

IN THE CLAIMS

Please amend the claims as follows:

1. (Currently Amended) A brain-computer interface (BCI) configured to be engrafted on a brain of a mammal, the BCI comprising:

a cortical graft layer comprising a plurality of exogenous neuronal cells configured to be transplanted on the brain's cerebral cortex, the plurality of exogenous neuronal cells being configured to engraft on the brain ~~and respond to an external stimulus with a detectable signal; and~~

processing circuitry configured to send and receive information to and from the brain of the mammal via the cortical graft layer;

a camera configured to capture image data of the cortical graft layer and connect to the processing circuitry to obtain information from the cortical graft layer; and

~~a signal detector configured to detect the detectable signal~~

a light source configured to illuminate the cortical graft layer based on signals from the processing circuitry to transmit information to the cortical graft layer,

wherein the exogenous neuronal cells are configured to, at an outermost cortical layer, penetrate the brain by ~~neurites~~ processes growing from the exogenous neuronal cells.

2. (Previously Presented) The brain-computer interface of claim 1, wherein the exogenous neuronal cells are transfected.

3. (Original) The brain-computer interface of claim 2, wherein transfection is ex vivo with a plasmid by electroporation.

4. (Original) The brain-computer interface of claim 2, wherein transfection is via virus-mediated transfection.

5. (Previously Presented) The brain-computer interface of claim 1, wherein the exogenous neuronal cells are tissue cultured mammalian stem cells.

6. (Previously Presented) The brain-computer interface of claim 5, wherein the exogenous neuronal cells are chemically tethered to an electrode.

7. (Previously Presented) The brain-computer interface of claim 3, wherein the plasmid contains a GCaMP nucleic acid sequence.

8. (Previously Presented) The brain-computer interface of claim 1, wherein the cortical graft layer is configured to extend axons and dendrites into the cerebral cortex or striatum.

9. (Previously Presented) The brain-computer interface of claim 1, wherein the cortical graft layer is configured to form synaptic connections to enable bidirectional communication.

10. (Previously Presented) The brain-computer interface of claim 1, wherein the cortical graft layer is configured to be engrafted over a lobe of the cerebral cortex selected from the group consisting of the frontal lobe, the parietal lobe, the temporal lobe, the occipital lobe and a combination thereof.

11. (Original) The brain-computer interface of claim 1, wherein the cortical graft layer is about 50 microns to about 1 mm in thickness.

12. (Cancelled).

13. (Cancelled).

14. (Currently Amended) The brain-computer interface of claim [[13]] 1, wherein the light ~~signal~~ source has a wavelength of about 300 nm to about 1.5 microns.

15. (Cancelled).

16. (Original) The brain-computer interface of claim 1, wherein the mammal is a human.

17. (Cancelled).

18. (Currently Amended) The brain-computer interface of claim [[17]] 16, wherein the human has an impairment selected from the group consisting of a motor skill, a sight function, an auditory function, a taste function and an olfactory function.

19-35. (Cancelled).

36. (New) A brain-computer interface (BCI) configured to be engrafted on a brain of a mammal, the BCI comprising:

a cortical graft layer comprising a plurality of exogenous neuronal cells configured to be transplanted on the brain's cerebral cortex, the plurality of exogenous neuronal cells being configured to engraft on the brain; and

a signal detector configured to detect a detectable signal,

wherein the exogenous neuronal cells are configured to, at an outermost cortical layer, penetrate the brain by processes growing from the exogenous neuronal cells, and

wherein the exogenous neuronal cells are tethered to electrodes connected to the signal detector.

37. (New) A brain-computer interface (BCI) configured to be engrafted on a brain of a mammal, the BCI comprising:

a cortical graft layer comprising a plurality of exogenous neuronal cells configured to be transplanted on the brain's cerebral cortex, the plurality of exogenous neuronal cells being configured to engraft on the brain; and

processing circuitry configured to send information to the brain of the mammal via the cortical graft layer,

wherein the exogenous neuronal cells are configured to, at an outermost cortical layer, penetrate the brain by processes growing from the exogenous neuronal cells, and

wherein the exogenous neuronal cells are tethered to electrodes connected to the processing circuitry.

38. (New) A brain-computer interface (BCI) configured to be engrafted on a brain of a mammal, the BCI comprising:

a cortical graft layer comprising a plurality of exogenous neuronal cells configured to be transplanted on the brain's cerebral cortex, the plurality of exogenous neuronal cells being configured to engraft on the brain;

processing circuitry configured to send information to the brain of the mammal via the cortical graft layer; and

a light source configured to illuminate the cortical graft layer based on signals from the processing circuitry to transmit information to the cortical graft layer,

wherein the exogenous neuronal cells are configured to, at an outermost cortical layer, penetrate the brain by processes growing from the exogenous neuronal cells.

39. (New) A brain-computer interface (BCI) configured to be engrafted on a brain of a mammal, the BCI comprising:

a cortical graft layer comprising a plurality of exogenous neuronal cells configured to be transplanted on the brain's cerebral cortex, the plurality of exogenous neuronal cells being configured to engraft on the brain;

processing circuitry configured to receive information from the brain of the mammal via the cortical graft layer; and

a camera configured to capture image data of the cortical graft layer and connect to the processing circuitry to obtain information from the cortical graft layer,

wherein the exogenous neuronal cells are configured to, at an outermost cortical layer, penetrate the brain by processes growing from the exogenous neuronal cells.