Vestibular Autonomic Interaction During Galvanic Vestibular Stimulation

Galen Huffcutt, *Utah State University* | Chris Warren, *Utah State University*

Introduction

- Galvanic Vestibular Stimulation (GVS) is a technique used to improve a person's balance.
- Small electrodes are placed behind the ears and an electric current is applied.
- How specific is the current to the vestibular system?
- Branches of the sympathetic nervous system (SNS) are nearby
- Salivary alpha amylase is a hormonal marker that increases when the transcutaneous vegas nerve has been stimulated
- If it increases with GVS, then the SNS has also been stimulated
- Hypothesis: GVS also stimulates the SNS
- Null hypothesis: It has no effect

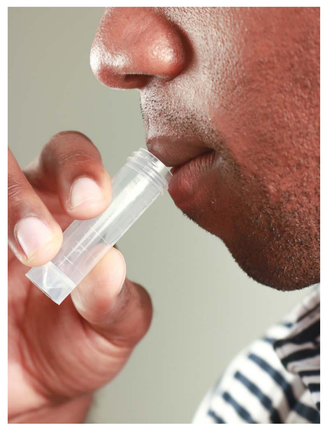
Methods

- Sample size: 40
- 2 60-minute sessions separated by at least 3 days at a maximum of 9 days
- During one session GVS will be applied, during the other it will be a sham stimulation
- Saliva will be collected at various times and later assayed for salivary alpha amylase
- A balance test is also done

Results/Conclusions

- The project will begin shortly once it is approved by the IRB
- Either way the results lean, it will still be significant

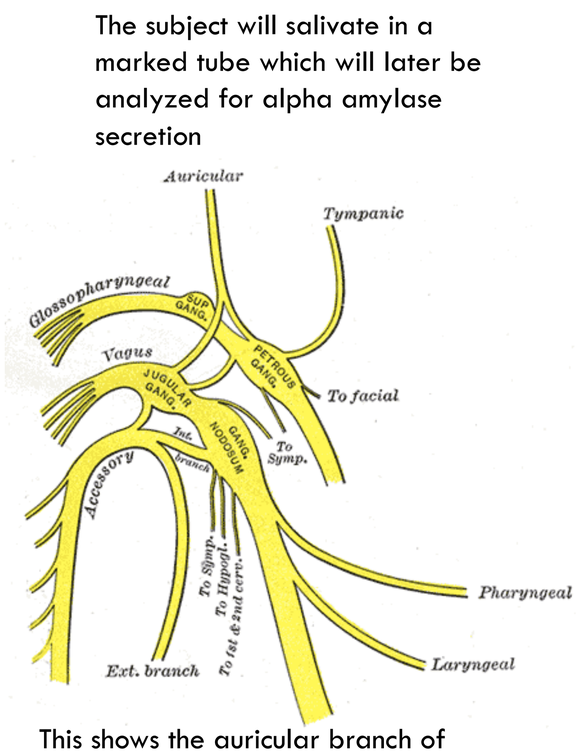
These pictures show the position of the electrodes for taVNS and sham stimulation



The subject will salivate in a marked tube which will later be analyzed for alpha amylase secretion

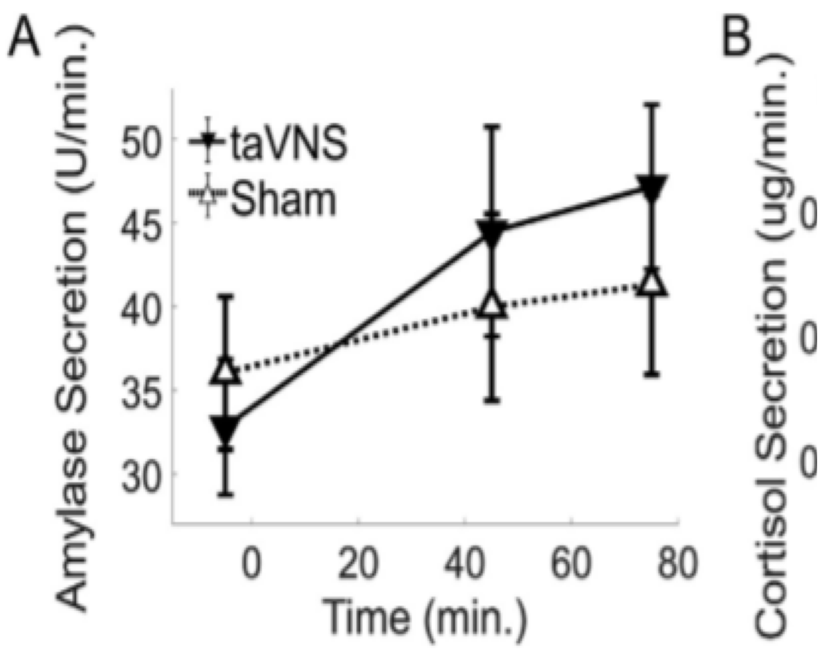
Time Relative to Arrival	Activity	Stimulation /Sham	Time Relative to Stimulation
0	Arrive/Orientation		-32
4	Informed Consent		-28
8	Demographics		-24
12	Saliva Sample 1 (Baseline)		-20
16	Balance Test 1 (Baseline)		-16
20	Set up Device		-12
24			-8
28	Calibrate		-4
32	Balance Test 2	ON	0
36	Break	OFF	4
40	Break	ON	8
44	Break	OFF	12
48	Break	ON	16
52	Break	OFF	20
56	Break	ON	24
60	Break	OFF	28
64	Balance Test 3	ON	32
68	Break	OFF	36
72	Saliva Sample 2	ON	40
76	Break	OFF	44
80	Break	ON	48
84	Break	OFF	52
88	Saliva Sample 3	ON	56
92	Break	OFF	60
96	Break	ON	64
100	Break	OFF	68
104	Saliva Sample 4	ON	72
108	Remove Device		76
112	Balance Test 4		80
116	Debrief		84
120	Leave		88

This chart shows the schedule of the study



This shows the auricular branch of the vegas nerve, where we will be stimulating

This shows a man standing on a force plate, which increases the stability of a person's center of gravity



This chart shows the effects of taVNS on alpha amylase secretion. We expect to see similar results

Galen Huffcutt
Utah State University
Department of Biology
gphuffcutt@aggiemail.usu.edu

Utah State University
DEPARTMENT OF BIOLOGY