

## Accepted Manuscript

Title: Antidepressant effects of focused ultrasound induced blood-brain-barrier opening

Authors: Skyler J. Mooney, José N. Nobrega, Anthony J. Levitt, Kullervo Hynynen



PII: S0166-4328(17)31739-4  
DOI: <https://doi.org/10.1016/j.bbr.2018.01.004>  
Reference: BBR 11245

To appear in: *Behavioural Brain Research*

Received date: 24-10-2017  
Revised date: 5-1-2018  
Accepted date: 6-1-2018

Please cite this article as: Mooney SJ, Nobrega JN, Levitt AJ, Hynynen K, Antidepressant effects of focused ultrasound induced blood-brain-barrier opening, *Behavioural Brain Research* (2018), <https://doi.org/10.1016/j.bbr.2018.01.004>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## Antidepressant effects of focused ultrasound induced blood-brain-barrier opening

**Authors:** Skyler J. Mooney<sup>1,\*</sup>, José N. Nobrega, PhD<sup>3,4</sup>, Anthony J. Levitt, MBBS<sup>2,3</sup>, Kullervo Hynynen, PhD<sup>1,5</sup>

### Affiliations:

<sup>1</sup> Physical Sciences Platform, Sunnybrook Research Institute, Toronto, Canada

<sup>2</sup> Department of Psychiatry, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada.

<sup>3</sup> Department of Psychiatry, University of Toronto, Toronto, Ontario, Canada.

<sup>4</sup> Behavioural Neurobiology Laboratory, Research Imaging Centre, Centre for Addiction and Mental Health, Toronto, Ontario, Canada.

<sup>5</sup> Department of Medical Biophysics, University of Toronto, Toronto, Ontario, Canada.

\* Corresponding author:

2075 Bayview Avenue, Suite C07 13  
Toronto, ON Canada M4N 3M5  
Telephone: 647-523-2478  
Email: mooneysk@sri.utoronto.ca

### Highlights

- The blood-brain-barrier of rats is transiently opened with focused ultrasound
- 2 weekly treatments results in short-term antidepressant effects.
- Longer-term effects are absent at 5 weeks post-treatment

### Abstract

In many cases, hippocampal neurogenesis appears to be a hallmark of antidepressant treatments. One novel technique for inducing this type of neurogenesis is using focused ultrasound waves, in conjunction with circulating microbubbles, to open the blood-brain-barrier. The present experiment aimed to test whether this technique has antidepressant effects in a rodent model. Rats were subjected to 1, 2 or 3 weekly treatments of magnetic resonance-guided focused ultrasound in order to open the blood-brain-barrier in the hippocampal region. Before and after treatments, animals went through modified forced swim tests. 1 week after the final treatment, animals that received 2 weekly treatments showed antidepressant-like effects on behavioural measures in comparison to untreated controls. This was not the case for animals that received 1 or 3 weekly treatments. Effects had disappeared by 5 weeks following the first ultrasound treatment. These results suggest that focused ultrasound may be used for inducing short-term antidepressant effects.

Download English Version:

<https://daneshyari.com/en/article/8837897>

Download Persian Version:

<https://daneshyari.com/article/8837897>

[Daneshyari.com](https://daneshyari.com)