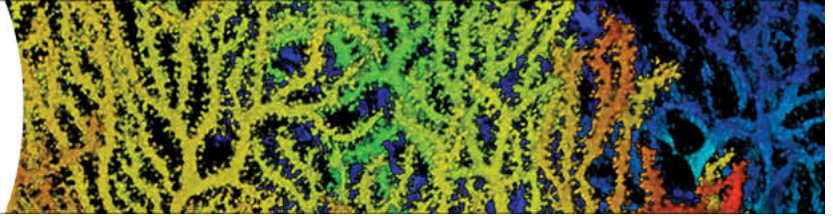




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### Ultrasound vocalization syllable–shape specific neural activity modulations found within cortico–limbic areas

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#### Abstract:

It is known that mice produce ultrasonic vocalizations (USVs) under several social contexts comprising syllables with different lengths and shapes. Although it is documented that USVs have certain communicative functions (Portfors and Perkel, *Curr Opin Neurobiol*, 2014), the neural correlates and social meanings of different syllable morphologies remain unexplored. At the same time, there is a lack of understanding of activities in the cortico–limbic areas related to USV production, although some correlated activity was found in lower thalamic and medullary regions. In this study, we let pairs of a male and a female mouse freely interact while using the CBRAIN telemetry system (Kim et al., *Sci Adv*, 2020) to record activities in the nucleus accumbens (NAc), medial prefrontal cortex (mPFC), and basolateral amygdala (BLA) regions. Over 20,000 distinct USV syllable contours were extracted from the recordings through an optimized USV detection and purification algorithm. Through analysis of USV frequency contour patterns together with oscillatory activities synchronized to the USV production time, we identified syllable–shape specific modulations in the recorded areas, where the strongest were found in the NAc region. Current study's findings suggest a possibility of dynamic activities in the higher brain regions of the mouse influencing lower motor regions, enabling the mouse to produce a larger repertoire of sounds that could convey different social values.

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**G. Lee:** None. **J. Lee:** None. **J.H. Choi:** None.

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**For the Program Planner :** \*G.-H. LEE<sup>1,2</sup>, J. LEE<sup>1</sup>, J. H. CHOI<sup>1</sup>;

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