related to each computational model results.

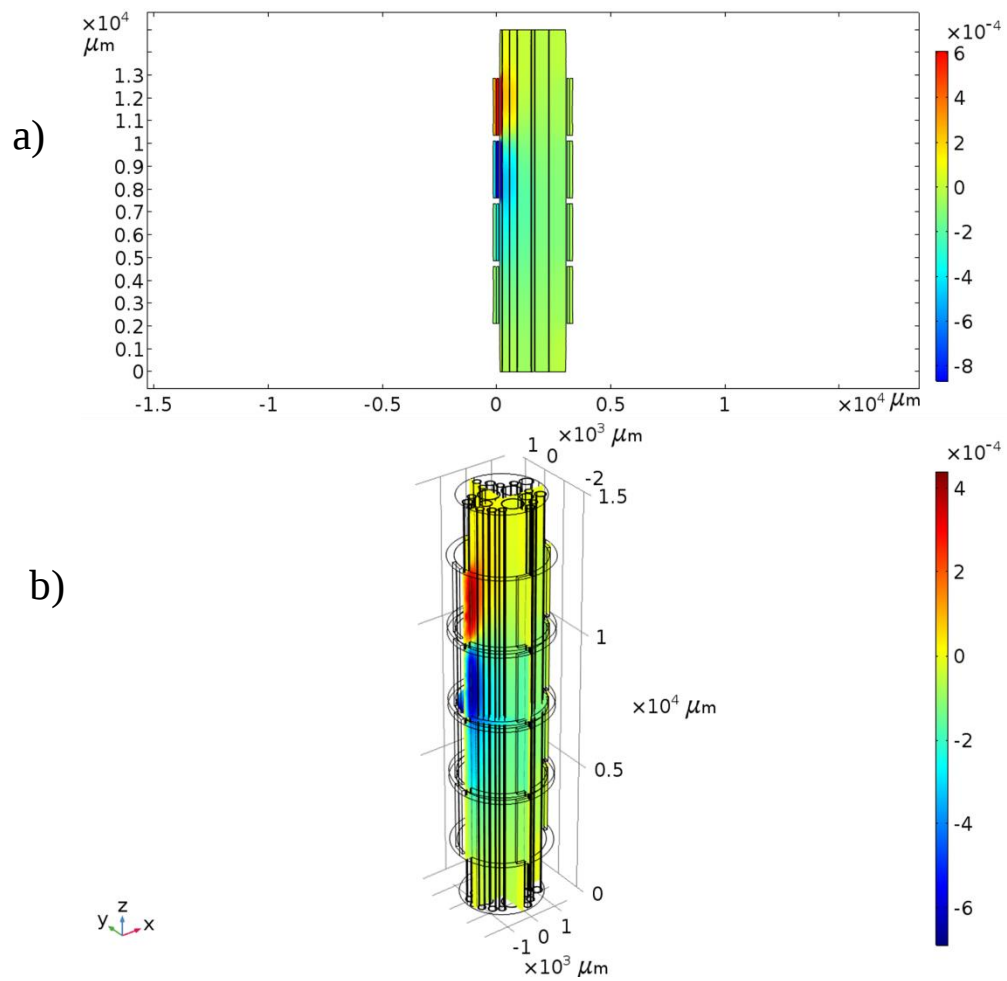


Figure S3: a) Electric potential distribution in the nerve model with Cuff related to Figure 3a, lateral view (X-Z plane). b) 3D view of the same nerve model with cuff. Colorbar is in Volt.

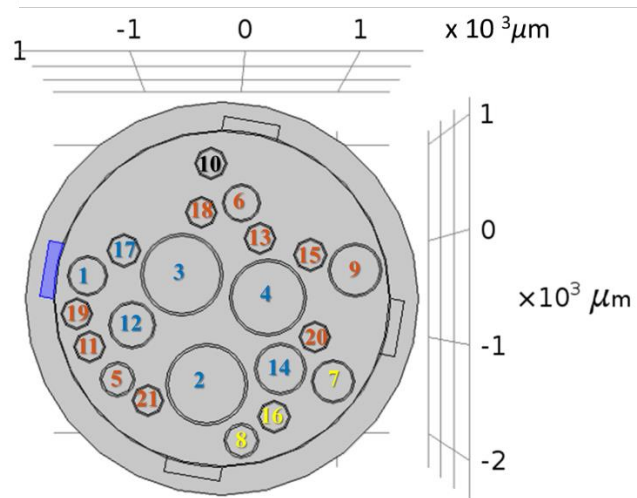


Figure S4: Nerve section of the nerve model with cuff as shown in Figure 3 a.

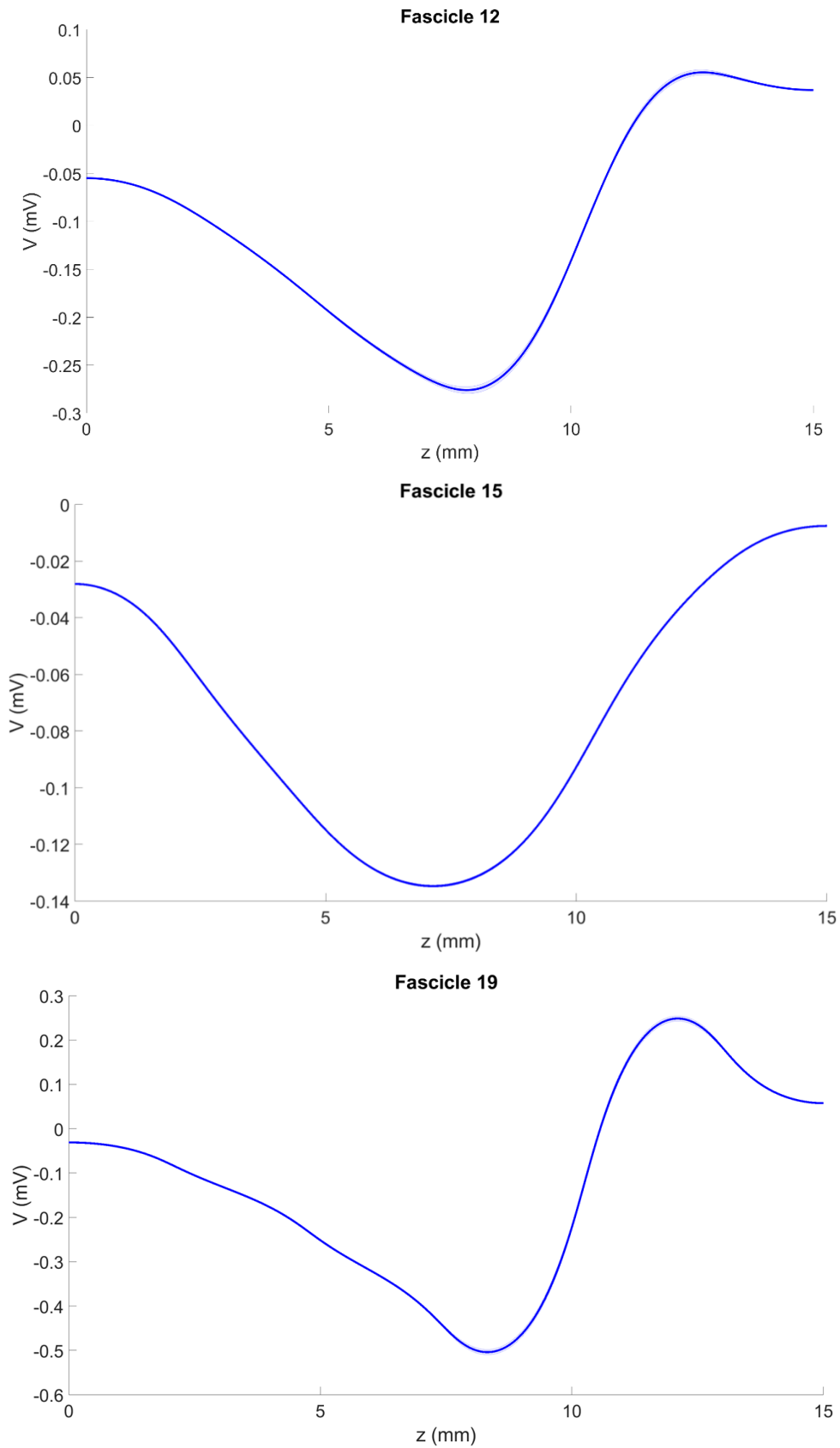


Figure S5: Electric potential variation along the Z axis, related to Figure S2. Mean value and standard deviation (shaded area) of electric potential variation along the z-axis for the nerve fibers in fascicles #12, #15, #19, respectively.