

## Accepted Manuscript

Title: Evidence for mast cell-mediated zinc homeostasis:  
Increased labile zinc in the hippocampus of mast-cell deficient mice

Authors: Rachel H. Kennedy, Amen Wiqas, James P. Curley



PII: S0304-3940(17)30338-5  
DOI: <http://dx.doi.org/doi:10.1016/j.neulet.2017.04.037>  
Reference: NSL 32778

To appear in: *Neuroscience Letters*

Received date: 24-3-2017  
Accepted date: 20-4-2017

Please cite this article as: Rachel H.Kennedy, Amen Wiqas, James P.Curley, Evidence for mast cell-mediated zinc homeostasis: Increased labile zinc in the hippocampus of mast-cell deficient mice, *Neuroscience Letters* <http://dx.doi.org/10.1016/j.neulet.2017.04.037>

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.

## Evidence for mast cell-mediated zinc homeostasis: Increased labile zinc in the hippocampus of mast-cell deficient mice

Rachel H. Kennedy<sup>a,b\*</sup>, Amen Wiqas<sup>c</sup>, James P. Curley<sup>a,d</sup>

<sup>a</sup>Department of Psychology, Columbia University, New York, New York, USA

<sup>b</sup>Department of Science, Bard Early College-Manhattan, New York, New York, USA

<sup>c</sup>Department of Psychology, Barnard College, New York, New York, USA

<sup>d</sup>Center for Integrative Animal Behavior, Columbia University, New York, New York, USA.

email: [rhk2117@columbia.edu](mailto:rhk2117@columbia.edu), [aw2868@barnard.edu](mailto:aw2868@barnard.edu), [jc3181@columbia.edu](mailto:jc3181@columbia.edu)

\*corresponding author

### Highlights

- Mast cell deficient mice have higher levels of labile brain zinc than wild type animals
- Total brain zinc levels remain unchanged
- Granule cell layer and hilar regions of the dentate gyrus are not significantly different
- Data support mast cell-mediated zinc homeostasis in hippocampus

### ABSTRACT

The dentate gyrus of the hippocampus is a site of adult neurogenesis, and is also known to contain one of the highest concentrations of labile brain zinc (Zn), thought to aid in learning and memory by supporting neurogenesis. At the same time, it is known that unbound Zn, when present at excessive levels, decreases the formation of new neurons. Since mast cells contain Zn transporters capable of moving this essential element across their plasma membrane, as well as Zn-rich granules that are dispelled upon secretion, we reasoned that mast cells contribute to Zn homeostasis in this area of the brain, as they are found in greatest numbers in and around the dentate gyrus. This line of evidence was tested by comparing Timm-stained hippocampal sections of mast cell-deficient C57BL/6-*Kit*<sup>W-sh/W-sh</sup> (*Sash*<sup>-/-</sup>) mice to those of mast cell-containing wild type (*Sash*<sup>+/+</sup>) animals. Mast cell deficient mice were found to have significantly increased Timm-positive staining as compared to controls, reflecting an increase in labile or bioactive Zn in this region. As we observed no change in total brain Zn (protein-bound plus unbound Zn), these increases indicate that mast cells may serve to bind what would otherwise be excessive or deleterious levels of labile Zn, or that they are able to recruit metallothionein proteins. Because elevated levels of labile Zn are observed in the brains of patients with neurodegenerative diseases such as Alzheimer's, the potential contribution of mast cells to these diseases remains a compelling one. Overall, these data support a role for

Download English Version:

<https://daneshyari.com/en/article/5738356>

Download Persian Version:

<https://daneshyari.com/article/5738356>

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