Functional imaging

Functional imaging (or physiological imaging), is a medical imaging technique of detecting or measuring changes in metabolism, blood flow, regional chemical composition, and absorption.

As opposed to structural imaging, functional imaging centers on revealing physiological activities within a certain tissue or organ by employing medical image modalities that very often use tracers or probes to reflect spatial distribution of them within the body. These tracers are often analogous to some chemical compounds, like glucose, within the body. To achieve this, isotopes are used because they have similar chemical and biological characteristics. By appropriate proportionality, the nuclear medicine physicians can determine the real intensity of certain substance within the body to evaluate the risk or danger of developing some diseases.

Although structural imaging enables early diagnosis, directs initial management, and helps to predict eventual outcome, imaging of cerebral function is desirable. It can define the early pathophysiological processes responsible for neuronal injury, assess the efficacy of therapeutic interventions, and potentially direct the design and implementation of future therapeutic interventions aimed at reversing or preventing neuronal injury. Several imaging techniques are available which can measure aspects of brain physiology, including cerebral blood flow (CBF) and metabolism.

Xenon CT

CT perfusion

SPECT

provide measurements of cerebral perfusion, whereas PET, MRI, and MRS are able to assess both perfusion and cerebral metabolism. These imaging modalities are helpful in defining the extent of injury, evidence of cerebral ischaemia, and predicting outcome [1) 2)]. [3)].

1)
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2)
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