http://dx.doi.org/10.5665/sleep.3194

Relation of Melanin Concentrating Hormone Levels to Sleep, Emotion and Hypocretin Levels

A response to Fraigne JJ, Peever JH, Jones BE, Hassani OK, McGinty D, Alam N, Luppi PH, Peyron C, and Fort P. Critical Topics Forum. Sleep 2013;36:1767-1776.

Ashley M. Blouin, PhD[1]; Jerome M. Siegel, PhD[2]

[1]Department of Metabolism and Aging and Department of Neuroscience, The Scripps Research Institute, Jupiter, FL; [2]Neurobiology Research, VA Greater Los Angeles Healthcare System, Neuropsychiatric Institute and Brain Research Institute, University of California, Los Angeles, North Hills, CA

We thank the editor[1] and commentators[2-5] for their kind remarks on our human microdialysis paper[6] and for integrating the results of all three papers.[6-8] Our findings in the human are quite compatible with Konadhode et al.[7] They found that optogenetic activation of MCH neurons decreased sleep onset latency and increased total sleep time. We see a great increase in MCH levels in the human brain at sleep onset and a smaller elevation of MCH levels throughout sleep. These microdialysis data together with Konadhode et al.'s stimulation data establish a causal link between MCH release and normal human sleep. In contrast, we see that Hcrt level, assessed from the same aliquots of microdialysis fluid, decreases prior to sleep onset. We agree with the commentators' suggestion that our findings of elevated MCH level after eating may be related to postprandial relaxation, although this increase is clearly occurring in a waking state and may simply be linked to satiety.

An important finding of our study was that whereas MCH and Hcrt are often inversely related to each other, this is not always the case. For example, MCH and Hcrt levels were both markedly decreased while the subjects were experiencing pain during waking. We found a strong link between Hcrt release and emotion, especially positive emotion. No such emotional link was seen with MCH levels with the same assays in the same aliquots. These unique human data thus highlight another difference between MCH and Hcrt: Hcrt is strongly related to positive affect, whereas MCH is not related to positive or negative affect within waking, but rather to sleep onset and satiation or postprandial relaxation.

We directly addressed the role of Hcrt neurons in a wide range of behaviors in prior studies in the dog, cat, rat, and mouse.[9-14] These studies all point to a role for Hcrt in maintaining arousal during positively motivated behaviors such as play or bar pressing for food or water. Our human data are consistent with that conclusion.

CITATION

Blouin AM; Siegel JM. Relation of melanin concentrating hormone levels to sleep, emotion and hypocretin levels. *SLEEP* 2013;36(12):1777.

Submitted for publication October, 2013
Accepted for publication October, 2013

Address correspondence to: Jerome M. Siegel, Neurobiology Research, VA Greater Los Angeles Healthcare System, Neuropsychiatric Institute and Brain Research Institute, University of California, Los Angeles, 16111 Plummer St., North Hills, CA 91343.

DISCLOSURE STATEMENT

This was not an industry supported study. The authors have indicated no financial conflicts of interest.

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