

The background features a red grid pattern. On the left side, there is a white ECG (heart rate) line that starts with a regular rhythm, then has a very tall, narrow spike, followed by a regular rhythm again. Behind the ECG line, there is a faint red outline of a heart. The text is centered on the right side of the slide.

# KOMPUTASI BIOMEDIK (3 SKS)

Program Studi Informatika

Wiharto

# Diskripsi Matakuliah

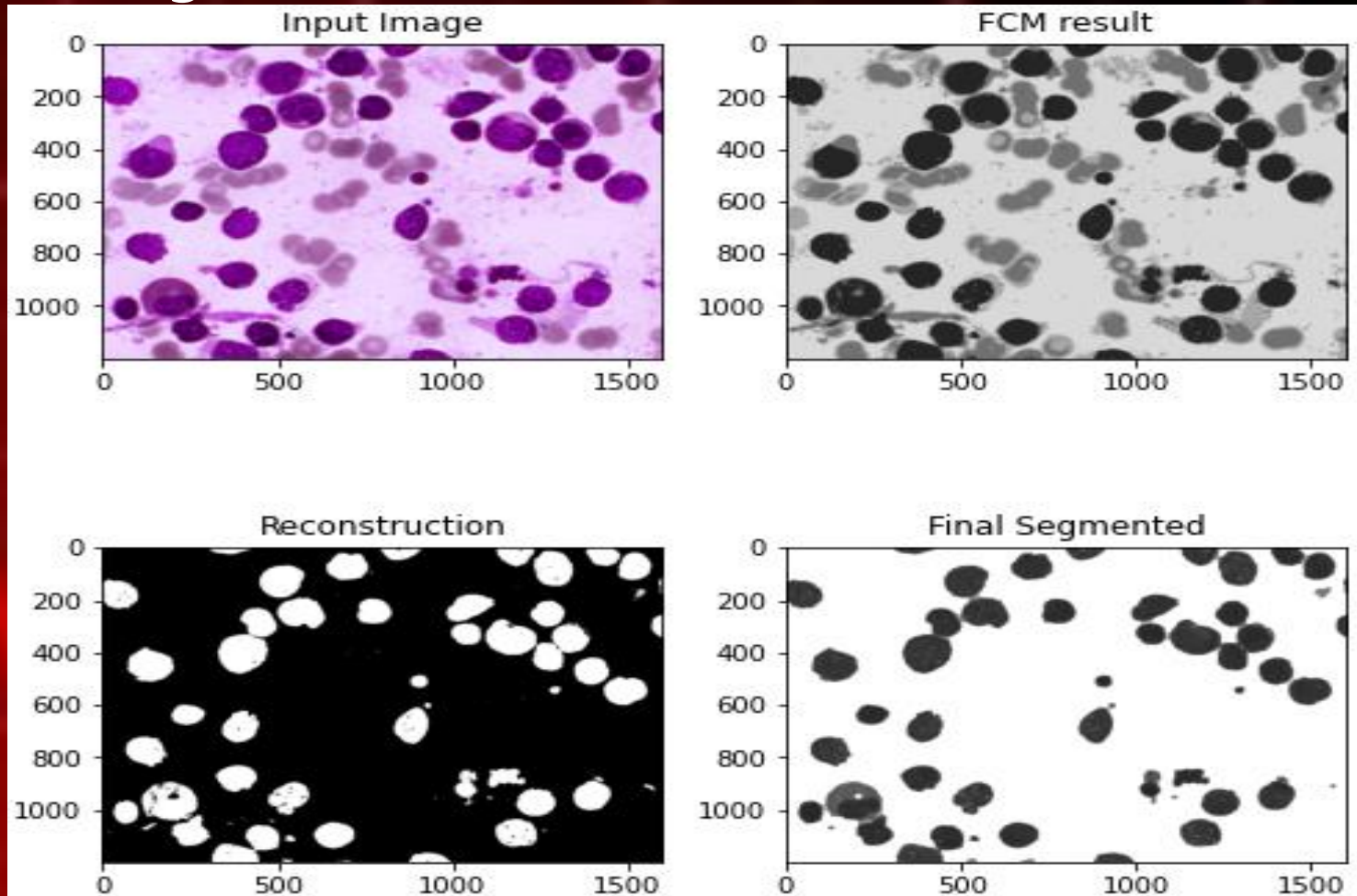
- Malui mata kuliah ini mahasiswa akan mempelajari komputasi yang diaplikasikan di bidang biomedik.
- Pada mata kuliah ini, mahasiswa akan belajar mengenai berbagai macam format dan sifat data-data biomedik seperti data hasil lab, data sinyal digital ECG data citra medis (X-Ray, MRI, USG, Darah, Retina) dan data gen (DNA, Microarray, protein).
- Data-data tersebut akan dianalisis dan dimodelkan menggunakan metode-metode Statistik dan Machine Learning untuk menjawab permasalahan-permasalahan di bidang biomedik.

# Materi

- Macam-macam format dan sifat data-data biomedik
- Pengolahan Citra Medis hasil pemeriksaan seperti X-Ray, MRI, Citra Darah dan Retina
- Pengolahan Sinyal digital hasil pemeriksaan seperti Suara, ECG, dan EEG
- Komputasi data gen : DNA, Micro Array dan Protein
- Penggunaan tools programming Python/Matlab

# Gambaran Aplikasi

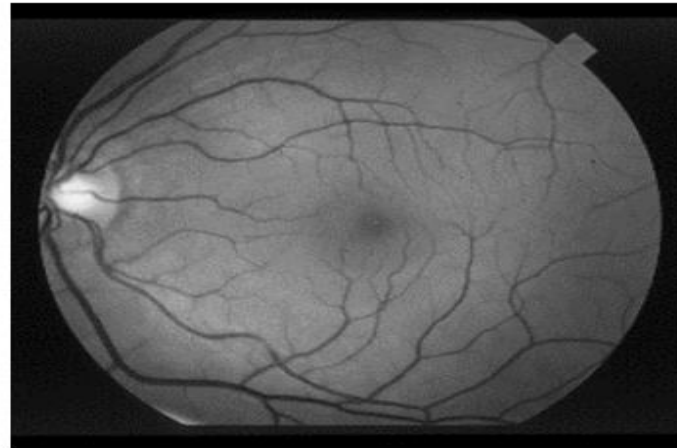
- Pengolahan citra WBC



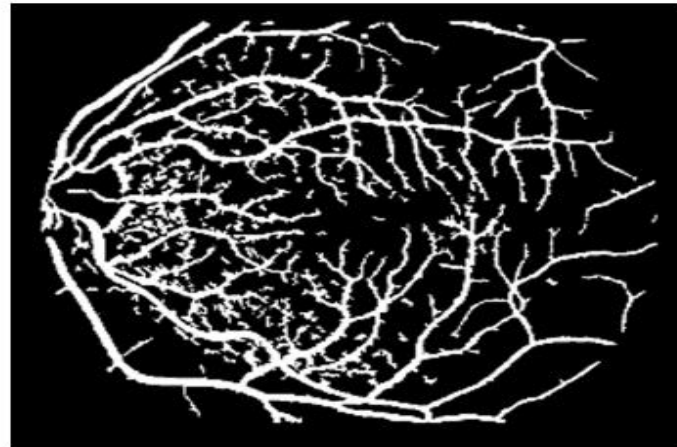
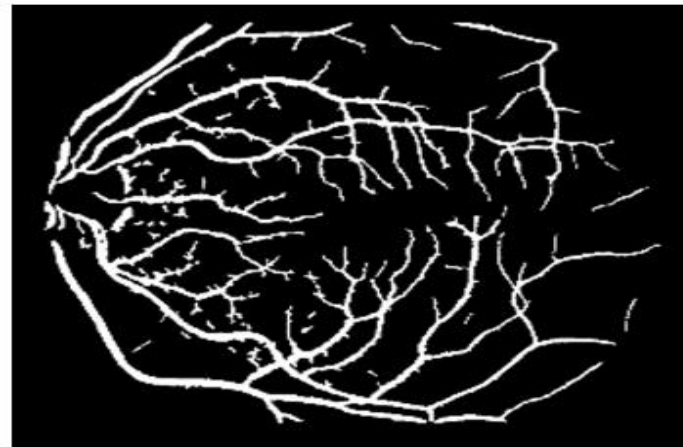
# Pengolahan citra retina



(a)

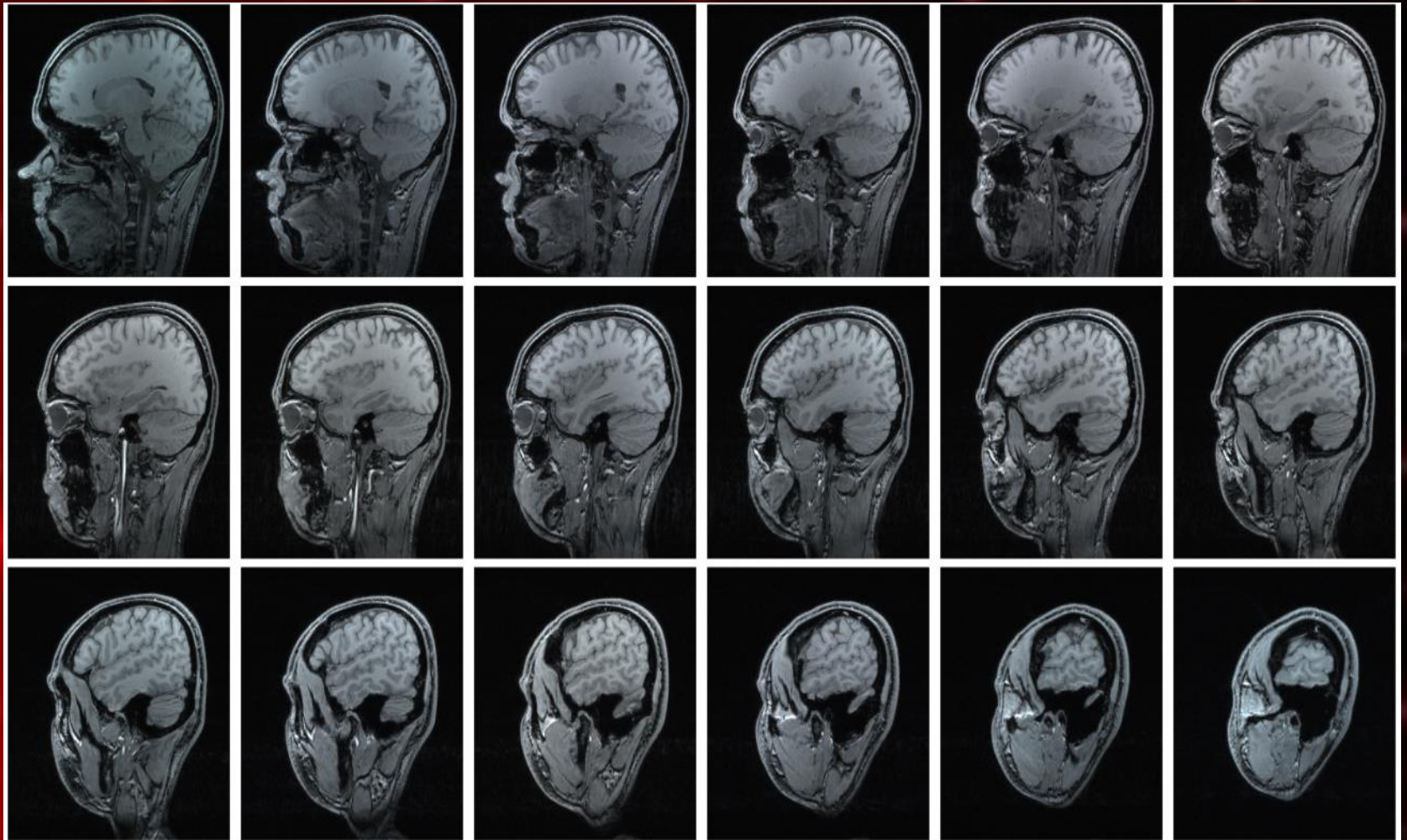


(b)



# Pengolahan Magnetic Resonance Imaging

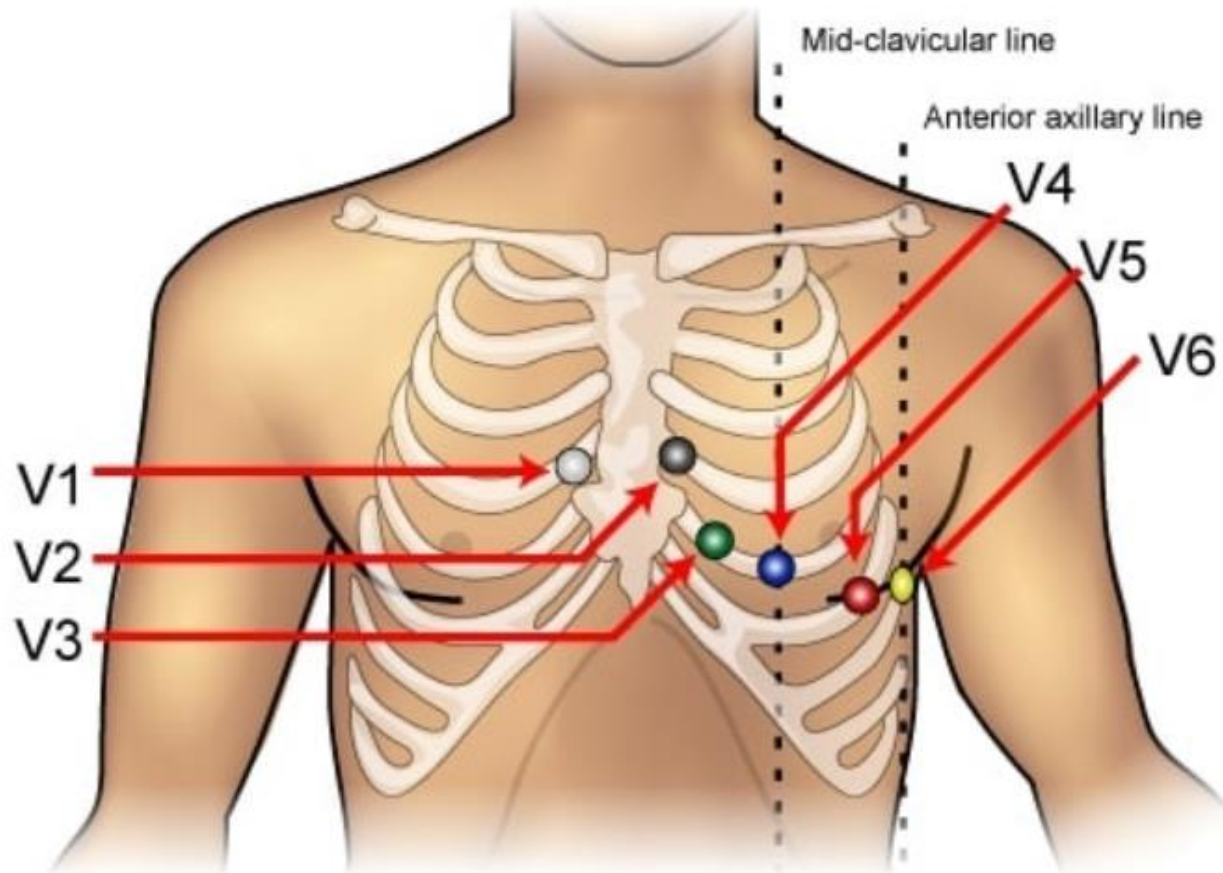


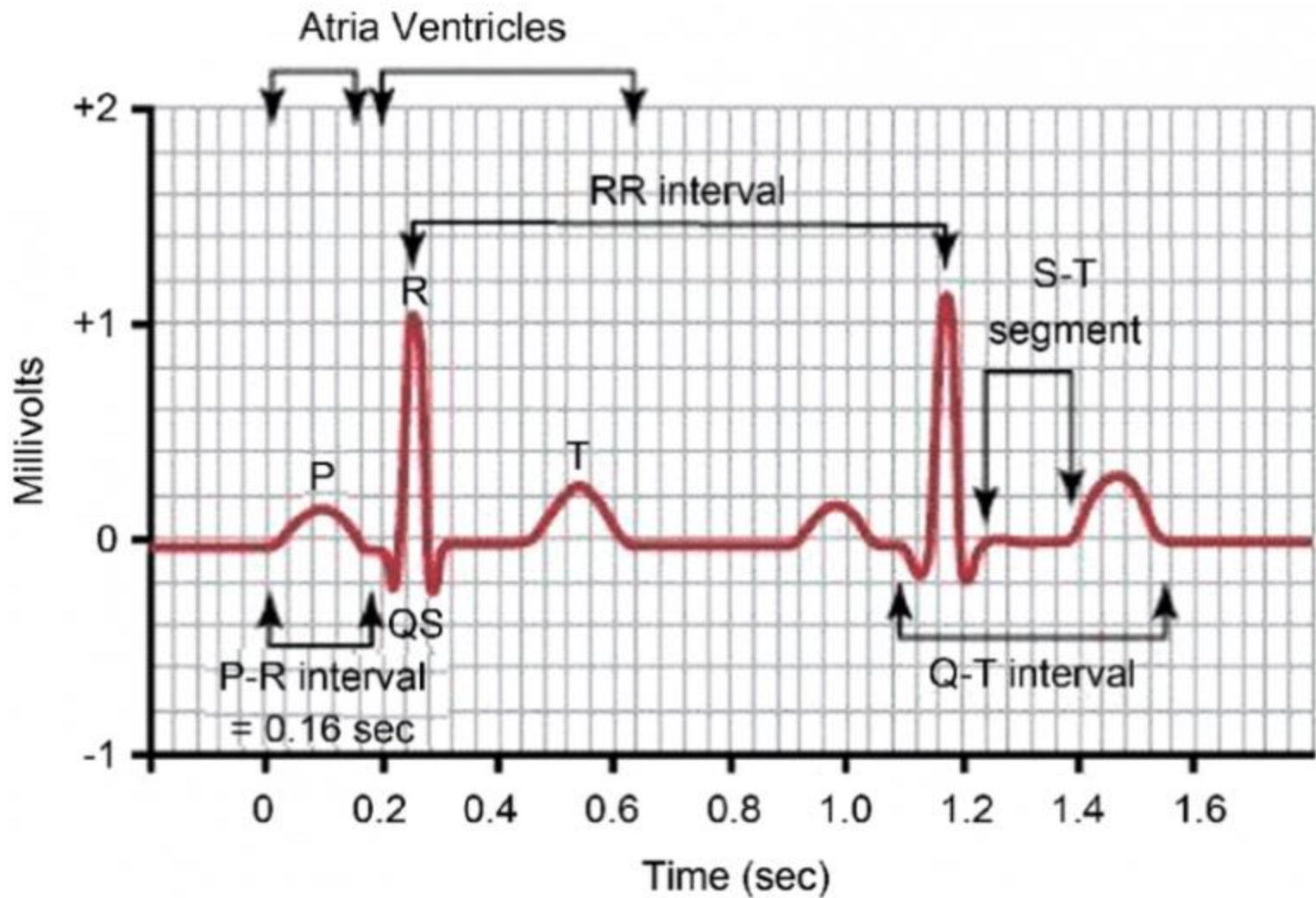


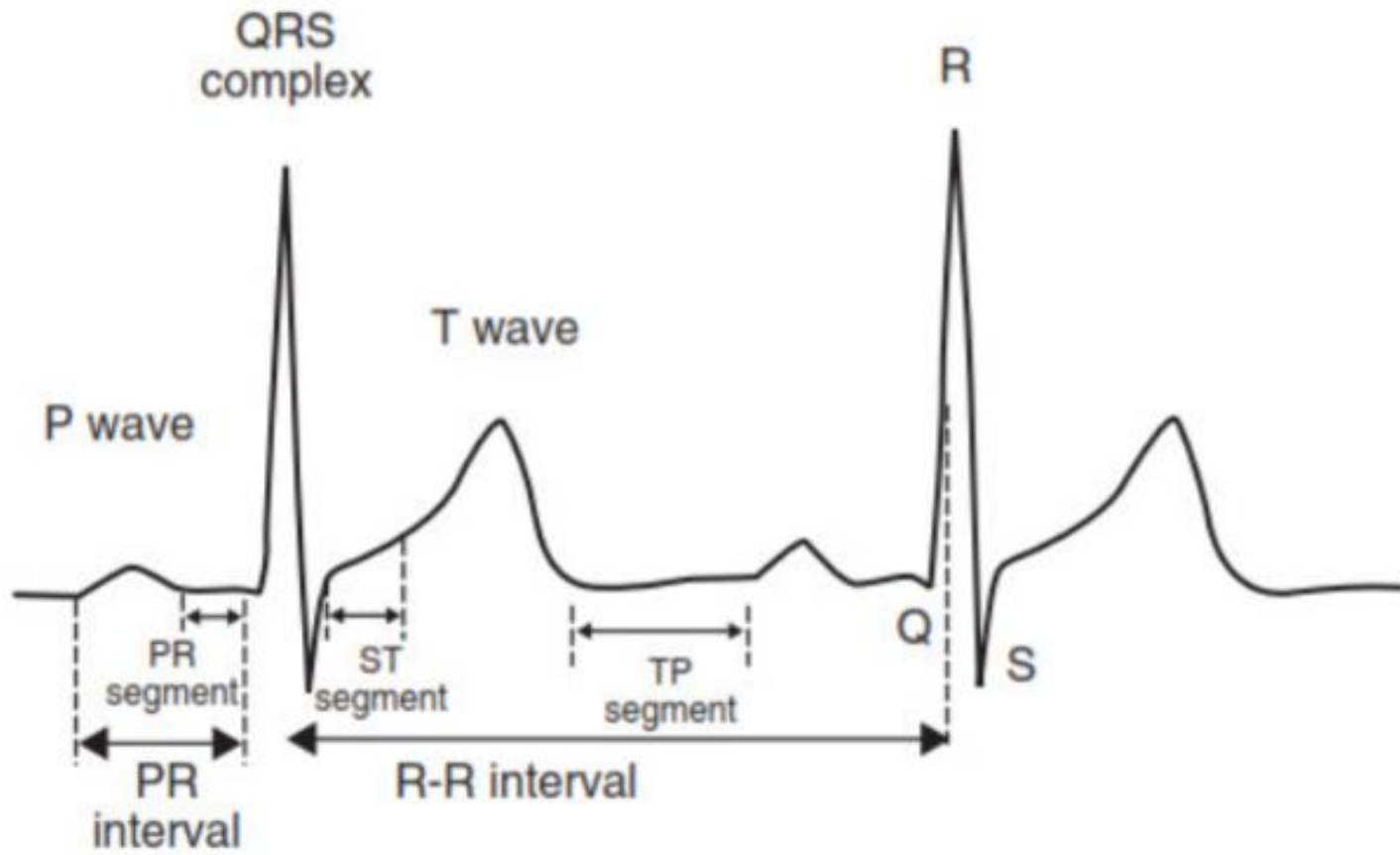
# Pengolahan Sinyal ECG



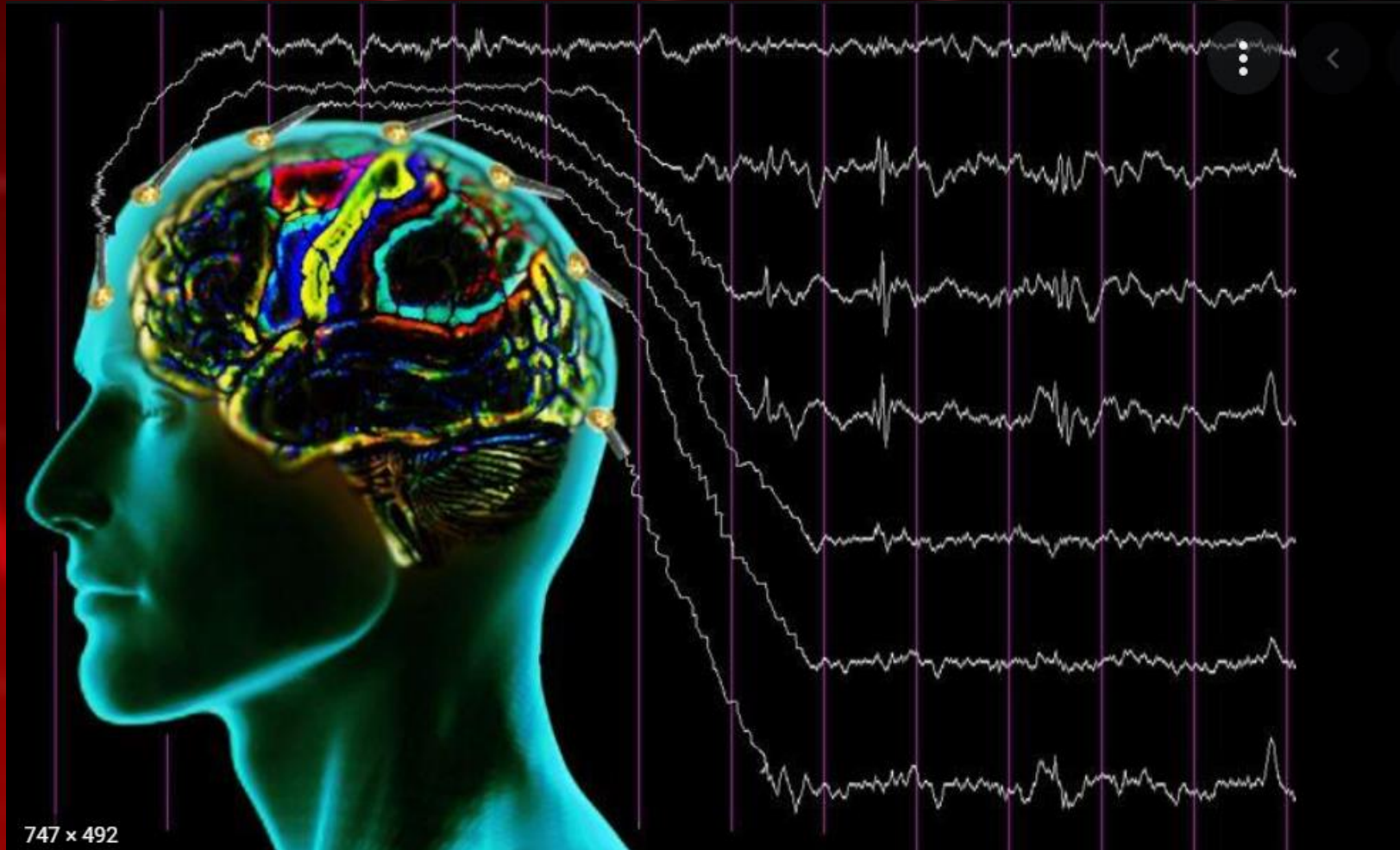


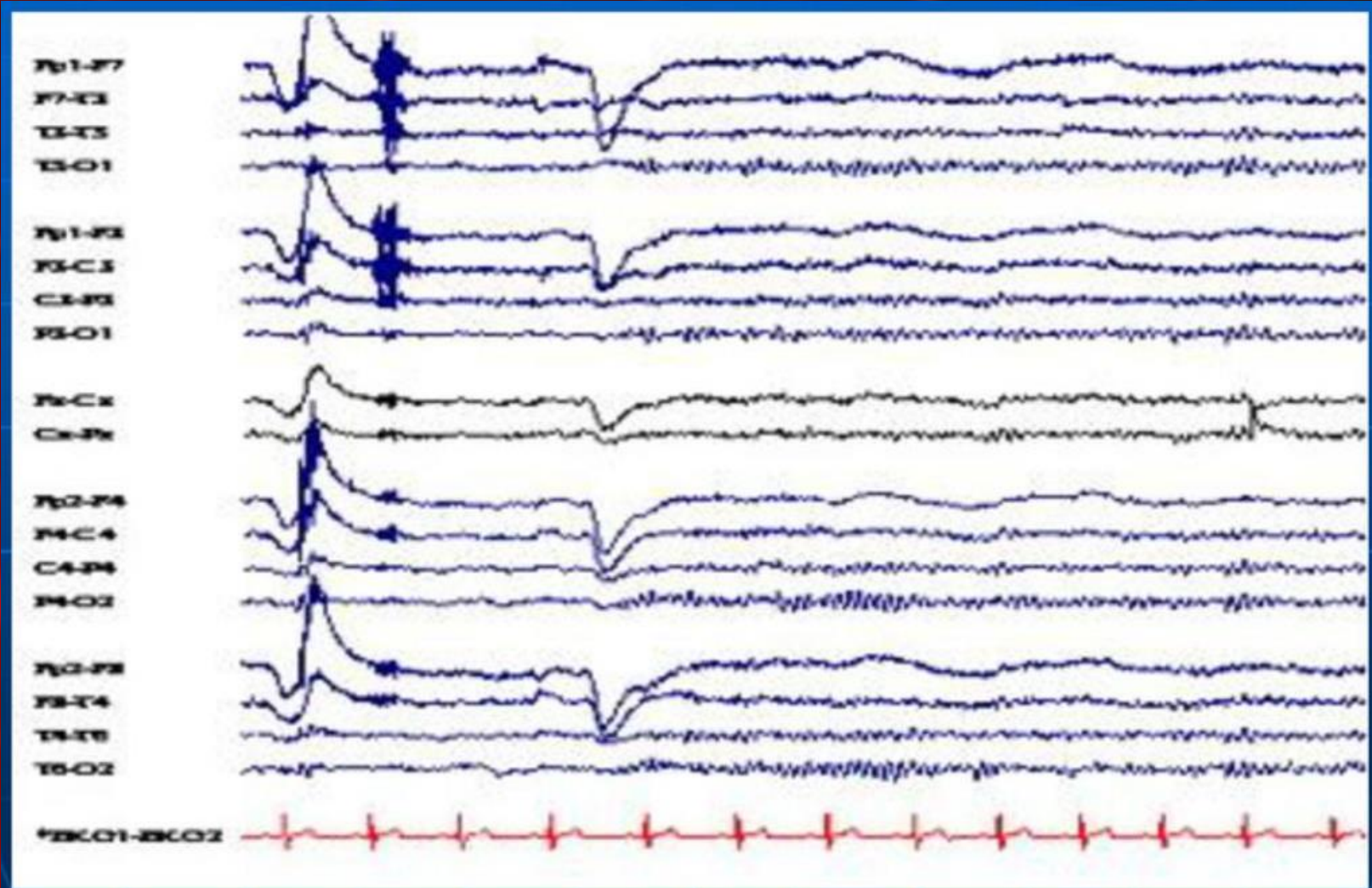




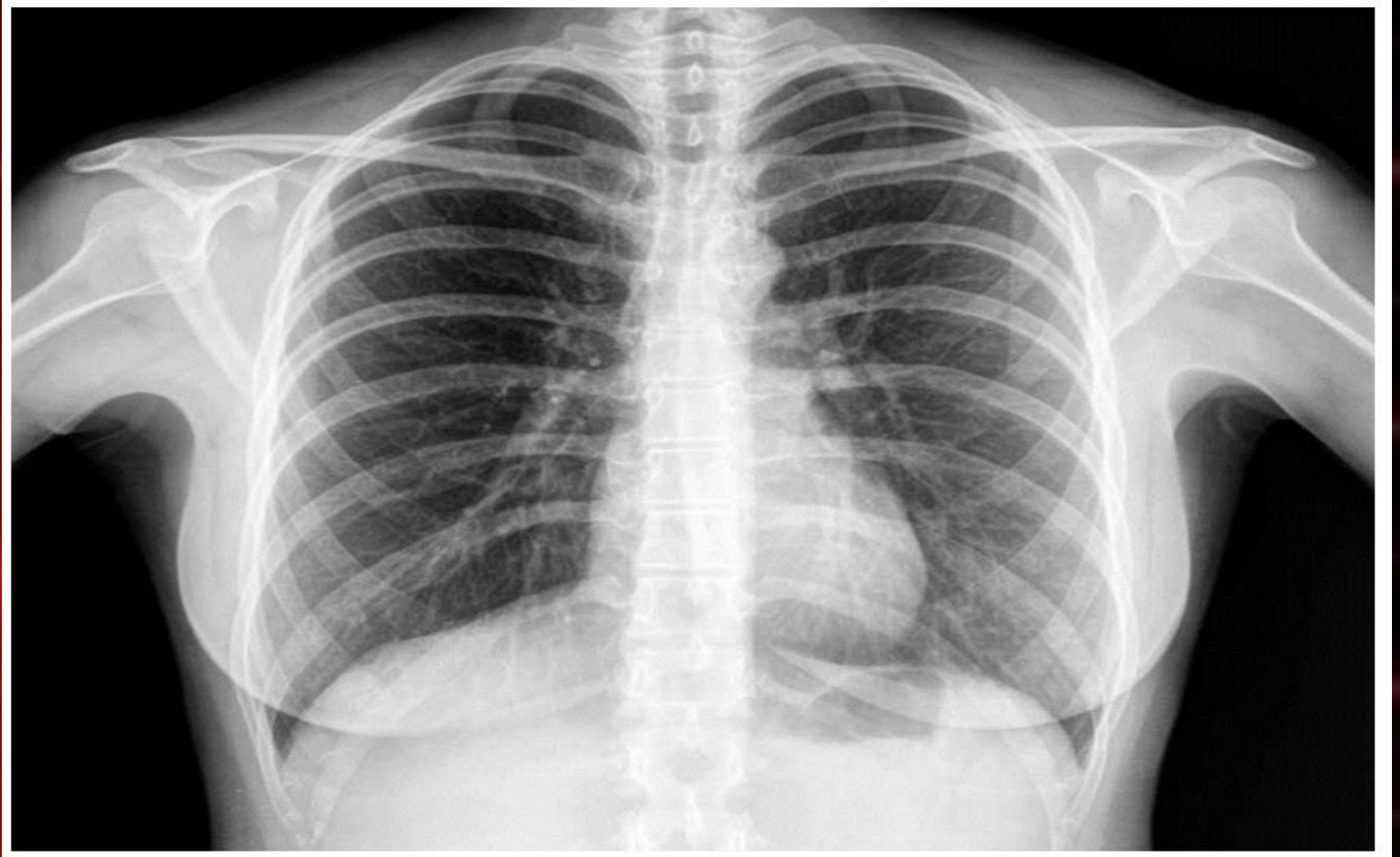


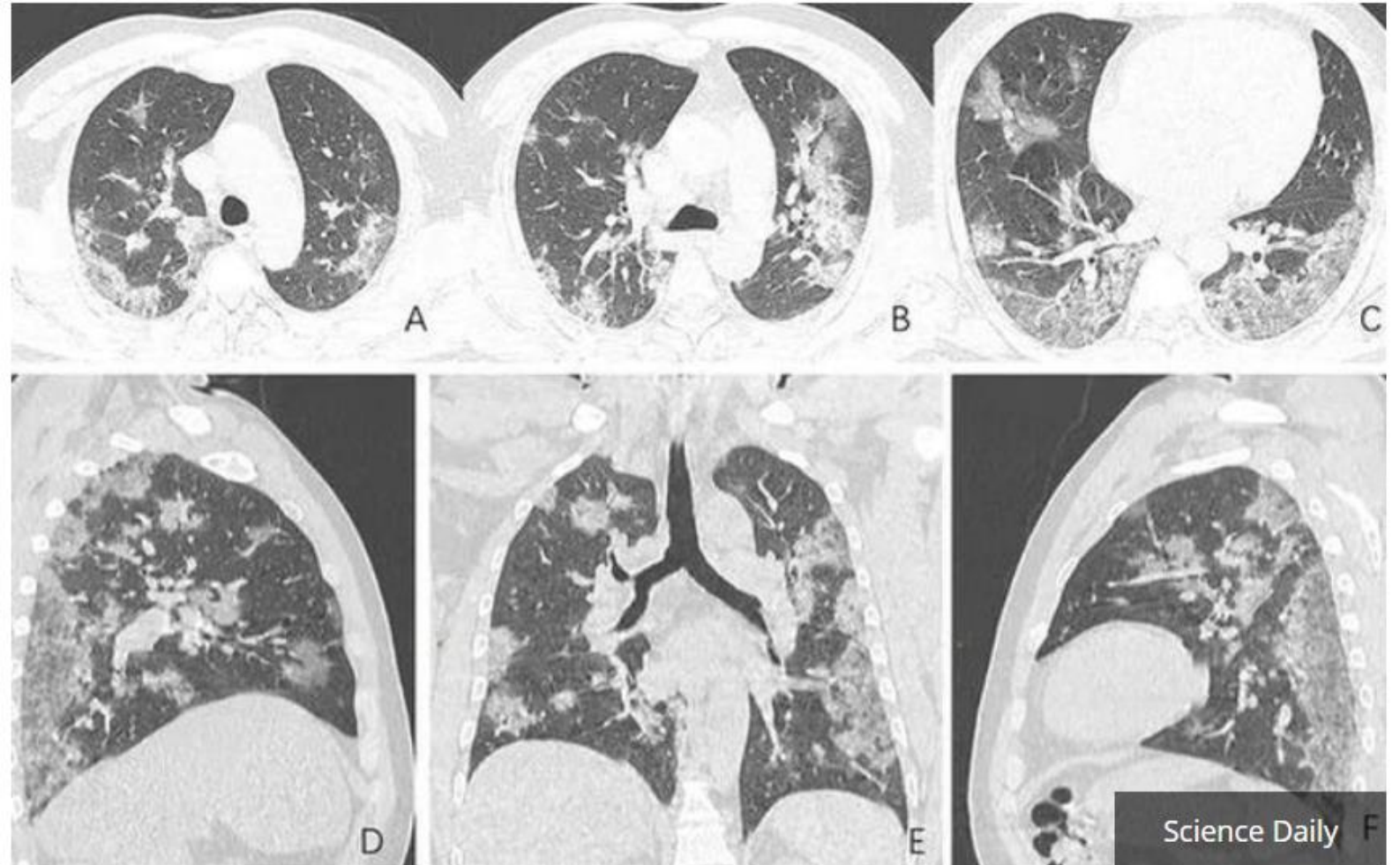
# Pengolahan Sinyal EEG





# Pemeriksaan X-Ray

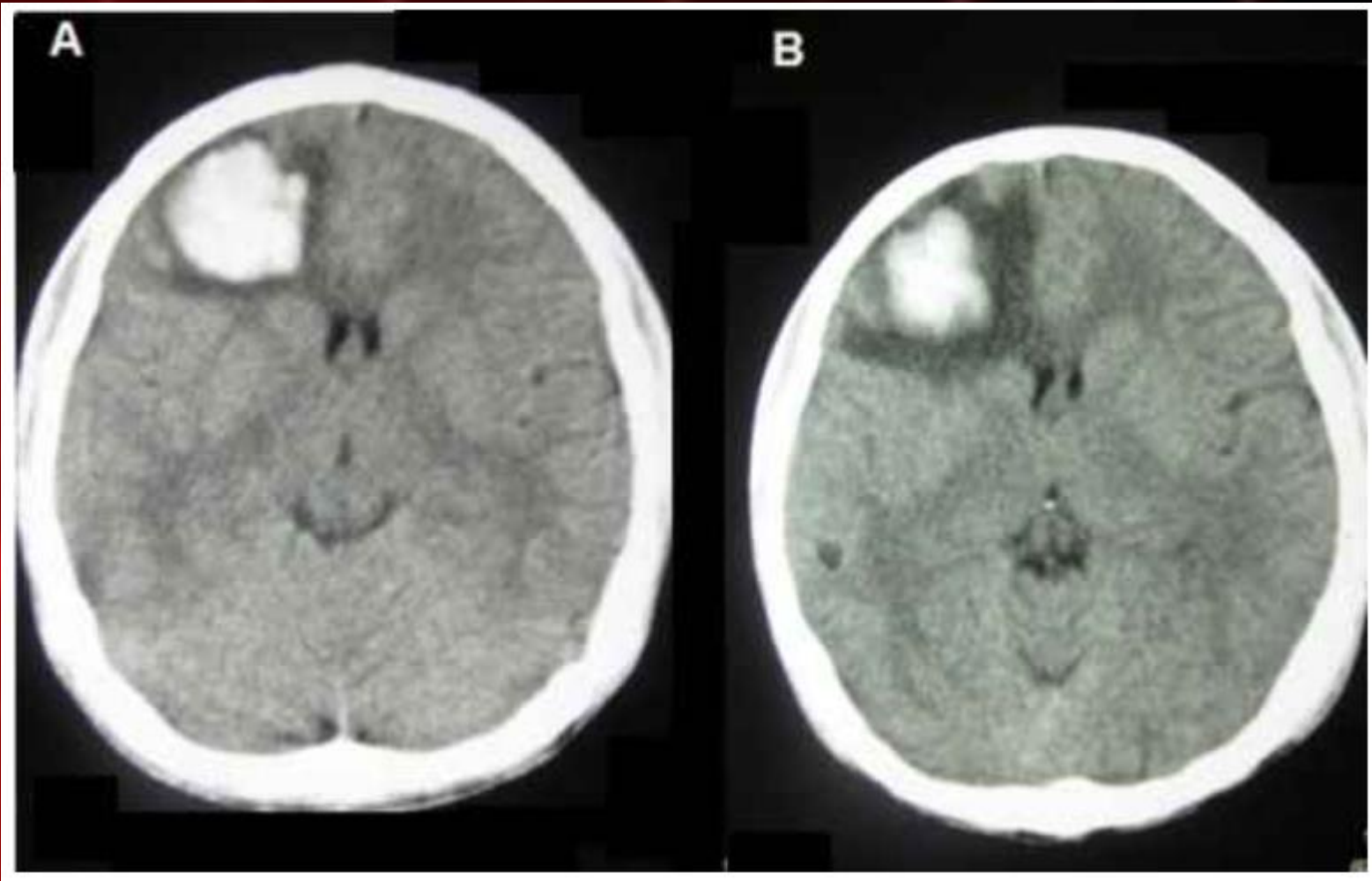




# Pemeriksaan CT-Scan







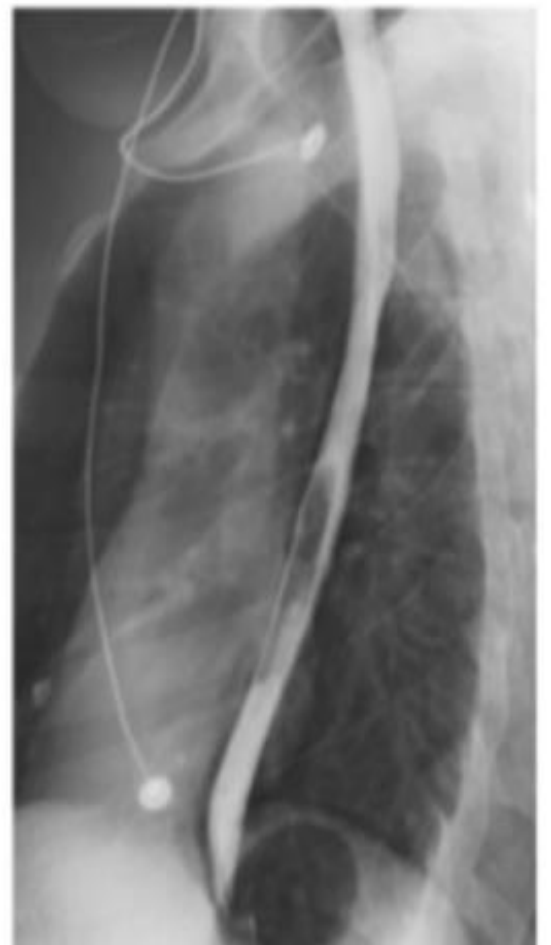
# Pemeriksaan USG

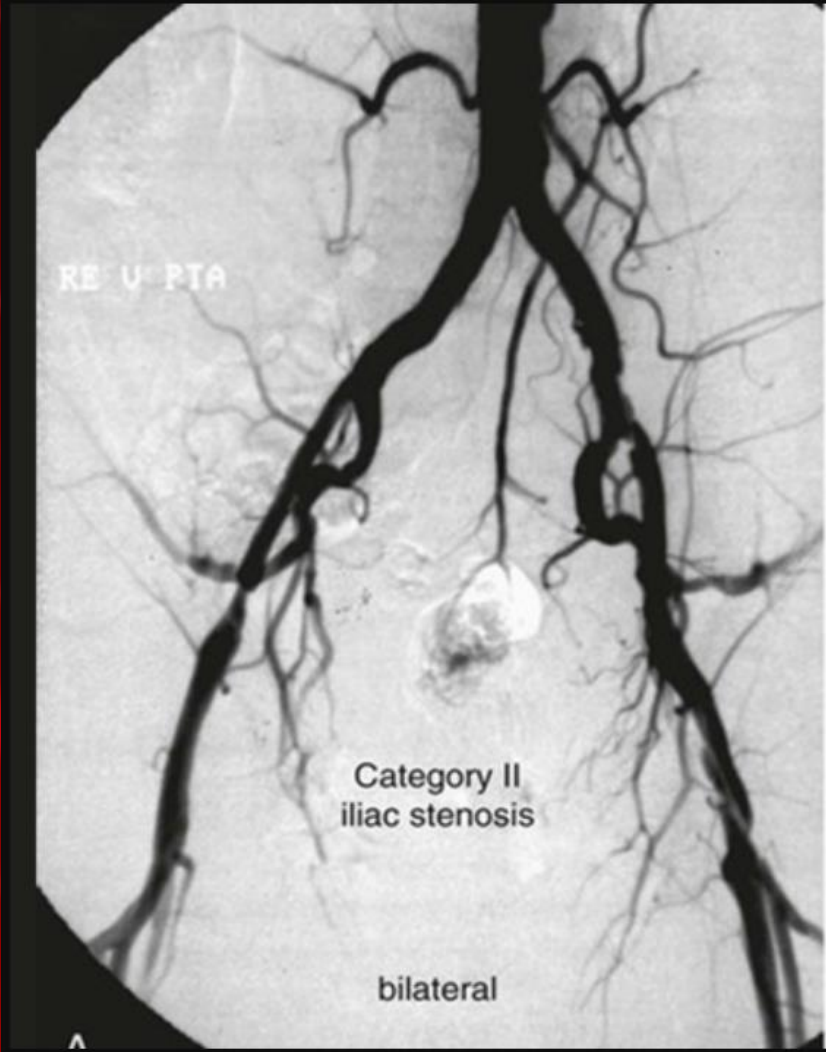




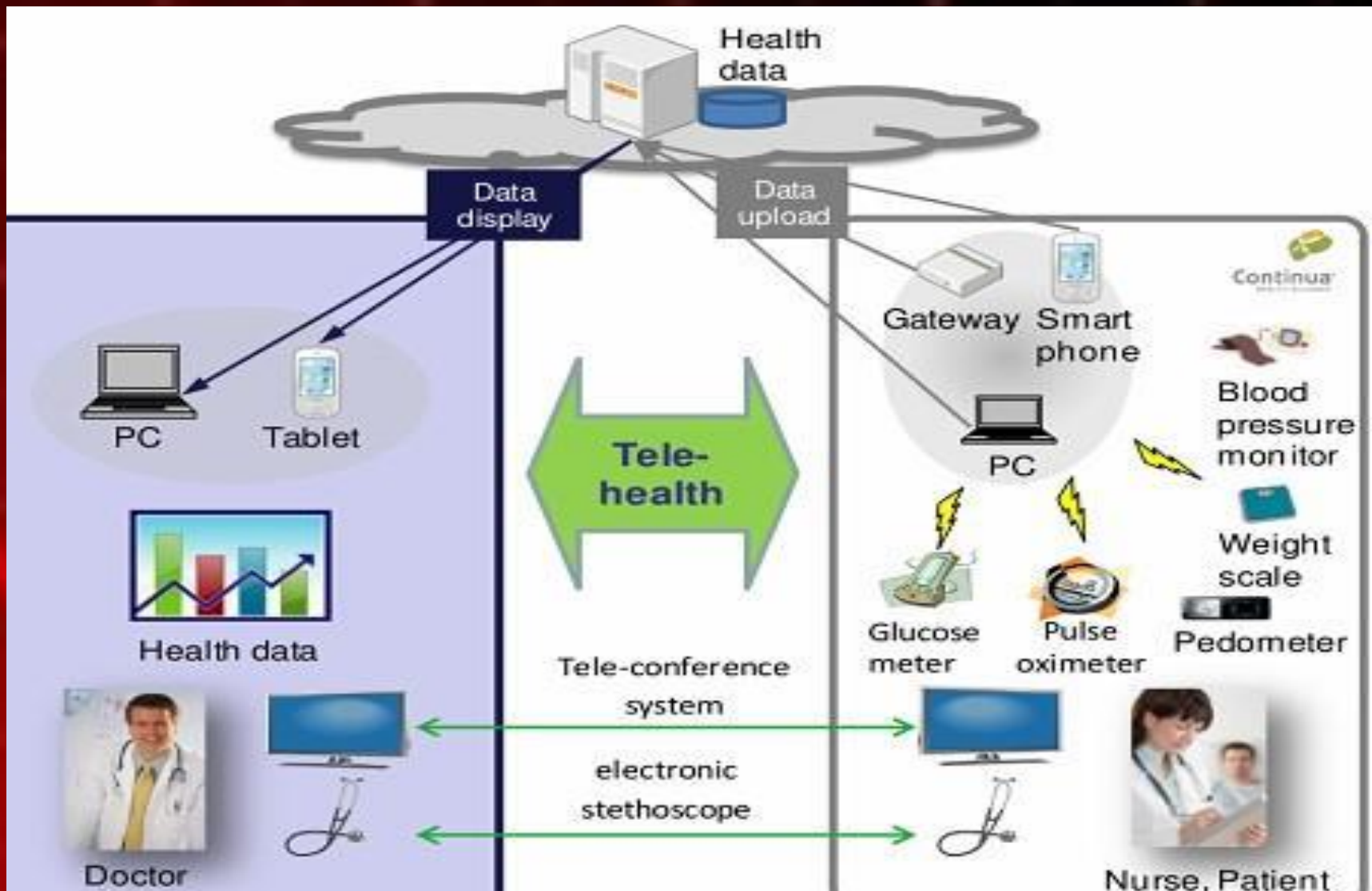
# Pemeriksaan Fluoroskopi

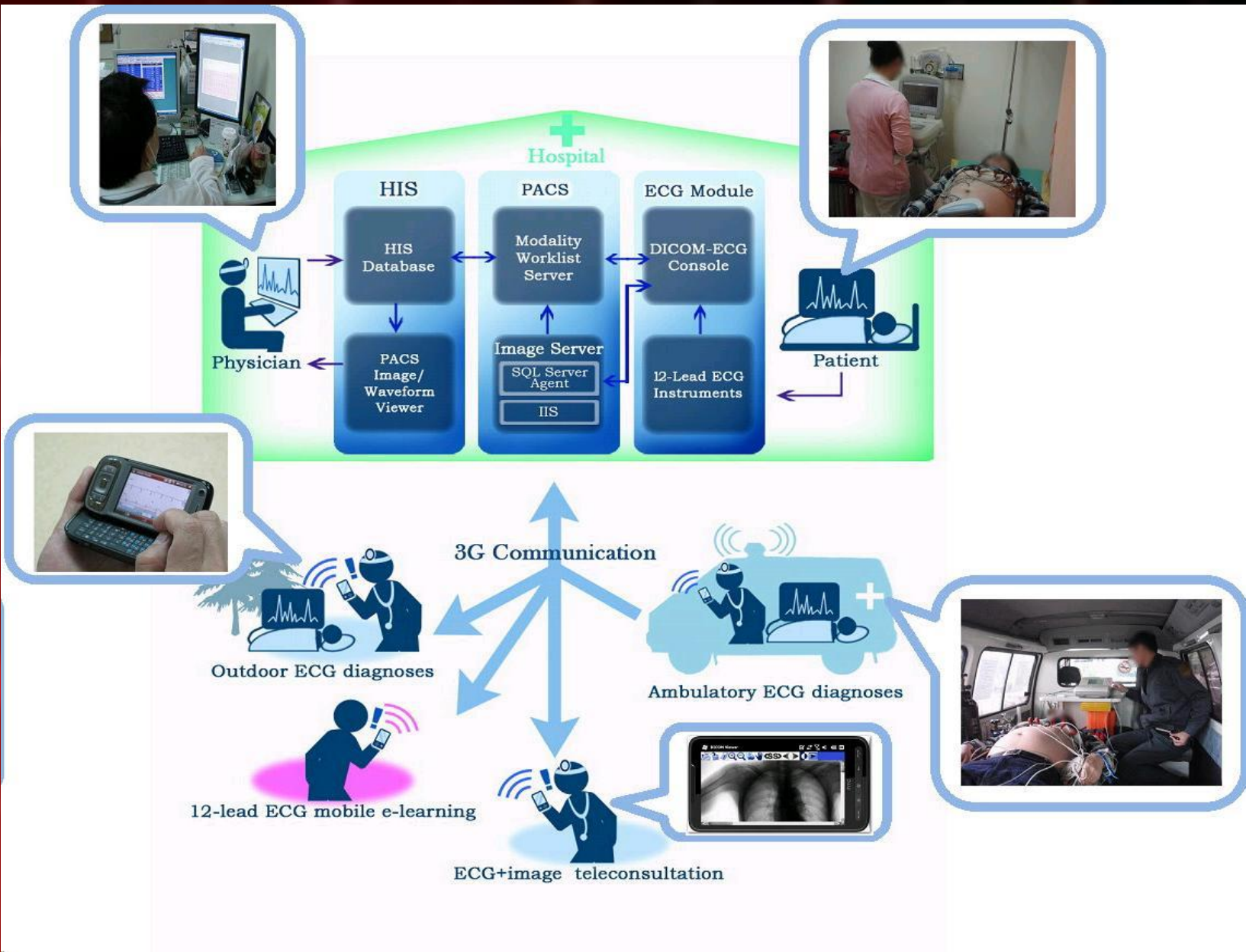






# Telemedicine

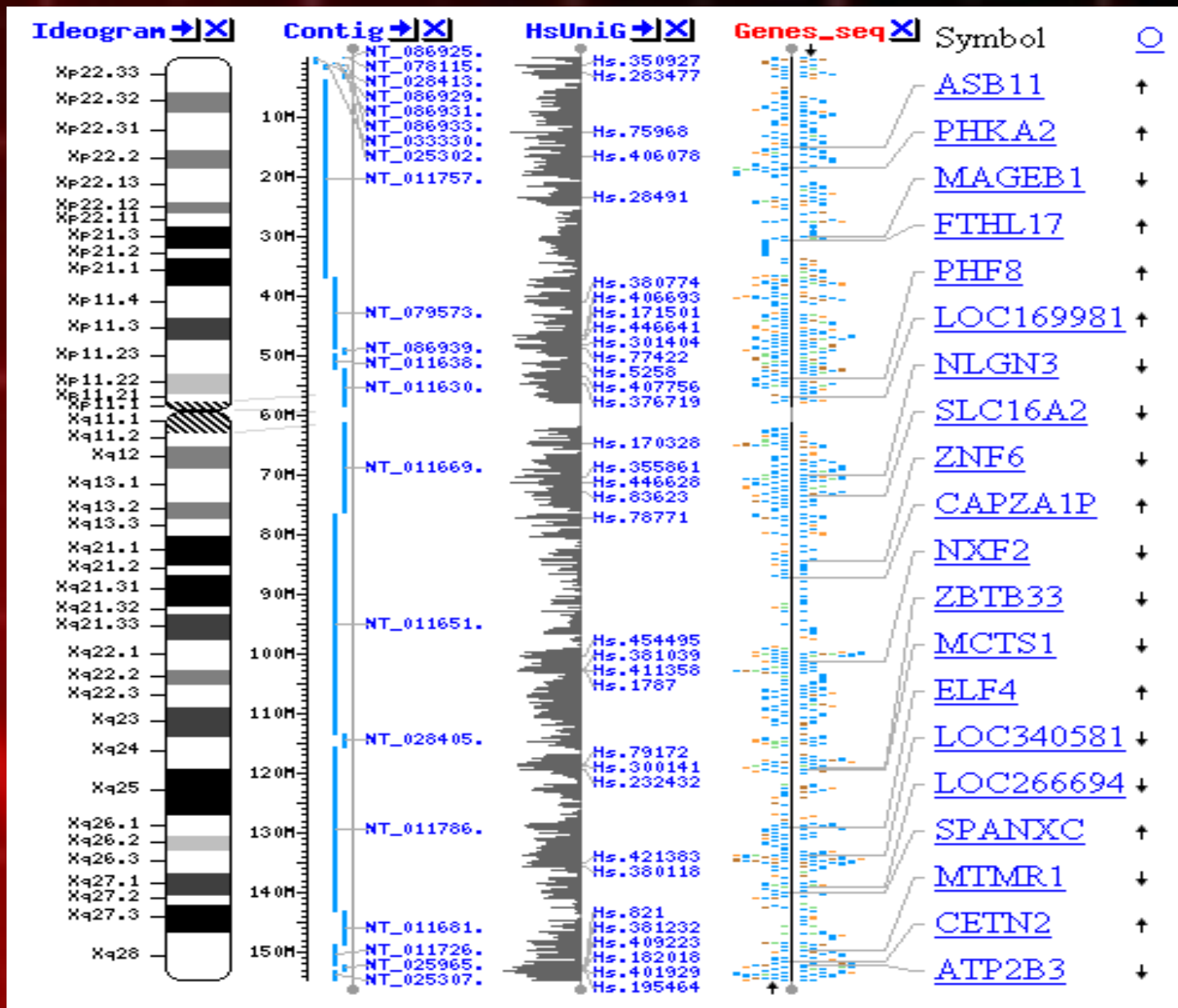






# Pengolahan GEN

- Untuk memecahkan masalah-masalah biologis, terutama dengan menggunakan sekuens asam amino & DNA, serta informasi yang berkaitan dengannya.
- Contoh topik utama bidang ini meliputi basis data untuk mengelola informasi biologis, penyejajaran sekuens (sequence alignment), prediksi struktur untuk meramalkan bentuk struktur protein maupun struktur sekunder RNA, analisis filogenetik dan analisis ekspresi gen.



# Penilaian

- Projek Setiap Kompetensi 5x @5%
- Projek Utama 75% → output Artikel (Kelompok dgn anggota 2 mhs)
- Presensi minimal 75% hadir dari jumlah pertemuan

# Referensi

- Biomedical Informatics, Edward C Shortliffe & James J. Cimino, 2006
- Medical Informatics: Concepts, Methodologies, Tools, and Applications; Joseph Tan; Wayne State University, USA, 2009.
- Biomedical Image Processing; Thomas M. Deserno, Springer, 2011
- Biomedical Signal and Image Processing; Kayvan Najarian, Robert Splinter, CRC Press, 2012

# Next