

### **Invariant Reversible QEEG Effects of Anesthetics.**

John E.R., Prichep L.S., Kox W., Valdés-Sosa P., Bosch-Bayard J., Aubert E., Tom M., di Michele F., Gugino L.D. *Conscious Cogn.* 2001 Jun;10(2):165-83.

#### **Methods**

Continuous recordings of brain electrical activity were obtained from a group of 176 patients throughout surgical procedures using general anesthesia. Artifact-free data from the 19 electrodes of the International 10/20 System were subjected to quantitative analysis of the electroencephalogram (QEEG). Induction was variously accomplished with etomidate, propofol or thiopental. Anesthesia was maintained throughout the procedures by isoflurane, desflurane or sevoflurane (N = 68), total intravenous anesthesia using propofol (N = 49), or nitrous oxide plus narcotics (N = 59).

#### **Results**

A set of QEEG measures were found which reversibly displayed high heterogeneity of variance between four states as follows: (1) during induction; (2) just after loss of consciousness (LOC); (3) just before return of consciousness (ROC); (4) just after ROC. Homogeneity of variance across all agents within states was found. Topographic statistical probability images were compared between states. At LOC, power increased in all frequency bands in the power spectrum with the exception of a decrease in gamma activity, and there was a marked anteriorization of power. Additionally, a significant change occurred in hemispheric relationships, with prefrontal and frontal regions of each hemisphere becoming more closely coupled, and anterior and posterior regions on each hemisphere, as well as homologous regions between the two hemispheres, uncoupling. All of these changes reversed upon ROC. Variable resolution electromagnetic tomography (VARETA) was performed to localize salient features of power anteriorization in three dimensions. A common set of neuroanatomical regions appeared to be the locus of the most probable generators of the observed EEG changes.