Purpose: In this study we utilized resting state fMRI (rsfMRI) to identify and compare hypothalamic connectivity in lean subjects during fasting and satiated state.

Methods:

rsfMRI were performed on 7 healthy lean subjects (4 male, 3 female, 20-35 yo, BMI = 18-25 kg/m2). Subjects fasted overnight (8 hrs), average blood glucose of 80Â± 5 mg/dL. None of the subjects were on diet program or recently lost/gain weight. rsfMRI EPI parameters: TR = 3000ms, TE = 30 ms, and spatial resolution of 1.7 x 1.7 mm x 5mm, ST= 65 mins (10-min pre-glucose ingestion acquisition, followed by 50 mins of post-glucose ingestion). During rsfMRI, subjects ingested standard glucola (75 g of glucose dissolved in 296 ml of flavored water) over 4.5 Â± 0.75 min via a peroral rubber tube. Preprocessing procedure was implemented using FSL consisting of 1) motion correction 2) spatial smoothing, 3) temporal filtering between 0.01-0.08 Hz. Using the Talairach-Daemon atlas, ROI in the hypothalamus was selected. The individual timeseries of hypothalamus was used as seed to find neural structures that share similar temporal pattern that hypothalamus.

Results:

Structures that were engaged only during fasting were (Table 1): Inferior frontal gyrus (BA 47) has been linked to the modulation of hunger. The output from the orbitofrontal cortex to both striatum (lentiform nucleus) and lateral hypothalamus has been reported. The structures that were engaged only during satiated state were: Superior temporal gyrus has been implicated in food inhibition and mid temporal gyrus has been reported to be engaged in satiation. Cerebellum is activated when the brain is monitoring its sensory systems.