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Control of genioglossus muscle inspiratory activity.

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Tonic and phasic inspiratory genioglossus (GG) electromyographic activity (EMG) was recorded from 13 anesthetized rabbits during unstimulated breathing. Integrated GG EMG peaked earlier in inspiration and presented a more rounded contour than integrated diaphragmatic (DIA) EMG. Spontaneous augmented deep inspirations (sighs) showed a biphasic pattern in both GG and DIA EMGs. Hyperventilation abolished phasic inspiratory activity in the GG before the DIA, suggesting that the GG has a higher CO2 apneic point. Hypercapnia increased both EMGs; however, GG EMG increased more, as a percent of base line, than did DIA EMG. Oxygen breathing decreased GG more than DIA EMG; sodium cyanide injection and brief nitrogen breathing increased GG more than DIA EMG; carotid body denervation abolished these responses. Vagotomy abolished the Hering-Breuer inflation-inhibition reflex in both muscles, and tactile, visual, and auditory stimulation increased GG more than DIA EMG. Thus, the GG responses to chemoreceptor input and to nonspecific respiratory stimuli are qualitatively similar but quantitatively different from DIA responses. The relevance to mixed and obstructive apnea is discussed.

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