## **Supplementary Information**

## Electroconductive Nanoscale Topography for Enhanced Neuronal Differentiation and Electrophysiological Maturation of Human Neural Stem Cells

Kisuk Yang<sup>1</sup>, Seung Jung Yu<sup>2</sup>, Jong Seung Lee<sup>1</sup>, Hak-Rae Lee<sup>2</sup>, Gyeong-Eon Chang<sup>1</sup>, Jungmok Seo<sup>3</sup>, Taeyoon Lee<sup>4</sup>, Eunji Cheong<sup>1\*</sup>, Sung Gap Im<sup>2\*</sup>, and Seung-Woo Cho<sup>1,5\*</sup>

<sup>1</sup>Department of Biotechnology, Yonsei University, Seoul 03722, Republic of Korea <sup>2</sup>Department of Chemical and Biomolecular Engineering and Graphene Research Center in KI for NanoCentury, Korea Advanced Institute of Science and Technology, Daejeon 34141, Republic of Korea <sup>3</sup>Center for Biomaterials, Korea Institute of Science and Technology, Seoul 02792, Republic of Korea

<sup>4</sup>School of Electrical and Electronic Engineering, Yonsei University, Seoul 03722, Republic of Korea

<sup>5</sup>Center for Nanomedicine, Institute for Basic Science (IBS), Seoul 03722, Republic of Korea

\*Corresponding authors:

Prof. Seung-Woo Cho

Department of Biotechnology, College of Life Science and Biotechnology, Yonsei University,

50 Yonsei-ro, Seodaemun-gu, Seoul 03722, Republic of Korea; E-mail:

seungwoocho@yonsei.ac.kr

Prof. Sung Gap Im

Department of Chemical and Biomolecular Engineering & Graphene Research Center in KI for NanoCentury, Korea Advanced Institute Science and Technology, Daejeon 34141, Republic of Korea; E-mail: <u>sgim@kaist.ac.kr</u>

Prof. Eunji Cheong

Department of Biotechnology, College of Life Science and Biotechnology, Yonsei University,

50 Yonsei-ro, Seodaemun-gu, Seoul 03722, Republic of Korea; E-mail:

eunjicheong@yonsei.ac.kr

## **Supplementary Figures**



Fig. S1 Experimental settings for direct supply of electrical stimulation to TNS.



Fig. S2 MTT assay to measure mitochondrial metabolic activity of hNSCs on each substrate after 2 days in culture (n = 3).