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Yan Zhang,  
University of Science and Technology of China,  
China

## REVIEWED BY

M. Babul Islam,  
University of Rajshahi, Bangladesh  
Utpala Namda Chowdhury,  
University of Rajshahi, Bangladesh

## \*CORRESPONDENCE

Mohammad Ali Moni  
✉ m.monir@ug.edu.au

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# Systems biology approach discovers comorbidity interaction of Parkinson's disease with psychiatric disorders utilizing brain transcriptome

Md Asif Nashiry<sup>1</sup>, Shauli Sarmin Sumi<sup>2</sup>, Salem A. Atyami<sup>3</sup> and  
Mohammad Ali Moni<sup>4,5\*</sup>

<sup>1</sup>Data Analytics, Northern Alberta Institute of Technology, Edmonton, AB, Canada, <sup>2</sup>Computer Science and Engineering, Jashore University of Science and Technology, Jashore, Bangladesh, <sup>3</sup>Mathematics and Statistics, Faculty of Science, Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Saudi Arabia, <sup>4</sup>Artificial Intelligence and Data Science, Faculty of Health and Behavioural Sciences, School of Health and Rehabilitation Sciences, The University of Queensland, Saint Lucia, QLD, Australia, <sup>5</sup>Artificial Intelligence and Cyber Futures Institute, Charles Sturt University, Bathurst, NSW, Australia

Several studies found that most patients with Parkinson's disorder (PD) appear to have psychiatric symptoms such as depression, anxiety, hallucination, delusion, and cognitive dysfunction. Therefore, recognizing these psychiatrically symptoms of PD patients is crucial for both symptomatic therapy and better knowledge of the pathophysiology of PD. In order to address this issue, we created a bioinformatics framework to determine the effects of PD mRNA expression on understanding its relationship with psychiatric symptoms in PD patients. We have discovered a significant overlap between the sets of differentially expressed genes from PD exposed tissue and psychiatric disordered tissues using RNA-seq datasets. We have chosen Bipolar disorder and Schizophrenia as psychiatric disorders in our study. A number of significant correlations between PD and the occurrence of psychiatric diseases were also found by gene set enrichment analysis, investigations of the protein-protein interaction network, gene regulatory network, and protein-chemical agent interaction network. We anticipate that the results of this pathogenetic study will provide crucial information for understanding the intricate relationship between PD and psychiatric diseases.

## KEYWORDS

Parkinson's disease, psychiatric disorder, bipolar disorder, schizophrenia, differentially expressed genes

## 1. Introduction

The burden of neurological disorders is continuing to increase worldwide, and present data indicate Parkinson's disease (PD) has undergone the fastest growth in prevalence and disability among neurological disorders (Prigun et al., 2019). An estimated 10 million people worldwide are living with PD. Several studies predicted that the number of patients with PD would grow substantially in future decades. It was estimated that there would be nearly 5 million PD patients in China and about 1.2 million PD patients in the US by 2030 (Marras et al., 2018; Ou et al., 2021). Although PD is rare before the age of 50, this disease is increasingly common in each subsequent decade of life (Powers et al., 2017). With the aging and increasing life span of the global population, age-related diseases, such as Parkinson's disease and Alzheimer's disease, are receiving much attention from researchers.

# Molecular Biology Approach To Parkinsons Disease

**M Woodhall**



## **Molecular Biology Approach To Parkinsons Disease:**

*A Molecular Biology Approach to Parkinson's Disease* Peter Jenner, 2000 Parkinson's disease is the only neurodegenerative disorder for which the major pathological and biochemical defects have been identified. But why dopamine-containing cells in the substantia nigra die in Parkinson's disease remains a mystery. Similarly, the changes in basal ganglia output pathways which lead to the onset of motor disability and the occurrence of L-DOPA-induced dyskinesia remain unclear. While treatment for the symptoms of Parkinson's disease is available, nothing can presently be done to stop the disease progressing. A molecular approach to Parkinson's disease is unraveling genetic factors responsible for inducing the onset of nigral cell degeneration or for making individuals susceptible to other neurotoxic factors. Similarly, key findings in the area of mitochondrial dysfunction are now providing a new insight into the pathogenesis of Parkinson's disease. The application of molecular biochemistry to cell susceptibility and to the mechanisms of neuronal adaptation occurring in basal ganglia are providing new clues to why motor abnormalities occur. Genetic engineering of cell lines, fibroblasts, and viral vectors are providing means of replenishing dopamine production and introducing growth factors into the damaged basal ganglia. This book considers all these approaches and their implications for the future treatment of Parkinson's disease.

**Parkinson's Disease** Patrik Verstreken, 2016-12-19 Parkinson's Disease: Molecular Mechanisms Underlying Pathology explores the molecular pathways at the basis of the cellular defects connected to Parkinson's disease, the second most common neurodegenerative disease and the most common movement disorder. This book presents the latest research on the pathways and mechanisms that have been discovered to play a role in Parkinson's pathology. This focus on mechanisms rather than individual genes allows the contributors to elaborate on overlapping and joint functions of different causative genes. Readers will find descriptions of model systems that present parallels and differences between discoveries in different species, demonstrating the importance of multidisciplinary research that spans a broad array of technologies and model organisms. Written from both a cross-methodology and cross-species perspective, the book provides readers with the current state of knowledge on the molecular biology of Parkinson's. Written by experts in the field that focus on pathways and mechanisms implicated in Parkinson's pathology. Draws parallels between multidisciplinary discoveries in different model organisms using an array of technologies. Provides a cross-methodology and cross-species approach to understanding the molecular biology of Parkinson's disease. Includes approximately 25 color illustrations and diagrams to explain concepts and models. Focuses on key pathways and mechanisms as opposed to model organism or gene to provide a multidisciplinary approach to Parkinson's disease.

**Parkinson's Disease. From Clinical Aspects to Molecular Basis** Toshiharu Nagatsu, Hirotaro Narabayashi, Mitsuo Yoshida, 2012-12-06 This book reviews the recent advances in the research on Parkinson's disease. It contains review articles from basic to clinical researches, including the historical introduction and the molecular biological approach to Parkinson's disease. Parkinson's disease is the most representative age-related neurodegenerative disease. It is

clinically characterized by movement disorders such as muscle rigidity akinesia and tremor The elucidation of its biochemical and molecular mechanisms has rapidly been progressing and is expected to contribute to the understanding of normal brain aging in general This project is supported by a Grant in Aid for Scientific Research on Priority Areas Molecular Biology of the Motor System Ministry of Education Science and Culture Japan for 3 years from 1987 to 1989 We are grateful for the support These reviews are a part of the works which have been supported by this Grant in Aid The characteristics of this research project on Parkinson s disease are interdisciplinary approach from basic molecular biology to clinical medicine and the molecular biological approach is expected to be the most promising for the elucidation of the pathogenesis The collaboration and discussion between basic and clinical researchers in this Priority Area Project has been efficient and productive We hope that this book can mark another new milestone in the studies on Parkinson s disease and in neuroscience We are very grateful to Nippon Schering for their generous support for the publication of this book Last but not least we thank Springer Verlag Wien New York for the excellent production of this book and the excellent cooperation **EUROHIS A.**

Nosikov,Claire Gudex,2003 The EUROHIS project has focused on the comparability of health surveys and has uncovered some problems that arise when aiming to compare data from different countries Similar problems of cross cultural comparability also arise when comparing data from other sources such as health registers and are just as complex and difficult to tackle One of the main advantages of health surveys however is the relatively low cost and time involved in adapting them according to the needs of health policy makers This work shows that the output from the EUROHIS project provides common instruments for the measurement of eight health indicators The development of these instruments has required careful consideration of relevant common concepts and how these should be defined and operationalized The instruments are freely available for use by all countries with the aim of enhancing national health information systems and facilitating cross national comparisons of health data **Nervous System Diseases: New Insights for the Healthcare**

**Professional: 2013 Edition** ,2013-07-22 Nervous System Diseases New Insights for the Healthcare Professional 2013 Edition is a ScholarlyEditions book that delivers timely authoritative and comprehensive information about Diagnosis and Screening The editors have built Nervous System Diseases New Insights for the Healthcare Professional 2013 Edition on the vast information databases of ScholarlyNews You can expect the information about Diagnosis and Screening in this book to be deeper than what you can access anywhere else as well as consistently reliable authoritative informed and relevant The content of Nervous System Diseases New Insights for the Healthcare Professional 2013 Edition has been produced by the world s leading scientists engineers analysts research institutions and companies All of the content is from peer reviewed sources and all of it is written assembled and edited by the editors at ScholarlyEditions and available exclusively from us You now have a source you can cite with authority confidence and credibility More information is available at <http://www.ScholarlyEditions.com> **Neurodegenerative Diseases: Multifactorial Degenerative Processes, Biomarkers and**

**Therapeutic Approaches (First Edition)** Tabish Qidwai, 2022-08-10 This reference is the definitive guide to common neurodegenerative diseases that affect humans The book covers mechanisms of some of the most well known neurodegenerative diseases their biomarkers neuropharmacology and emerging treatment strategies The book introduces the subject of neurodegeneration by outlining the biochemistry pathophysiology and multifactorial neurological mechanisms the role of genetics environmental factors and mitochondrial damage for example Next it explains some of the most studied diseases namely Parkinson s Disease Alzheimer s Disease Huntington s Disease and Multiple Sclerosis Subsequent chapters delve into current knowledge about diagnostic and immunological biomarkers followed by a summary of novel therapeutic strategies Special attention has been given to the role of medicinal plants in attempting to treat neurodegenerative diseases as well as the public health burden posed by these conditions Key Features give readers an overview of multifactorial disease mechanisms in neurodegeneration covers some major neurodegenerative diseases in detail covers diagnostic and immunological biomarkers explores current therapeutic strategies and drug targets in common neurodegenerative diseases offers a simple presentation with references for advanced readers The book is a suitable reference for all readers including students research scholars and physicians who are interested in the mechanisms and treatment of neurodegenerative diseases

**Mechanisms of Cell Death and Approaches to Neuroprotection/Disease Modification in Parkinson's Disease** ,2021-11-10 Mechanisms of Cell Death and Approaches to Neuroprotection Disease Modification in Parkinson s Disease explores the results of numerous studies surrounding in vitro and animal model evidence that looks at the impact of synucleinopathy on neuronal dysfunction and behavioral impairments ii how research in animal models supports the development of therapeutic strategies and iii how findings in animal models might relate to the disease process in humans In this book the author s shed light upon the complex scenario of the mechanisms of cell death and approaches to neuroprotection disease modification in PD both in vitro to in vivo Along with degeneration the pathological hallmark of PD is the presence of intraneuronal proteinaceous cytoplasmic inclusions named Lewy Bodies LB that invade the whole nervous system as the disease progresses Several fundamental discoveries have shed light upon the implication of the syn protein in the pathogenesis of familial and sporadic forms of PD Other proteins also accumulate in LB but syn is a major protein component of the pathological landmarks Updates on the latest research surrounding Mechanisms of Cell Death in Parkinson s Disease Includes In vitro and In vivo models of synucleinopathy Presents therapeutic strategies in Parkinson s Disease

Moderately Proteinuric IgA Nephropathy in the Young Rosanna Coppo, Licia Peruzzi, 2000 IgA nephropathy IgAN is one of the most common glomerular diseases world wide Its natural history is consistent with a clinical onset in the first decades of life Clinical indicators of poor prognosis are proteinuria and hypertension Angiotensin converting enzyme inhibitors ACE I are a promising treatment since angiotensin II plays a key role in glomerular hypertension and permselectivity and modulates mesangial and tubular cell functions

*Glial Interfaces in the Nervous System* Håkan Aldskogius, John

Fraher,2002 Glial cells are commonly viewed as subordinate players to the functional requirements of neighbouring neurons in normal as well as pathological conditions These neuron glial interactions are crucial for the development maintenance plasticity and repair of the nervous system They are also dependent upon and or influenced by interactions between glial cells themselves **Medicinal Chemistry Approaches to Personalized Medicine** Karen Lackey,Bruce Roth,2013-11-22

Edited by two renowned medicinal chemists who have pioneered the development of personalized therapies in their respective fields this authoritative analysis of what is already possible is the first of its kind and the only one to focus on drug development issues Numerous case studies from the first generation of personalized drugs are presented highlighting the challenges and opportunities for pharmaceutical development While the majority of these examples are taken from the field of cancer treatment other key emerging areas such as neurosciences and inflammation are also covered With its careful balance of current and future approaches this handbook is a prime knowledge source for every drug developer and one that will remain up to date for some time to come From the content Discovery of Predictive Biomarkers for Anticancer Drugs Discovery and Development of Vemurafenib Targeting Basal Cell Carcinoma G Quadruplexes as Therapeutic Targets in Cancer From Human Genetics to Drug Candidates An Industrial Perspective on LRRK2 Inhibition as a Treatment for Parkinson s Disease Therapeutic Potential of Kinases in Asthma DNA Damage Repair Pathways and Synthetic Lethality Medicinal Chemistry in the Context of the Human Genome and many more Prevention and Health Promotion for the Excluded and the Destitute in Europe Pierre Chauvin,2002

The social inequalities of health have persisted or even increased in Europe in the last few years This text presents the experiences of professionals from various institutional backgrounds in eight European countries as well as their recommendations to improve the access of excluded people **Parkinson's Disease and Related Disorders** Peter Riederer,Heinz Reichmann,Moussa B. H. Youdim,Manfred Gerlach,2006-11-23

Traditionally the International Congress of Parkinson s Disease and Related disorders ICPD is reflected in publishing its proceedings This is to 1 sum up the current knowledge in this particular spectrum disorder and 2 to remind clinicians and basic researchers on the development and progress made overtime with respect to etiology pathology genetics endogenous vulnerability factors models drug treatment strategies e g levodopa neuroprotective drugs new developments in neurotherapeutics neurosurgery plasticity of nerve cell structures and clinical issues e g staging early diagnosis differential diagnostic aspects clinico pathological correlations new scales etc All these topics that have been brought forward at the 16 ICPD congress 2005 Berlin are now available in a subsumed version in supplementum 70 of Journal Neural Transmission This book gives a comprehensive overview on current clinical and basic research issues related to Parkinson s disease and its related disorders and is suitable for neurologists psychiatrists neurosurgeons basic researchers geneticists and patients as well as their relatives **Biomedical Index to PHS-supported Research** ,1990 *Environmental Health Perspectives*

,2000 The European Union and Health Services Reinhard Busse,Matthias Wismar,Philip C. Berman,2002 While most

Member States Governments have assumed that they have full responsibility and control over their own health services it is becoming increasingly apparent that the Single European Market is having a substantial impact on health services Recent rulings by the European Court of Justice ECJ have in particular established the freedom of citizens to choose health care goods and services across borders To examine the actual relationship between the SEM and health services this book identifies SEM regulations and directives as well as ECJ decisions which explicitly refer to health services and which therefore have a potential impact on the purchasing supply and delivery of health services evaluates the impact of SEM regulations and ECJ decisions on the purchasing supply and delivery of health services identifies outcomes including both intended and unintended effects of the SEM on Member States health services and develops future scenarios exploring key issues identified in the earlier analysis and evaluation

*The Eurocleft Project 1996-2000* Bill Shaw,2000 The European Register of Cleft Lip and Palate Services will be produced as a result of the concerted action project Standards of Care for Cleft Lip and Palate in Europe EUROCLEFT funded by the European Commission under its BIOMED II and INCO COPENICUS programmes The project aimed at developing a network of cleft care teams across Europe ran for three years between 1996 and 1999 and aimed broadly to improve the effectiveness and efficiency of care for European children with clefts of the lip and or palate Clefts of the lip and or palate are birth defects affecting 1 500 live births Successful rehabilitation requires a complex multidisciplinary mix of services

**Palliative Care in Europe** H. ten Have,Rien Janssens,2001 This text is concerned with the organization ideas and problems of palliative care in the European context As a result of a BIOMED project various organizations concepts and problematic issues of palliative care have been studied and described

**Musculoskeletal Disorders in Health-related Occupations** Thomas Reilly,2002 Annotation The Biomed IV project researched musculoskeletal disorders in health related occupations This work based on the project provides insight on the problems of musculoskeletal disorders and the means of their investigation After a presentation of background to the project methodologies and applications are described and a set of reviews is provided in particular for the research techniques used by the various investigators These include the application of precision stadiometry electromyography epidemiology the Delphi method and body composition analysis Individual studies illustrate how hospital specialisms fit into the broader ergonomics context Reilly is affiliated with the Research Institute for Sport and Exercise Sciences at Liverpool John Moores University UK Annotation c Book News Inc Portland OR booknews com

**Phytochemistry: An in-silico and in-vitro Update** Shashank Kumar,Chukwuebuka Egbuna,2019-06-25 Phytochemistry is the branch of science that deals with the study of plant derived chemicals or compounds which are also known as phytochemicals or plant derived secondary metabolites Plants are known to produce phytochemicals that are essential for their growth and reproduction as they protect them from insects pathogens and herbivores Some of the major groups of plant derived secondary metabolites are phenolics flavonoids terpenoids alkaloids tannin etc Plant derived phytochemicals are pharmacologically active and have the potential

to cure various human diseases and disorders Natural plant products have been known for their medicinal properties for untold years and form the basis of several medicinal systems such as Chinese Unani and Ayurvedic Medicine This book offers an essential introduction to phytochemicals and their synthetic analogues It discusses various in silico approaches used to identify pharmacologically active phytochemicals and their biological activities as well as in vitro and in vivo models assays that have been utilized for the pharmacological profiling of plant derived products to combat cancer diabetes cardiovascular diseases and neurological disorders The intended audience includes upper level undergraduate and graduate students researchers and scientists from the pharmaceutical food chemistry nutrition sciences biochemistry and clinical biochemistry fields and medical students Sharing the latest findings the book will familiarize these readers with the concepts chemistry and tremendous potential of phytochemistry

### **Proteomics, Multi-Omics and Systems Biology in Optic Nerve**

**Regeneration** Sanjoy K. Bhattacharya, 2025-01-28 Proteomics Multi Omics and Systems Biology in Optic Nerve

Regeneration is a comprehensive reference that covers all vistas of standardization of axon regeneration as well as all multi omics and system level data and integration tools By adopting a translational approach the book bridges current research in the field to clinical applications and readers can expect to learn standardization approaches for axon regeneration multi omics datasets different databases search engines multiple dataset integrative tools pathway convergence approaches and tools outcome and outcome measures that unify bench research with clinical outcome The axon regeneration from existing neurons in central nervous system CNS have become a potential possibility in the last decade The potential possibility of long distance axon growth has opened the possibility of re connectivity of axons of retinal ganglion cell neurons within the lateral geniculate nucleus in the brain The long distance axon regeneration and re connectivity is a promise to restore lost vision in the optic nerve Further long distance regeneration and re innervation is equally helpful for other fields such as spinal cord injuries Includes updates on the use of multi omics datasets for selecting molecules for axon regeneration Bridges the preclinical and clinical world from selection of the molecules to outcome leading to IND filing and their use Includes system level knowledge needed for central nervous system axon and dendrite regeneration and standardizes the system level biology for axon regeneration Explores the current state of multi omics in axon and dendrite regeneration in the optic nerve and its comparison to other CNS regeneration

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