The ability of a treatment method to interfere with tinnitus-related neural activity patterns has been suggested to indicate its potential in relieving tinnitus [1]. Decreased alpha-band (8–12 Hz) and increased gamma-band (> 30 Hz) activity, especially in temporal areas, have been reported in tinnitus patients. Changes in interareal connectivity have also been identified as possible tinnitus markers [2].

Our aim was to investigate the effects of transcortaneous vagus nerve stimulation (tVNS) on evoked and spontaneous auditory cortex activity.

**SUBJECTS & METHODS**

### RESULTS

**TINNITUS-MATCHED TONES**

The tVNS-induced changes in connectivity are illustrated in **Fig. 1**.

**Gamma** connectivity decreased in all subjects between left AC and left **BA 32** (dorsal ACC, mean decrease 0.021); right AC and right **BA 6** ( premotor cortex, mean decrease 0.02); and right AC and left **BA 37** (fusiform gyrus, mean decrease 0.012).

Further, the change in **gamma** connectivity between right AC and left **BA 44** (Broca’s area) correlated negatively with THI scores ($r = -0.964$). Also **beta** connectivity between left AC and right **BA 35** (perirhinal area) correlated with THI scores ($r = 0.964$). THI scores also correlated with the change in left AC **delta** spectral power ($r = 0.964$) and right AC **gamma** spectral power ($r = -0.964$).

### SILENCE

The tVNS-induced changes in connectivity are illustrated in **Fig. 2** and given numerically in **Table 2**. THI scores correlated with changes in left AC **alpha** power ($r = -0.893$); **gamma** connectivity between left AC and right **BA 23** (ventral PCC, $r = 0.893$); and in **alpha** connectivity between left AC and left **BA 26** (cingulate gyrus, $r = 0.964$).

### CONCLUSIONS

tVNS-induced changes were most prominent at gamma band for tone-evoked activity, and at alpha band for spontaneous activity.

tVNS may interfere with dysfunctional auditory-limbic connections found in tinnitus [5].

### REFERENCES