

Supplementary information: Ising-like model replicating time-averaged spiking behaviour of in vitro neuronal networks

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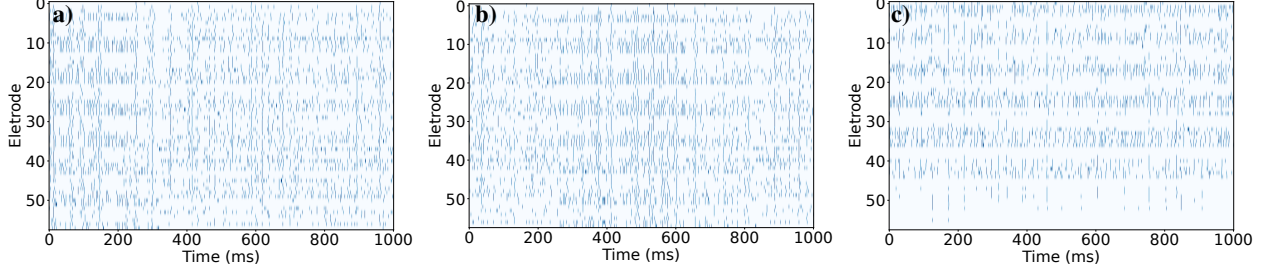


Fig. S1 The ensemble of investigated time series of binarized spikes spanning a total of 1 sec for 60 electrodes of the in vitro samples 4, 5 and 6 are shown in (a), (b) and (c), respectively. Each horizontal line represents the temporal spiking series of a local group at an electrode or single neuron, respectively, whereas each vertical line represents the state of the system at time t . A blue point corresponds to a spike (+1) and an empty place to no spike (-1).

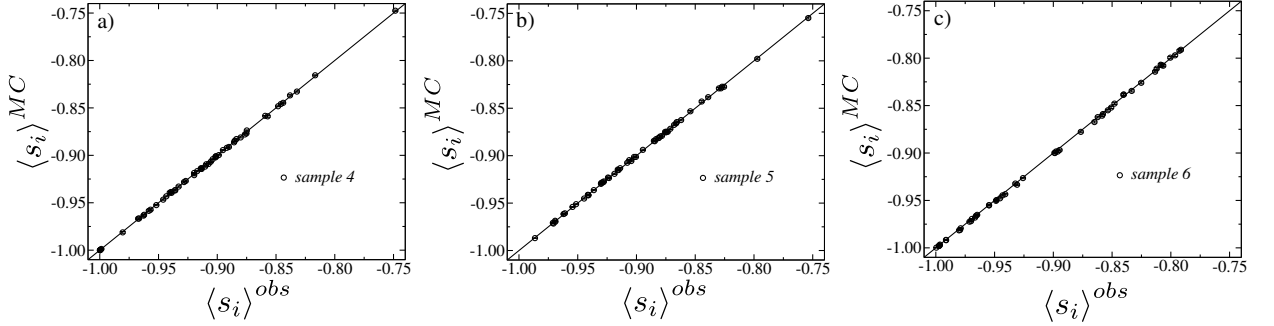


Fig. S2 In (a), (b), and (c) are shown the the magnetizations $\langle s_i \rangle^{MC}$ vs $\langle s_i \rangle^{obs}$ for the in vitro samples 4, 5, and 6, respectively. The error bars represent the standard deviations calculated from 10^5 samples generated through repeated Monte Carlo runs. The solid black lines correspond to the function $y = x$.

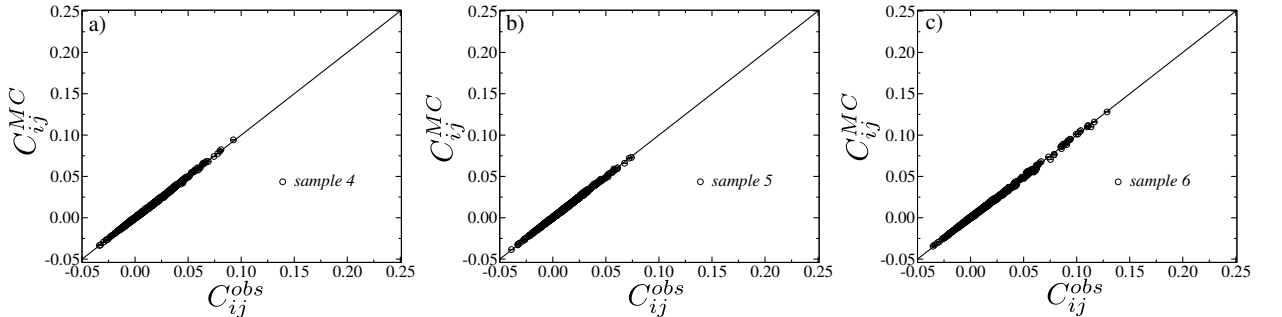


Fig. S3 In (a), (b), and (c) are shown the the correlations C_{ij}^{MC} vs C_{ij}^{obs} for the in vitro samples 4, 5, and 6, respectively. The error bars represent the standard deviations calculated from 10^5 samples generated through repeated Monte Carlo runs. The solid black lines correspond to the function $y = x$.

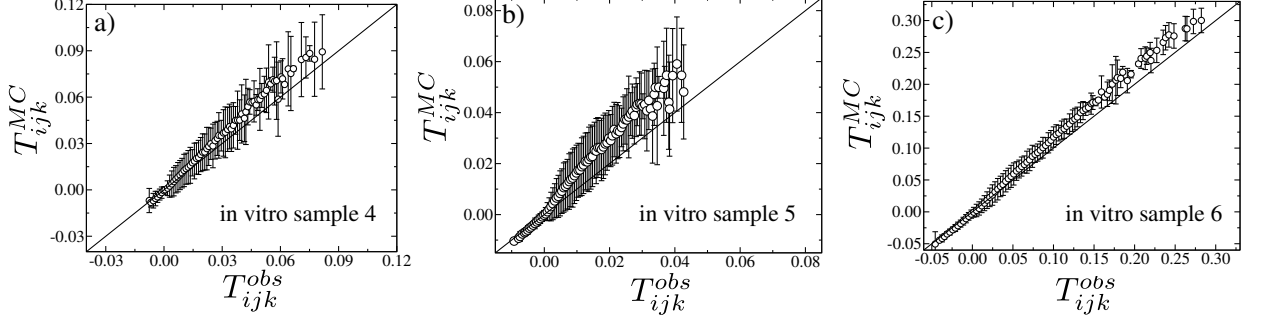


Fig. S4 Test to verify if the three-point correlations T_{ijk}^{MC} from the Monte Carlo simulations of the Ising-like model of Eq. (4) are able to reproduce the three-point correlations T_{ijk}^{obs} of the experimental in vitro samples 4, 5 and 6, in (a), (b) and (c), respectively. The solid black lines correspond to the function $y = x$. The triplets are binned into 100 populated bins and the error bars are the standard deviations across the bins.