cortiQ

RAPID CORTICAL MAPPING

rapid functional mapping of the cortex using the electrocorticogram (ECoG)

- generate a personalized functional map of the cerebral cortex in high detail
- can be operated at the patient's bedside
- optimize electrical cortical stimulation (ECS) mapping
- readily integrates with your existing clinical monitoring system
- go beyond the current time- and spatial resolution of mapping techniques by using the best suited signal – the ECoG
- use a brain-mapping system that works in real-time
- optimize surgical procedures
- minimize the burden for the patient
- reduce risk for patients
- reduce hospital time and costs
- provide a functional cortical atlas

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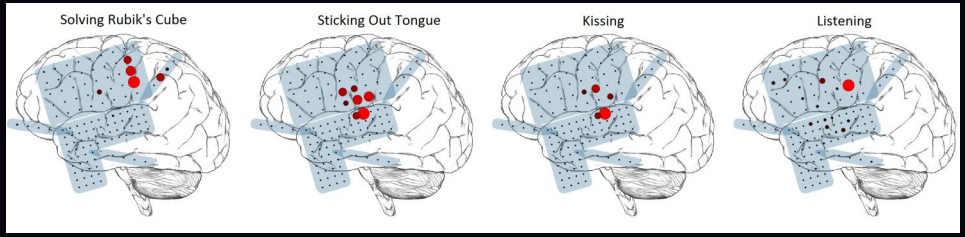
Brain surgery is a therapeutic option for many patients with intractable seizure disorders and brain tumors. The goals of surgery are twofold – on the one hand the epileptogenic tissue or tumor has to be removed, but on the other hand essential brain regions like primary motor and sensory cortex as well as brain areas supporting language and memory functions have to be spared to avoid neurological deficits caused by the operation. The decision to perform surgery and what brain region to resect is based on several considerations including the clinical examination, history, MRI, noninvasive video-EEG monitoring, neuropsychological testing, metabolic imaging studies (PET, SPECT), functional MRI and magnetoencephalography. If the above tests are not sufficient for reaching a decision, then an additional diagnostic procedure – invasive monitoring with implanted electrodes – is performed. cortiQ was developed to identify functional brain regions in real-time with invasive sensors. Using that data, the system constructs and continuously updates a Mental Activity Profile (MAP). This MAP is unique for each patient, reflecting which brain areas are active during specific functions. Medical experts are able to get more relevant information than previously possible, presented in a straightforward fashion with clear and helpful images, with less work than currently required.

As noted, pre-surgical evaluation for epilepsy and other conditions seeks to identify the affected areas (e.g. epileptic foci or tumors), as well as "eloquent" areas. The surgical procedure is then tailored such as to resect the affected areas while simultaneously sparing areas subserving important functions. Currently, the eloquent cortex is identified with electrical cortical stimulation (ECS) within 1.5-7.5 hours and is not completed for the majority of patients - leaving about 12-74% of the covered cortex unexplored. This is so because: (1) the areas had no relevance for the surgical procedure, (2) the stimulation current produced pain or a seizure or (3) time was limited.

cortiQ provides physicians with real-time results during pre-surgical evaluation for epilepsy or other conditions.

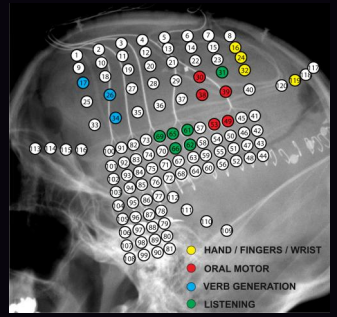
cortiQ takes advantage of existing ECoG grids (including the Leuthardt grid) and consists of the following components:

1. **Biosignal amplifier – high quality biosignal amplifier with 24 Bit and 256 channels**
2. **Real-time processing system – high performance real-time control unit to manage all devices in real-time, to analyze the signals and to visualize and store data**
3. **Mapping system – high performance source localization and mapping system based on SIGFRIED mapping technology (licensed from Wadsworth Center)**



cortiQ allows you to position the used electrode grids (selected from the cortiQ grid library) over a schematic brain map. For different tasks performed by the patient (e.g. using the Ritaccio paradigm), high gamma activity is indicated in form of red circles for all electrodes. A big red circle shows that the corresponding electrode is placed over a brain area which is highly active in the performed task.

Wadsworth Center/Albany Med, Albany, USA



Electrical cortical stimulation (ECS) is used to verify the correct electrodes incorporated in a specific task or action. Multiple grids and strips are often used to cover large cortical areas (Gerwin Schalk, Wadsworth Center, USA).

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