

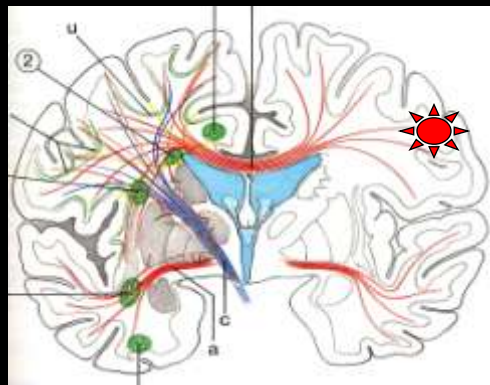
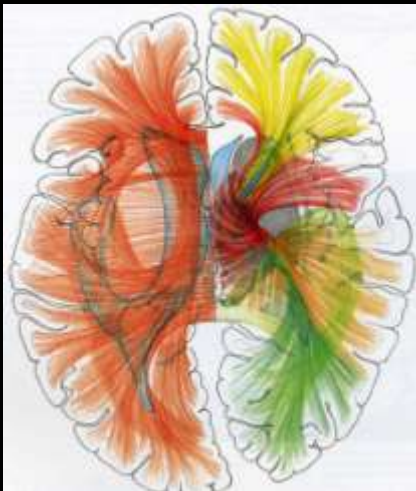
Epilepsy Surgery

“ Hypothesis to be proven ”



Atthaporn Boongird, MD.
Ramathibodi Hospital

Brain :electricity and circuits

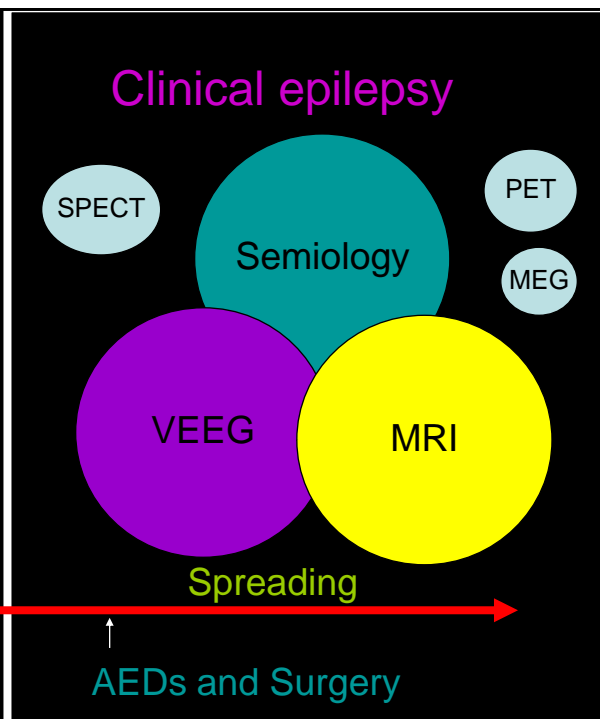


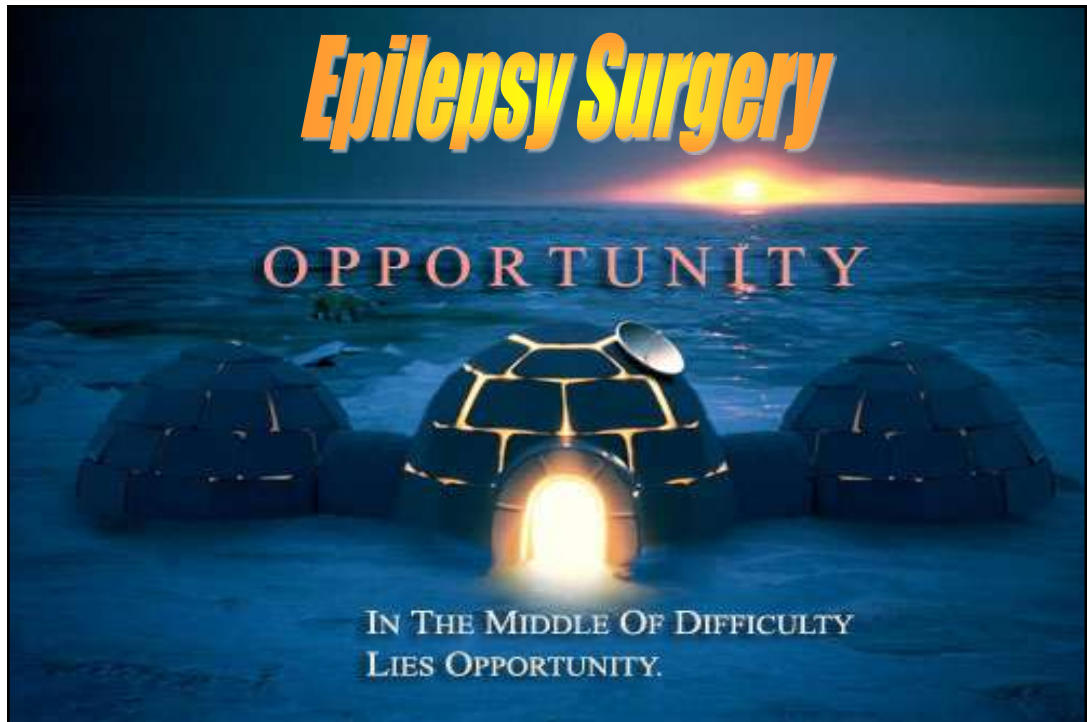
Two main characteristics defining the generation of epilepsy

- 1) **Hyperexcitability** : is the ability of neurons to fire spontaneously at a lower threshold than normal.
- 2) **Hypersynchrony** : is the ability of firing neurons to recruit neighboring cells and to transmit the signal to distant locations.

- Cellular level
 - Action potential
 - Paroxysmal depolarization shifts (PDS)
 - Changes in membrane potential
 - Hypersynchrony

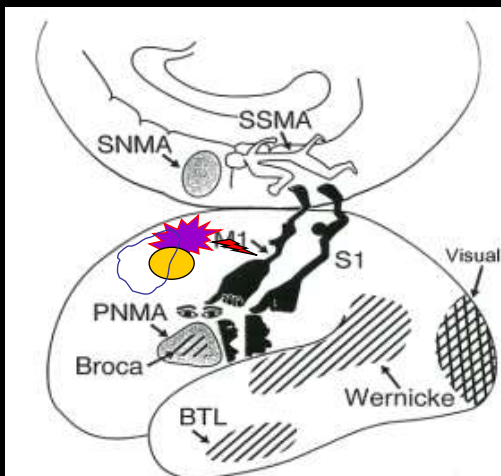
Gene, Biological markers or Substrates, ? New AEDs





Principle of epilepsy surgery

- aim to get rid of epileptogenic zone without any neurological deficit.



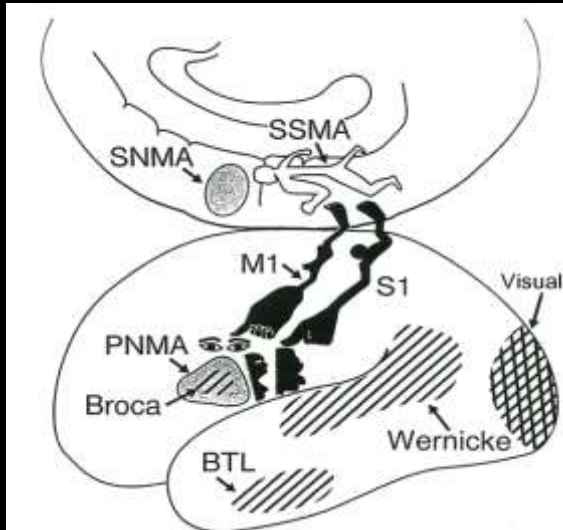
— Symptomatogenic zone.

— Epileptogenic lesion

— Irritative zone

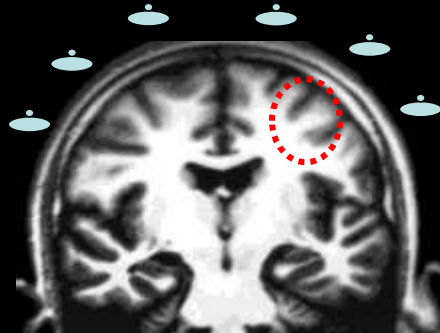
Functional deficit zone ??
- Todd's paralysis

Integrated Neuroanatomy&Physiology&Pathology



Stereotyped clinical semiology

Scalp EEG



Lesion or not

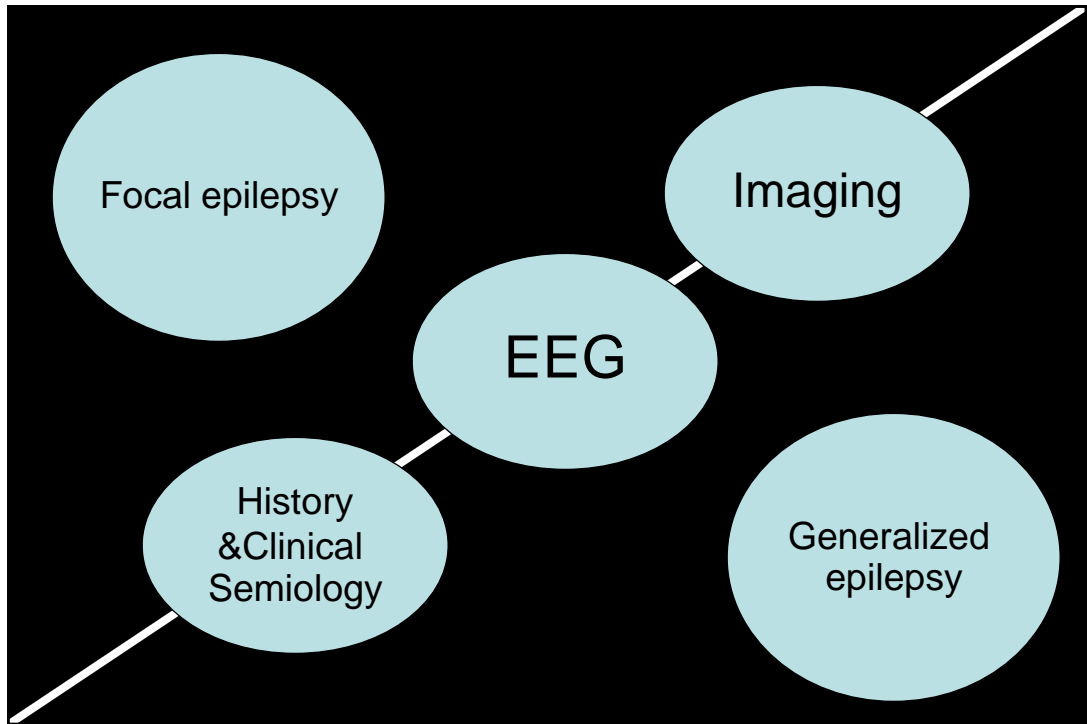
Focal epilepsy

Epilepsy surgery

Focal epilepsy

Generalized epilepsy

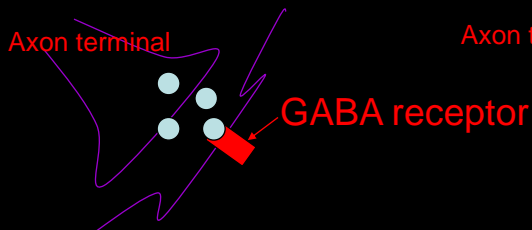
The first question to be answered????



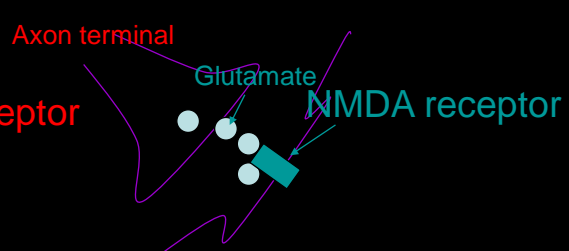
What is an electroencephalogram(EEG)?

- The EEG is a measure of cerebral electrical activity in the cortex.
- The post-synaptic potentials are the main generators of the recorded scalp EEG

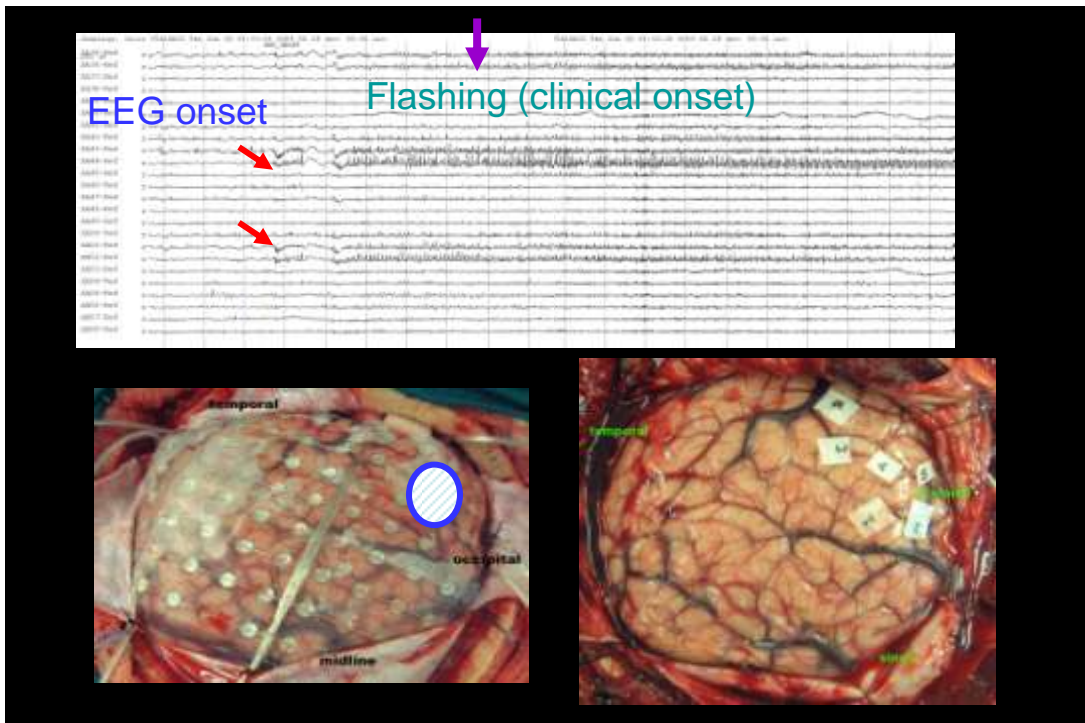
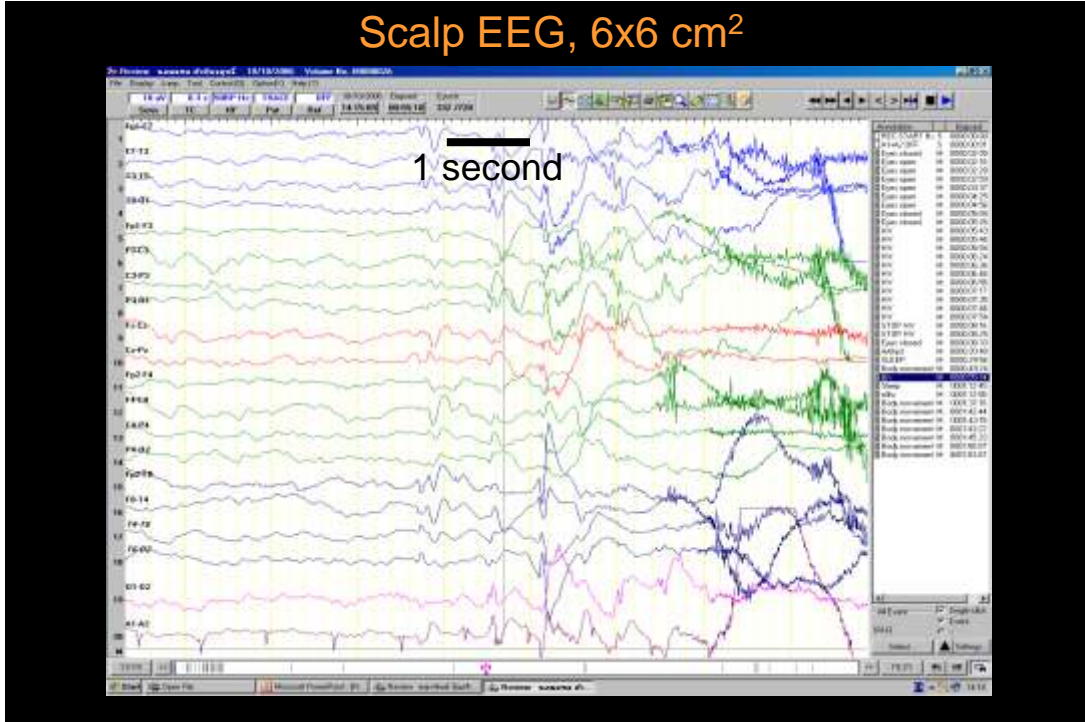
Inhibitory Postsynaptic potential

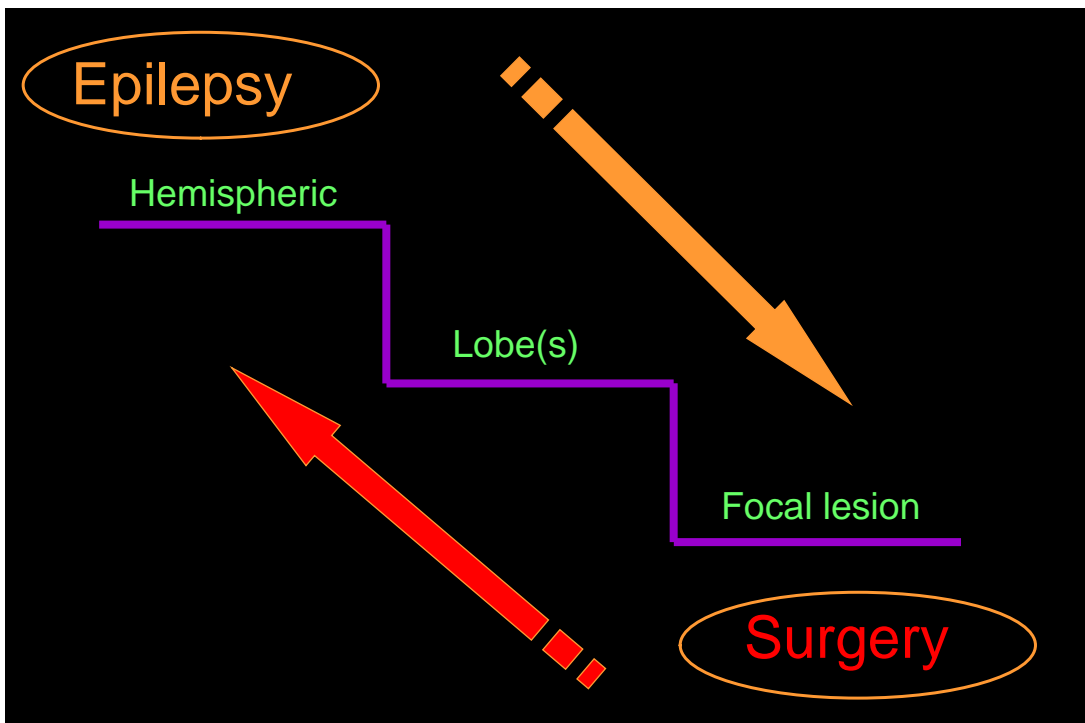
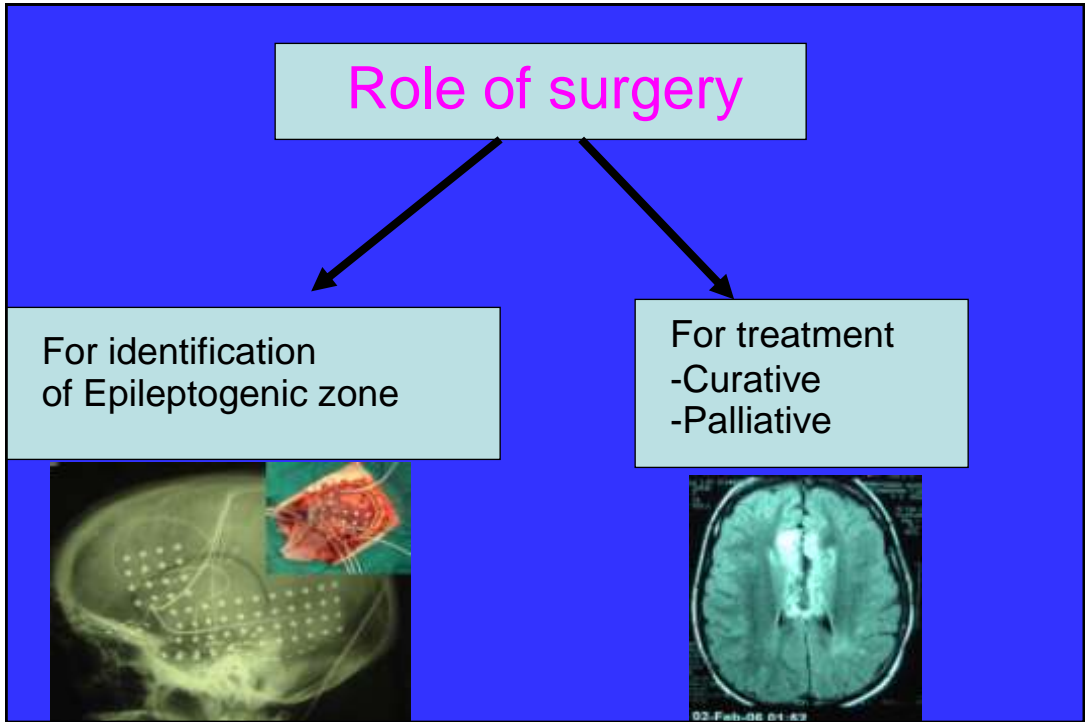


Excitatory Postsynaptic potential

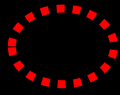


Scalp EEG, 6x6 cm²





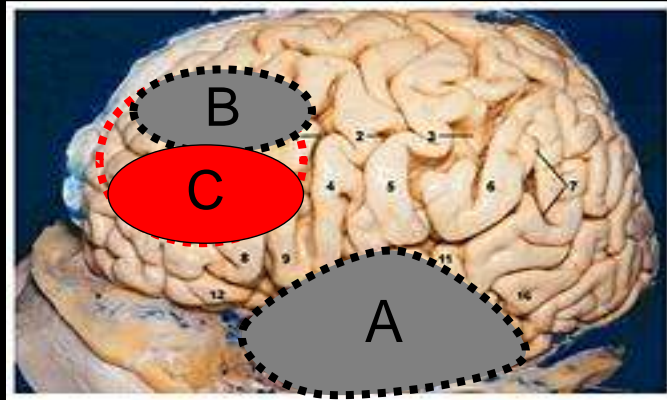
Left fronto-temporal lobe epilepsy



Epileptogenic zone



Resection



A – Seizure continues

B – Some seizure reduction or remission

C - Recurrence of seizure

Things to remember

“You can actually see things, but the things that caught your eyes may not be the truth”

Limitation of investigations

Bias

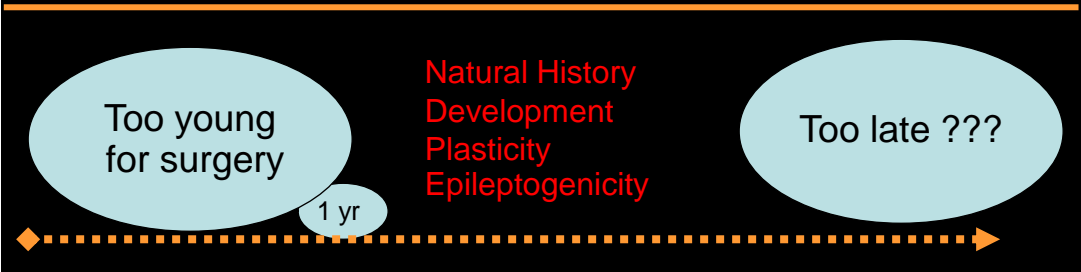
Clinical Experiences

Steps in Epilepsy Surgery

- Makes your good hypothesis.
- Confirms your hypothesis.
- Makes a safely reasonable move for the patients.
- When ?: The earlier is better for developmental concern.
- Long term follow-up is very important.

Timing of surgery

- 1) Urgent surgery for life threatening conditions
- 2) Elective surgery
 - 2.1) Lesional surgery
 - 2.2) Medically intractable epilepsy



What are specials in kids?

- Daily seizures
- Difficulties of H&P, investigations
- Developmental concerns : EEG , timing of surgery, plasticity
- Different pathology and diseases
- Details and details in any procedures
- Demands of family

Facts in epilepsy surgery

- The more epileptic tissue is removed, the better seizure free accomplished.
- An epileptogenic tissue can be located in or near the eloquent cortex.
- Invasive monitoring should be performed to answer specific questions, which go along with your hypothesis.
- “Possibilities” makes the surgery challenging and fun.
- “The right move leads to the right results” .

Antiepileptic Drugs in the United States



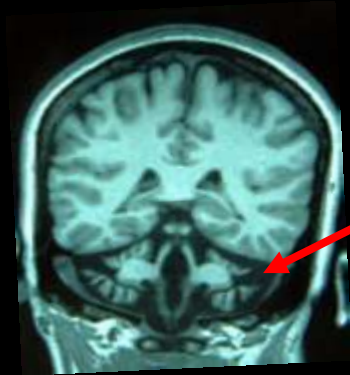
Does anticonvulsant work?

Seizure-free	N	%
First monotherapy	222	47
Second monotherapy	61	13
Third monotherapy	6	1
Two AEDs	12	3
Total	301	64

(470 patients with newly diagnosed epilepsy) Brodie, Kwan 2002

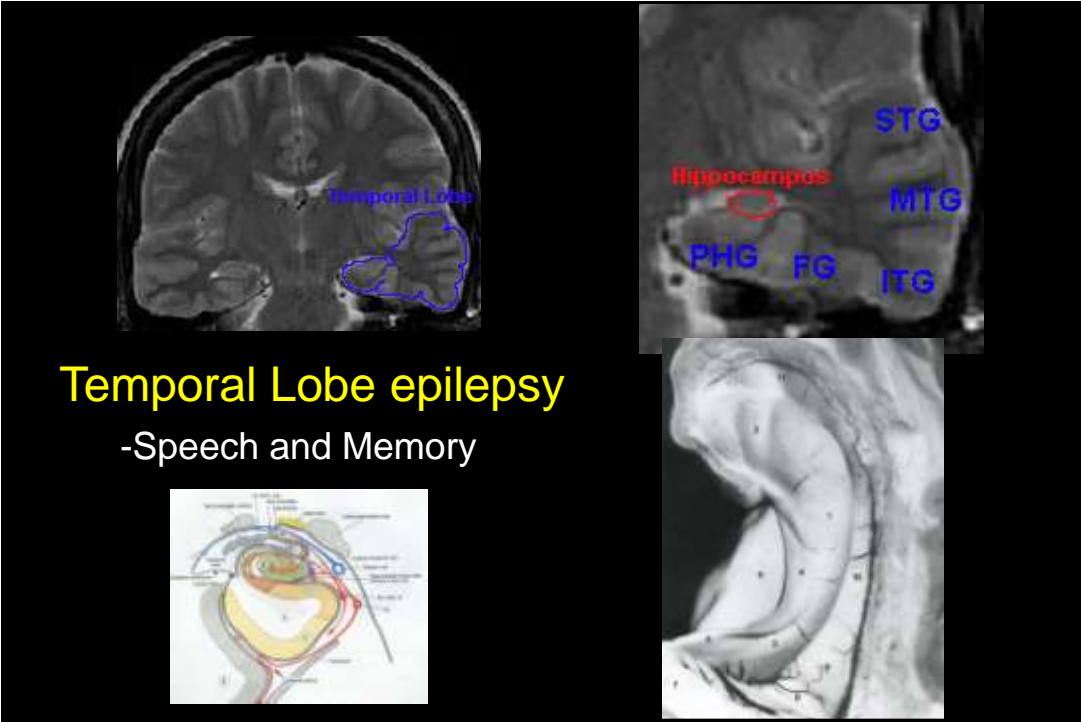
Why surgery ???

- Intractable epilepsy
- Refractory epilepsy
- Risk of sudden death
- Quality of life
- Neurological development
- Cost & effectiveness
- Side effects of antiepileptic medications
- Secondary epileptogenicity
- Life threatening condition



What are the challenges in epilepsy surgery?

- 1) Where is the epileptogenic zone?
- 2) Is functional cortex involved or not?
- 3) Pediatric population – cooperation
- 4) Surgical techniques



Temporal Lobe epilepsy
-Speech and Memory

Commissural fibers

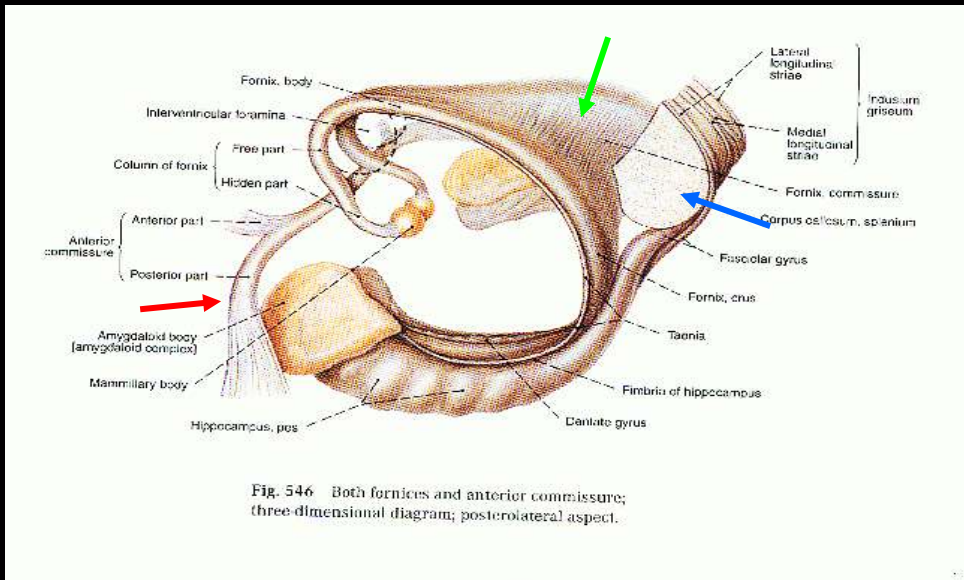
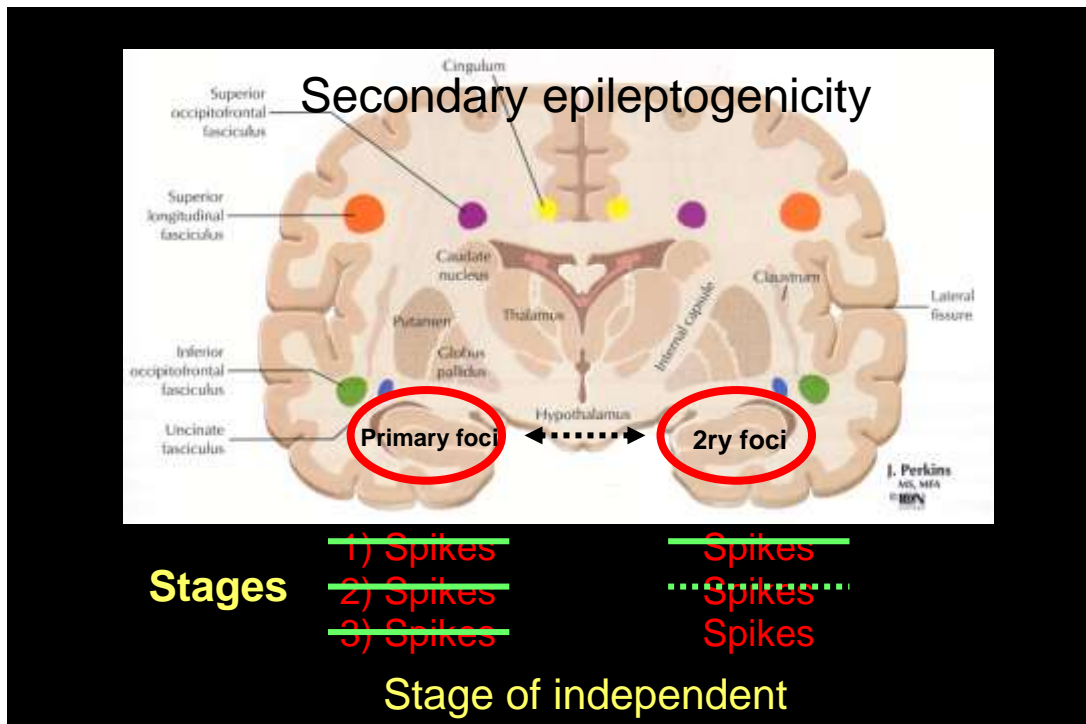


Fig. 546 Both fornices and anterior commissure; three-dimensional diagram; posterolateral aspect.



Benefit of surgery

- 1) Seizure control
- 2) Reduce anticonvulsants if seizure free
- 3) Improved quality of life for patients and care givers
- 4) Cost & effectiveness
- 5) Improved neurological development for children after seizure control