

POSTER PRESENTATION

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Computational modelling of micro-seizures and focal seizure onset

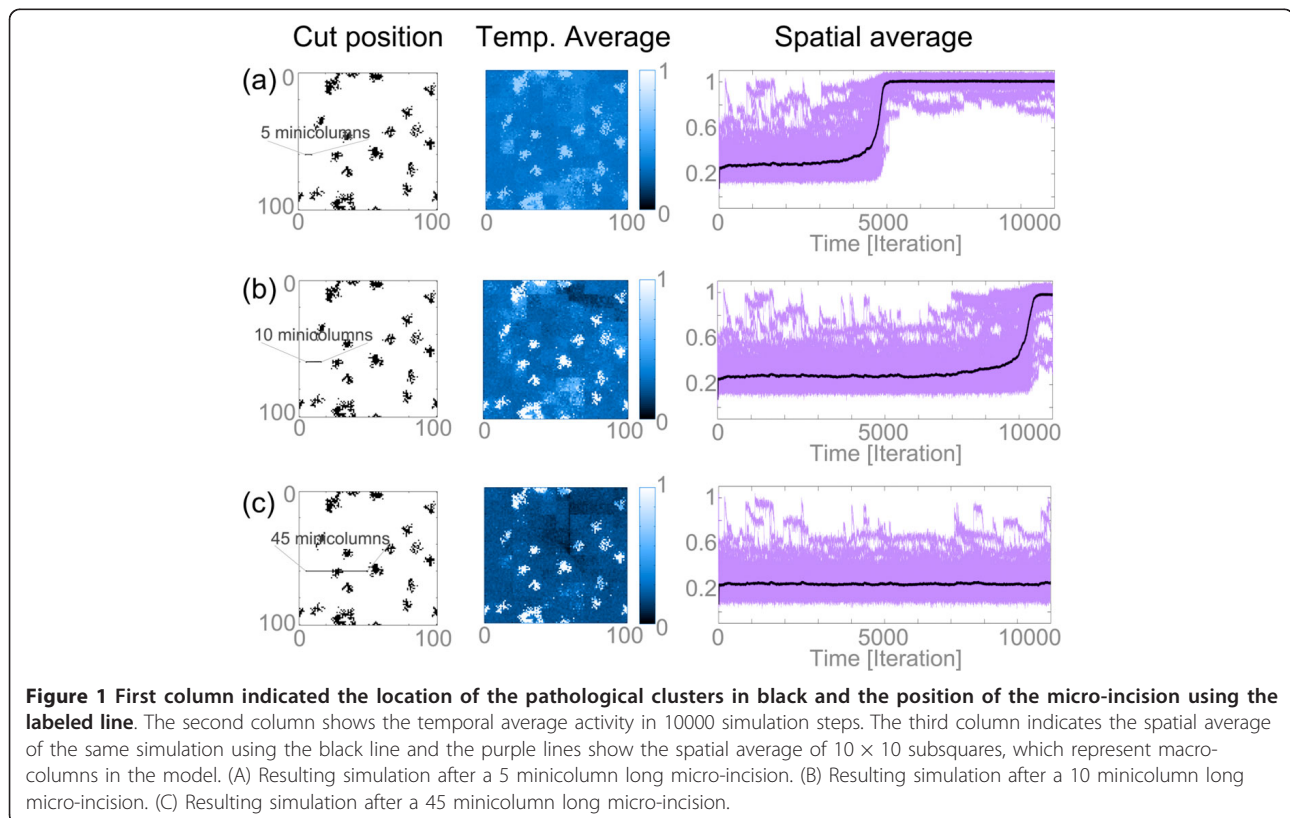
Yujiang Wang^{1*}, Peter N Taylor², Gerold Baier³

From Twenty Second Annual Computational Neuroscience Meeting: CNS*2013
Paris, France. 13-18 July 2013

Pathological micro-domains have been proposed to underpin the generation of local pathological activity, as seen in focal seizures in the epileptic cortex [1-3]. Specifically, so-called micro-seizures have been suggested to be markers for these micro-domains [2,3]. Astonishingly, micro-seizures have also been observed in non-epileptic

control patients [3]. This suggests that local activity, such as micro-seizures, only become pathological when in a specific arrangement.

We hypothesize that pathological dynamics could be due to an increased density of micro-domains. To test this, we introduce a computational model on the mesoscopic scale



* Correspondence: yujiang.wang@manchester.ac.uk

¹Manchester Interdisciplinary Biocentre, 131 Princess Street, Manchester M1 7DN, UK

Full list of author information is available at the end of the article

of a $5 \times 5 \text{ mm}^2$ cortical sheet [4]. The units are modelled as excitable minicolumns. This model also incorporates realistic connectivity schemes observed at this spatial scale [5].

The model shows occasional, non-pathological micro-seizure occurrences, as well as recruitment of normal tissue into full-blown seizure activity in the presence of dense clusters of hyperactive micro-seizure domains. A specific prediction of this model is that the transition to full-blown seizures can be prevented by using micro-incisions to separate the clusters of abnormally active micro-domains (Figure. 1) [6].

Author details

¹Manchester Interdisciplinary Biocentre, 131 Princess Street, Manchester M1 7DN, UK. ²School of Electrical & Electronic Engineering, Nanyang Technological University, Singapore. ³Division of Bioscience, Faculty of Life Sciences, University College London, London WC1E 6BT, UK.

Published: 8 July 2013

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doi:10.1186/1471-2202-14-S1-P14

Cite this article as: Wang et al.: **Computational modelling of micro-seizures and focal seizure onset.** *BMC Neuroscience* 2013 **14**(Suppl 1):P14.

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