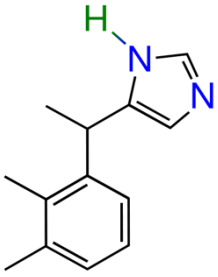


*Counterintuitively, Higher Continuous Infusion Rate of
Dexmedetomidine Shows the Tendency to Retain Both
Hypoglossal and Phrenic Nerve Activities Compared to Lower Rate
in Anesthetized Rabbits.*



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Overview of Our Experiment

At SASM 2015, we have reported that **bolus** injections of dexmedetomidine (**Dx**) induce balanced inhibition in hypoglossal and phrenic nerve activities (**HGA** and **PNA**). It's thought to be one of the main reasons for sedation with **Dx** achieved without serious pharyngeal collapse.

This time, we have studied the effects of **continuous** infusion of **Dx** on **HGA** and **PNA** in anesthetized rabbits.

We found that **the high** infusion rate of **Dx** more preserved respiratory-related nerve activity compared to the lower.



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How did we Examine the Effects of Dx on “Respiratory-Related Nerve Activity” ?

We estimated the effects of two infusion rates of Dx on **HGA** and **PNA** (Low Rate; 10 mcg/kg/hr., Dx10, n=6: High Rate; 30 mcg/kg/hr., Dx30, n=5) until 10 mcg/kg Dx was reached, or severe hypotension would occur. We measured the root mean square (**RMS**) on the integrated neurogram before and after Dx infusion (control, 2.5, 5.0, 7.5 and 10.0 mcg/kg in total). To compare the respiratory effects of Dx on **HGA** and **PNA**, percentage changes in **RMS** were calculated using a value of 100% for the activity before Dx infusion (control).

Rabbits Sample Size: n=11

Anesthetized with sevoflurane, N₂O, O₂ to prevent any nociceptive pain

Pancronium-Paralyzed

Mechanically Ventilated to keep CO₂ constant and avoid hypoxia

Bilaterally Vagotomized to interrupt pulmonary reflex



HGA : Hypoglossal Nerve Activity, keeping upper airway patency

PNA : Phrenic Nerve Activity, making inspiratory negative force

Dx10: 10 mcg/kg/hr. (Low Infusion Rate of dexmedetomidine)

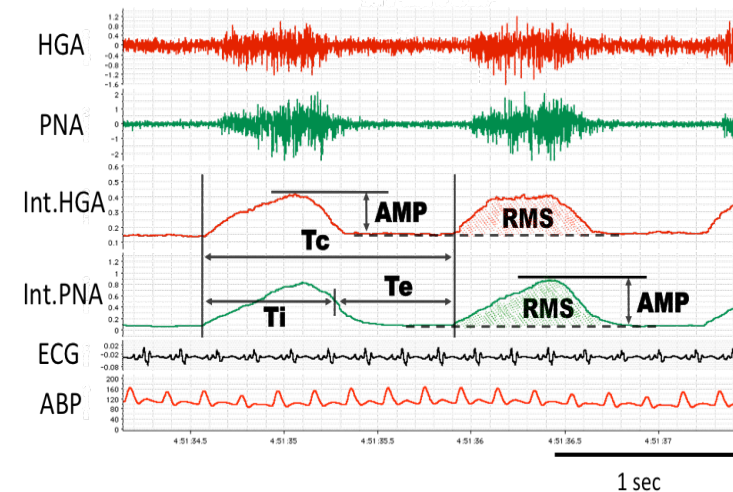
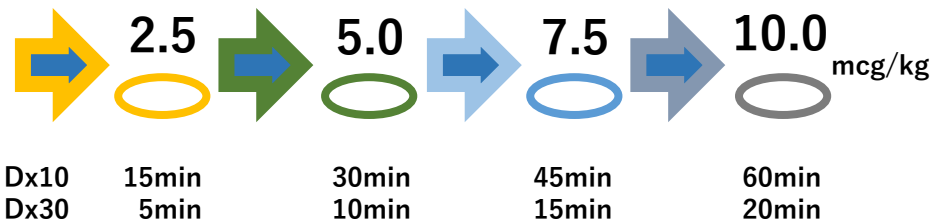
Dx30: 30 mcg/kg/hr. (High Infusion Rate of dexmedetomidine)

Dx10 or Dx30 Continuous Infusion

Dosage Levels

Start

End



HGA: Whole Hypoglossal Nerve Activity

PNA: Whole Phrenic Nerve Activity

Int.HGA: Integrated Neurogram of HGA

Int.PNA: Integrated Neurogram of PNA

RMS: Root Mean Square of Integrated Neurogram

AMP: Amplitude of Integrated Neurogram

Tc: Neural Respiratory Cycle

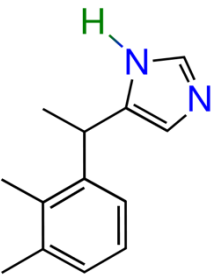
Ti & Te: Inspiratory and Expiratory Time

Others: HR, mABP, ETCO₂, Rectal Temperature

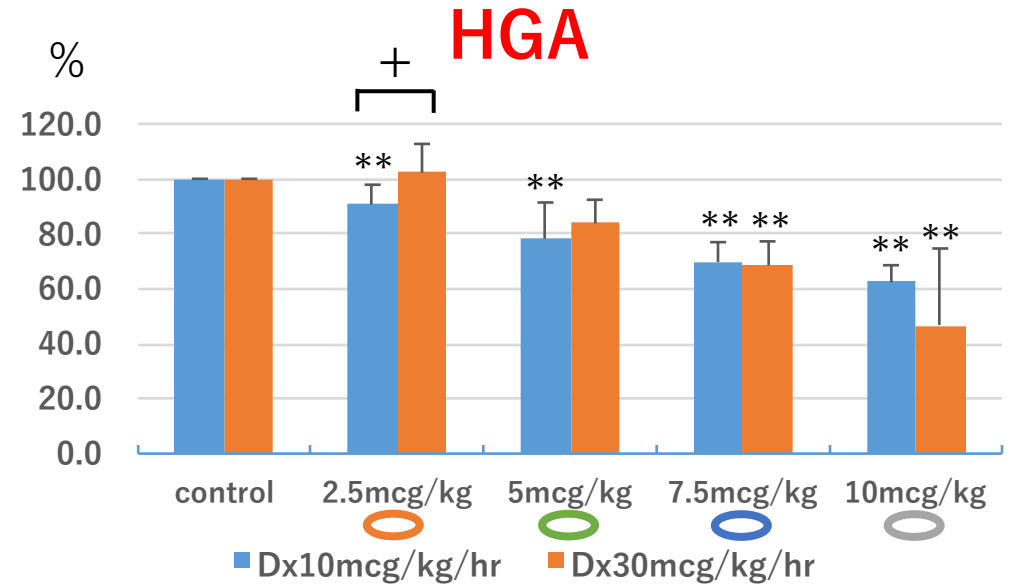
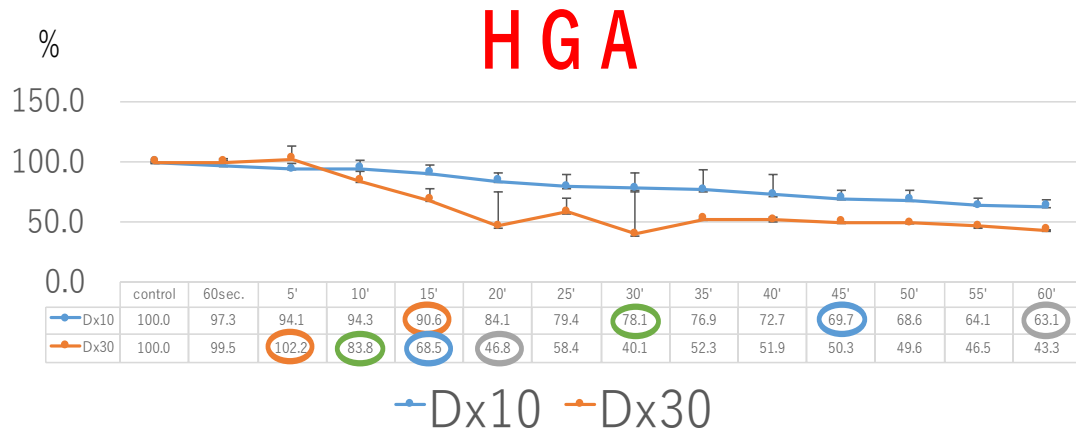


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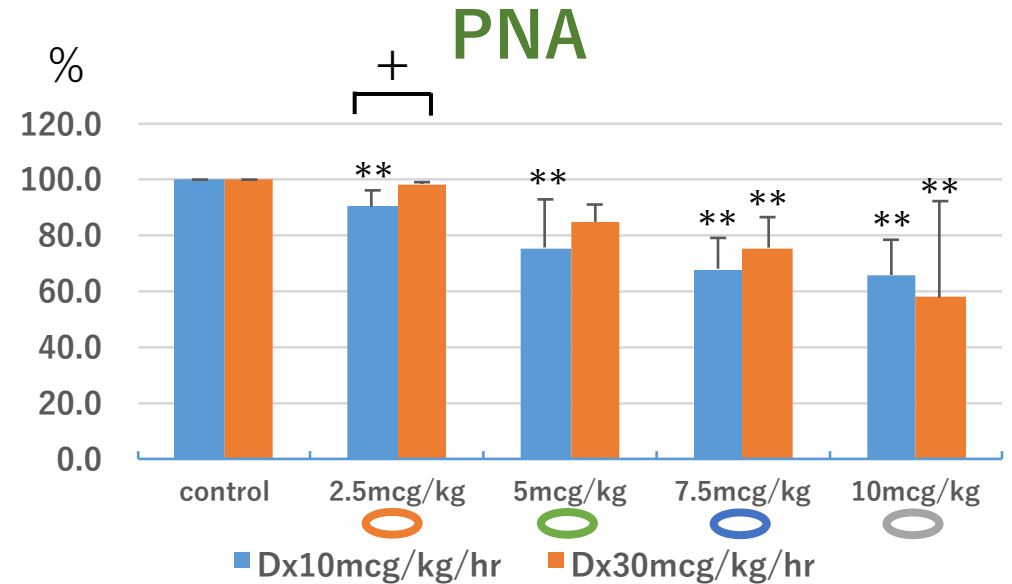
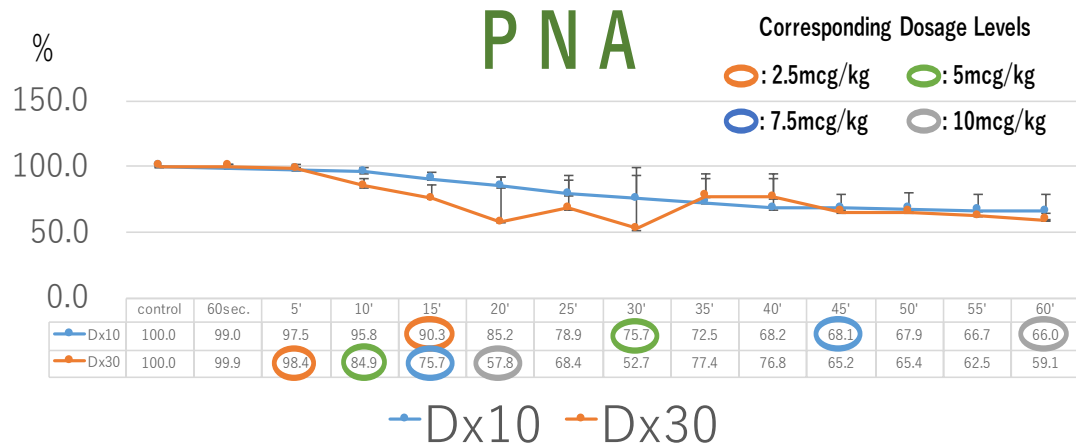
Results: Unexpected Consequences !



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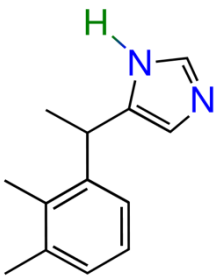
Sampling Size	control	60sec.	5'	10'	15'	20'	25'	30'	35'	40'	45'	50'	55'	60'
Dx10: n=6	6	6	6	6	6	6	6	6	6	6	3	3	3	3
Dx30: n=5	5	5	5	5	5	5	3	3	2	2	1	1	1	1



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Conclusions and Implications

At the same dosage of Dx the **Higher** infusion rate of Dx preserved respiratory activities more than the Lower one, which may be attributed to **time**-dependent changes in the effects of Dx.



Counterintuitively, Higher Continuous Infusion Rate of Dexmedetomidine Shows the Tendency to Retain Both Hypoglossal and Phrenic Nerve Activities Compared to Lower Rate in Anesthetized Rabbits.

So our finding may help us to **better** understand the clinical practice of Dx sedation.

However, there is insufficient evidence concerning optimal infusion rates of Dx for the induction, and thus may **not** be directly applicable to humans.

That's all. Thank you for your attention.

