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Roles of New Drugs in Neuroimaging

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Abstract

New molecular imaging approaches have helped to close the divide between preclinical and clinical studies. Imaging strategies have advanced significantly in the last decade as a result of advances in modern imaging scanners, prescription drug production, screening agents, and new clinical regimens, many of which have resulted in substantial changes in health care. The information gleaned from imaging methods in preclinical studies can be applied to patients. Similarly, complications discovered in human clinical trials will be examined and researched in preclinical experiments. In conclusion, neuroimaging continues to advance and expand, adopting emerging developments and addressing ever more complex and relevant neuroscience issues.

Keywords: Neuroimaging; Drug development; Neuroscience issues

Introduction

There is unprecedented progress in the study of the human brain over the last two decades. The introduction of structural and functional brain imaging approaches, which have revolutionised cognitive and behavioural neuroscience by providing an insight into the brain activity behind complex human activities, is perhaps the most exciting. Among wide variety of brain imaging techniques, three can be classified into major categories: (1) nuclear medicine imaging techniques, including positron emission tomography (PET) and single photon emission computed tomography (SPECT); (2) magnetic resonance imaging (MRI) techniques including structural MRI, functional MRI (fMRI), and MR spectroscopy; and (3) electrophysiological imaging techniques, which include electroencephalography (EEG) and magnetoencephalography (MEG) [1].

Each of these approaches shows a particular feature of brain development and/or operation, resulting in a greater understanding of the brain's metabolic, electrophysiological, and functional processes; neurotransmitter activity; energy consumption and blood flow; and drug delivery and kinetics. They shed light on complex neuropsychological disorders, such as opioid addiction, by working together [2].

New treatment options are desperately required due to the relative failure of presently available antipsychotic medications to effectively provide lasting relief and increase quality of life for patients with schizophrenia. Increased use of biomarkers in early clinical trials may be one way to enhance the therapeutic discovery process To assess whether possible drug methods are engaging their intended biological targets, reliable biomarkers that represent facets of disease pathophysiology may be used. Using neuroimaging biomarkers like those suggested here to determine if therapy interventions are having their desired biological impact in humans early in the clinical development phase may help speed up the development of potential schizophrenia drugs [3].

Conclusion

The proper application of molecular imaging to drug research and production will significantly reduce drug development costs and time. Anatomical images are revealed by some imaging methods, such as computed tomography (CT) or magnetic resonance imaging (MRI), while functional images are revealed by single-photon emission computed tomography (SPECT), SPECT/positron emission tomography (PET), and PET.

This new molecular or neuroimaging techniques are revealing more anatomical and functional information regarding the nervous system. Each technique's fundamental concepts are explained, supplemented by examples of current applications in cutting-edge neuroscience research.

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