Physiological responses during exposure to carbon dioxide and bioeffluents at levels typically occurring indoors - DTU Orbit (27/04/2019)

Physiological responses during exposure to carbon dioxide and bioeffluents at levels typically occurring indoors

Twenty-five subjects were exposed to different levels of carbon dioxide (CO2) and bioeffluents. The ventilation rate was set high enough to create a reference condition of 500 ppm CO2 with subjects present; additional CO2 was then added to supply air to reach levels of 1000 or 3000 ppm, or the ventilation rate was reduced to allow metabolically generated CO2 to reach the same two levels (bioeffluents increased as well). Heart rate, blood pressure, end-tidal CO2 (ETCO2), oxygen saturation of blood (SPO2), respiration rate, nasal peak flow, and forced expiration were monitored, and the levels of salivary α-amylase and cortisol were analyzed. The subjects performed a number of mental tasks during exposures and assessed their levels of comfort and the intensity of their acute health symptoms. During exposure to CO2 at 3000 ppm, when CO2 was added or ventilation was restricted, ETCO2 increased more and heart rate decreased less than the changes that occurred in the reference condition. Exposure to bioeffluents, when metabolically generated CO2 was at 3000 ppm, significantly increased diastolic blood pressure and salivary α-amylase level compared with pre-exposure levels, and reduced the performance of a cue-utilization test: These effects may suggest higher arousal/stress. A model is proposed describing how mental performance is affected by exposure to bioeffluents.