Extracirculatory effects of noise of various frequency spectra in humans – effect of pink and blue noise on gastric myoelectrical activity and gastrointestinal passage of nutrients

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**Background.** Recent investigations in humans point out to a disturbing effect of auditory stimuli on the functional integrity of the brain-gut axis. **Aim.** The study was devoted to a systematic comparative evaluation of the effect of noises of different frequency spectra on the postprandial myoelectrical and transport functions of the digestive tract in humans. **Methods.** Twenty six healthy, Helicobacter pylori negative subjects were examined. Everyone had a normal audiogram confirming an undamped hearing of low and high frequencies, and a negative interview as to any occupational exposure to noise. The subjects attended a series of six examination sessions held at separate days; the randomized cross-over design of the study was targeted at a comparison of the effect of pink contrasted to blue noise within a given category (band or tonal) and a meal stimulus type (semi-liquid or solid test meal). The noises were digitally synthesized so as to resemble real-life ones produced by: a jet plane (pink band), gas welding (blue band), a low-frequency power transformer (pink tonal), a high-speed drilling machine (blue tonal). They were emitted through headphones for 45 min postprandially at an identical acoustic pressure level of 91 dB(A). A panel of noninvasive measurement methods was applied: heart rate variability (HRV) analysis, surface electrogastrography, $^{13}$C-Sodium acetate and $^{13}$C-octanoic acid breath test for liquid and solid phase gastric emptying (GE), respectively, and lactulose hydrogen breath test for orocecal transit time (OCTT). **Results.** Based on visual analogue scale records, the blue tonal noise was consistently rated the most annoying one, whereas solely the pink noises exerted discernible cardiovascular effects (a rise in pulse rate evoked by pink band noise, an augmentation of diastolic arterial blood pressure with pink tonal noise). No one of the four noises was capable of overriding the meal-induced preponderance of the sympathetic tone. The postprandial gastric myoelectrical activity and the GE of either the semi-liquid or the solid test meal appeared to be ‘resistant’ to the noise exposure, irrespective of the noise type. Similar was the finding in the case of the OCTT, with the exception of a statistically significant retardation of the OCTT with the blue band noise. **Conclusion.** Ingestion of mixed caloric meals seems to elicit a protective influence against noise-elicited derangements of the functional integrity of the digestive tract proven formerly to occur during the fasting period.