



EGG as a physiological marker of motion sickness in Asian and non Asian subjects

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We use the EGG to study gastric dysrhythmias associated with the experience of nausea. We use motion sickness as a model to study nausea. That is, we study motion sickness, a specific cause of nausea, in a controlled laboratory situation where we can provoke symptoms in healthy subjects in 5-10 min, and have them return to their prior healthy state within 30 min. We believe that the symptoms of motion sickness are the result of conflicting sensory inputs, usually from the visual and vestibular systems, and possibly from the proprioceptive system. When one or more of these sensory inputs does not confirm to the expected pattern there will be a sensory mismatch and in susceptible subjects, symptoms of motion sickness^[1].

To study motion sickness in the laboratory we use a rotating optokinetic drum as a provocative stimulus. Subjects are seated inside the stationary drum with their heads positioned in the center of the drum and aligned with the vertical axis. The drum is rotated clockwise about its vertical axis at 10 rotations per minute, resulting

in circularvection, *i.e.* illusory self-motion. Within a few seconds, all subjects experiencevection, but feedback from their vestibular and proprioceptive systems indicates, rightly, that they are sitting still. In previous studies with mostly European-American subjects, we have shown that exposure to a rotating optokinetic drum provokes not only symptoms of motion sickness in susceptible subjects, but also an increase in sympathetic nervous system activity, a decrease in parasympathetic activity, an increase in gastric tachyarrhythmia, and an increase in the anti-diuretic hormone vasopressin^[2].

We began to investigate a possible genetic factor in susceptibility to motion sickness following the serendipitous finding that most Chinese subjects who came to our laboratory experienced severe nausea and other symptoms of motion sickness when exposed rotating optokinetic drum. Three laboratory studies were conducted to test the hypothesis that Asian subjects are hyper-susceptible to motion sickness. The results of the first study^[3] showed that Chinese women compared to European-American and African-American women experienced significantly more severe symptoms of motion sickness and greater disturbance of normal gastric myoelectric activity. A second study^[4] yielded similar results using American-born children of Asian parents. The results of a third study^[5] using Chinese men and women were similar and also showed a significant increase in vasopressin during rotation. Possible genetic mechanisms that may account for these results will be discussed.

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