Understanding ~~the Processing~~ cortical processing of ~~Pitch~~ pitch as a ~~Frequency-Selective Inhibitory Process~~frequency-selective inhibitory process

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Pitch is a fundamental attribute of auditory sensation underlying the perception of complex sounds. However, the dynamics of pitch processing in human auditory cortex ~~is~~ are not fully understood ~~and is currently the backbone of~~ yet, engendering a vibrant debate. The N100m is a transient neuromagnetic response of auditory evoked fields observed in magnetoencephalographic recordings, ~~which is~~ sensitive to fundamental properties of the auditory stimuli such as pitch or timbre. The N100m is associated with activity in the antero-lateral Heschl's gyrus (alHG) in human auditory cortex~~; thus, it has been related~~ , which relates it to the perceptual processing of pitch. In this work, we explain the N100m ~~component~~ morphology on the basis of the dynamics of a network of cortical ensembles endowing realistic neural and synaptic parameters~~; which receives inputs from a biophysically detailed model of the peripheral auditory system. The model is~~ . The ensembles are derived from a mean field approximation of a network of spiking neurons. Selective populations receive inputs from a biophysically detailed model of the peripheral auditory system, from an excitatory non-selective population and from an ensemble of inhibitory interneurons. The resulting network is further simplified to be primarily driven by GABA and NMDA receptor dynamics. Interestingly, ~~ensemble connectivities furnish~~ the inhibitory connectivities enconde a harmonic structure ~~of recurrent self-excitations and effective inhibitory currents between frequency-selective populations which~~ that seems to be critical for the cortical processing of pitch. The model enables us to successfully link neurophysiological ensemble responses with perception. The dynamics of the gating variables of the neural ensembles explains the morphology of the N100m component in human alHG evoked by different dyads; for the first time to our knowledge. Moreover, the ~~activation of a subset of selective populations~~ , relative activation the populations is predictive of the pitch value. Critically, ~~the model dynamics explains~~ is the selective inhibiton that decodes the pitch value what generates the dynamics explaining the N100m response~~as the result of an increase in the input current of the neural ensembles followed by a frequency-selective inhibitory process~~. Thus, the model sheds light on the biophysical mechanisms underlying pitch perception and can potentially explain a range of neurophysiological data associated to pitch.