Worldwide trends in brain research: A bibliometric analysis

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Over the last 80 years, brain research has gained a lot of traction, with recent advances such as the sequencing of the human genome, the development of tools for mapping neuronal connections, the improvement of neuroimaging technology, and the rise of nanoscience. This paper aims to determine how brain research has evolved over time in terms of papers and impact among countries, and how those various trends vary by areas of brain research. Our results show that over the past 30 years, the number of brain-related papers has grown at a faster pace than the number of papers from all disciplines combined with China being at the forefront of this growth. Different patterns of specializations among countries and funders have also emerged.

1. Introduction

Brain disorders exert a significant and increasing global burden with varying opportunities for prevention and intervention (Feigin et al., 2019; Rehm & Shield, 2019). Over the last 80 years, brain research has gained a lot of traction, culminating in the 1990s which was named "The Decade of the Brain" by President Bush to enhance the visibility of brain research and due to several major breakthroughs related to the brain and the nervous system (Library of Congress, 2020). In the 2000s, the World Health Organization (WHO) underlined the importance of brain and mental health research in the context of a worldwide increase in mental health and neurological conditions. More recently, the science academies of the G7 nations along with seven other scientific academies urged world leaders to develop global brain resources in order to understand, protect, and develop global brain resources (G-Science Academies, 2016). This attention on brain research has led to recent advances such as the sequencing of the human genome, the development of cutting-edge tools for mapping neuronal connections, the increase in resolution and quality of neuroimaging technology, and the rise of nanoscience which have created great opportunities to understand how the brain works in health and disease and integrate these various new methods across scientific fields (NIH, 2021). Brain research has advanced our understanding of the biological substrates of

human behavior and its perturbation across a variety of neurophysiological states and disorders. It comprises a diversity of research themes such as mental health, brain health, cognitive function, and basic brain function.

Bibliometrics have previously been used in several articles that attempted to study general brain research (Buchan et al., 2016; Yeung et al., 2017a; Yeung et al., 2017b), or specific brain research topics such as Alzheimer's disease (Chen et al., 2014; Dong et al., 2019), neuroimaging (Yeung et al., 2019; Wu et al., 2020), brain-computer interfaces (Hu et al., 2016), epilepsy (Wang et al., 2019), microbiota-gut-brain (Zyoud et al., 2019), neuropharmacology (Yeung et al., 2018; Duan et al., 2020), deep brain stimulation (Hu et al., 2017), brain injuries (Li et al., 2018; Qi et al., 2020; Mojgani et al., 2020), neuroethics (Leefmann et al., 2016), neuropathic pain (Chen & Wang, 2020), and music (Albusac-Jorge & Giménez-Rodriguez, 2015). The evolution of brain research in specific geographic areas such as South America, Brazil, and Saudi Arabia have also been covered (Hoppen & Vanz, 2016; Alhibshi et al., 2020; Forero et al., 2020). However, there currently is no recent comprehensive overview of the evolution of brain research and its various specialties over a long period of time. This paper aims to determine (1) how brain research has evolved over time in terms of papers, (2) country rankings in terms of papers and impact, (3) how those various trends vary by areas of brain research.

2. Methods

Data for this paper were drawn from Clarivate Analytics' Web of Science (WoS) for a 30-year period (1991-2020). The lower bound (1991) of the period analyzed was selected as it is the year when papers' keywords and abstracts began to be indexed in the WoS. We used a relatively broad definition of brain research, which includes papers published in 513 journals (Appendix 1) as well as those retrieved using a set of 247 keywords and expressions (Appendix 2) chosen by experts in the field and validated. The 513 core brain journals were manually selected based on their title and topic and included most journals indexed in the Neurology & Neurosurgery subfield from the classification developed by the Patent Board (Hamilton, 2003). Keywords were chosen following the method developed by Archambault et al. (2009). Finally, to reduce false positives, we limited the analysis to articles published in journals from fields of biomedical research, clinical medicine, health, and psychology, as well as the subfield of computer science. The final set of papers is based on all papers published in the 513 core journals, as well as the papers retrieved using the set of 247 keywords and published outside the core journals. It totals 2,467,708 papers, which represents 7% of all 33,608,813 papers indexed in the Web of Science over the 1991-2020 period.

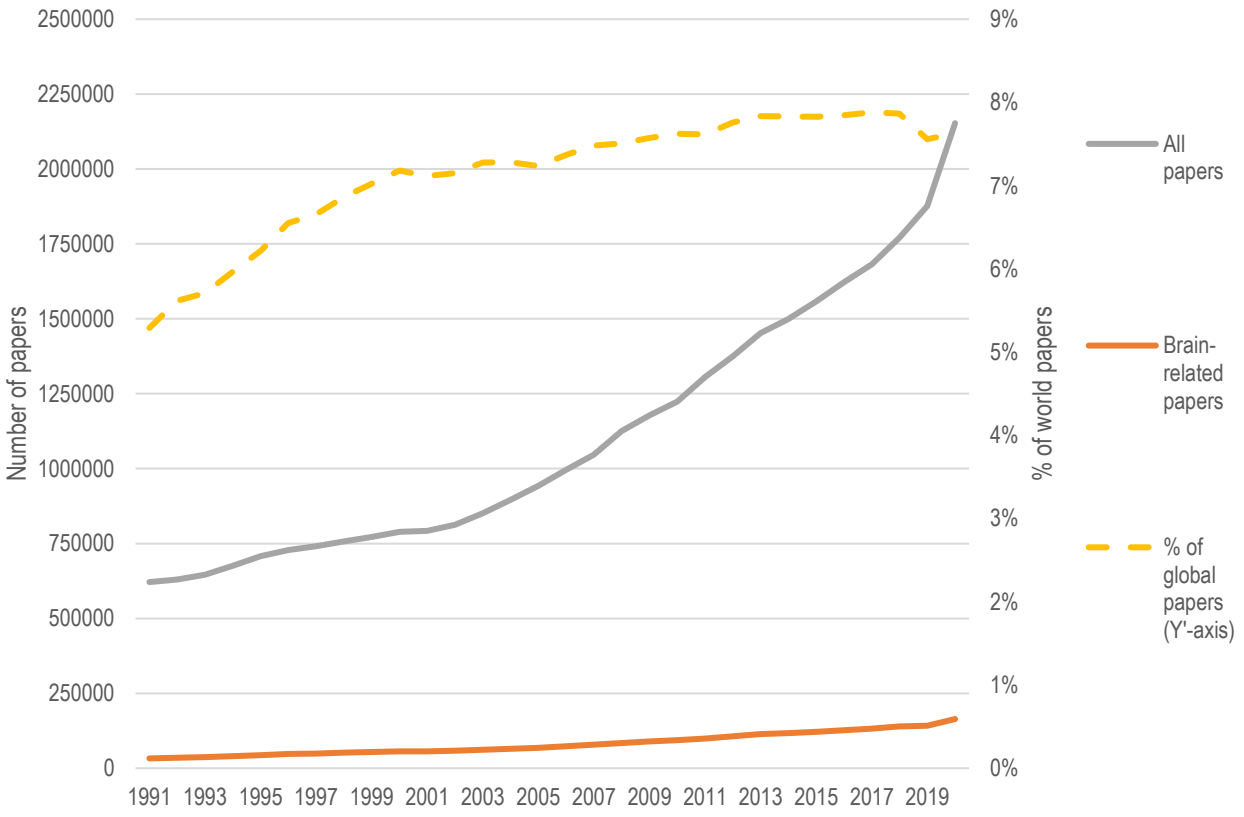
Three indicators are used in the analysis: number of papers, specialization, and research impact. We focus on the number of papers published as an indicator of the brain research activity of countries. Each country's percentage of all global papers is obtained by dividing their number of papers by the distinct number of papers published in brain research at the world level. Specialization in brain research is obtained by dividing the proportion of publications of each country in brain research by the proportion of the world's publications in brain research. For example, if a country A has 14% of its papers in brain research, but the percentage of brain research at the global level is 7%, the country would have a specialization index (SI) of 2. An SI value above 1 indicates the country has a higher percentage of brain research than would be expected, while an index value below 1 indicates the opposite. Research impact of countries in brain research

is obtained through the compilation of the average of relative citations (ARC), which considers the fact that papers across different disciplines and specialities have different citation potential (Sugimoto & Larivière, 2018).

3. Results

Figure 1 presents the evolution of the number of papers at the global level for the 1991-2020 period, both for all disciplines combined and for brain-related papers, and the percentage that brain research represents across all fields. The overall number of papers has grown exponentially over the last 30 years, from about 600,000 papers in 1991 to more than 2 million papers in 2020. The number of brain-related papers has grown faster than the number of papers of all disciplines combined, particularly between 1991 and 2011. During this period, the relative importance of brain research—that is, the proportion of brain-related papers across papers published in all disciplines combined—increased from 5% to 8% and has been relatively stable since then.

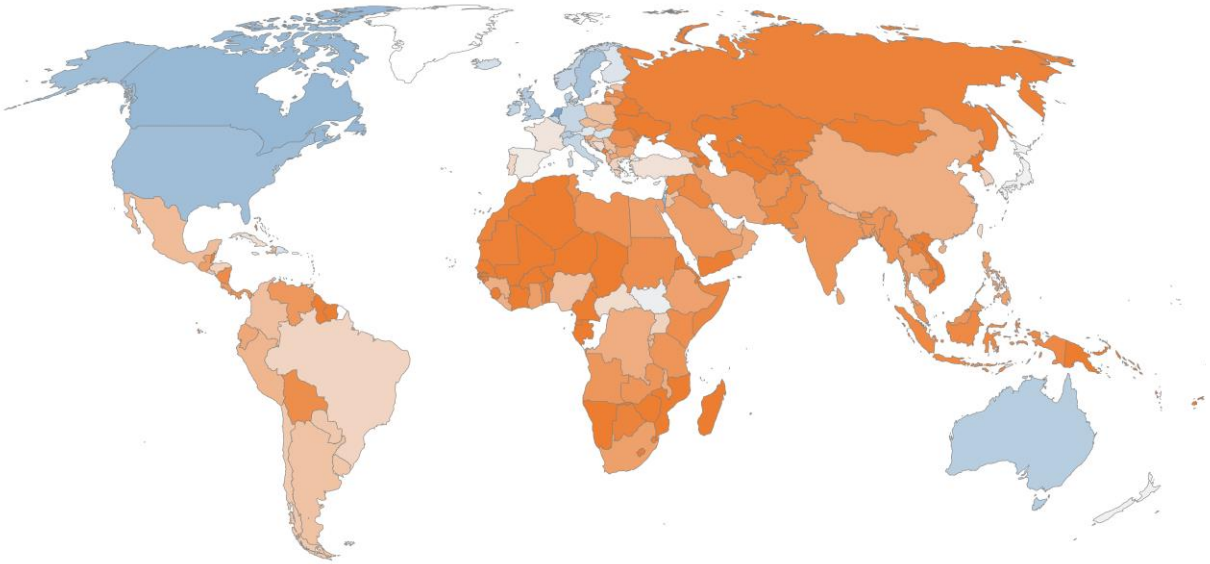
Figure 1. Number of papers (all disciplines combined and brain-related research) and percentage of brain-related research across all disciplines, 1991-2020.



The research output in the field is, however, quite heterogenous across countries. Figure 2 shows the distribution of brain-related research around the world, demonstrating a concentration in North America, Western Europe, and Oceania. Among the countries with a sizeable scientific output. The country with the highest level of specialization in brain research is the Netherlands, with an SI of 1.62, indicating that they perform 62% more brain research than expected. This is followed by Israel (1.46), Canada (1.45), the United States (1.41), Sweden (1.37), United Kingdom (1.31),

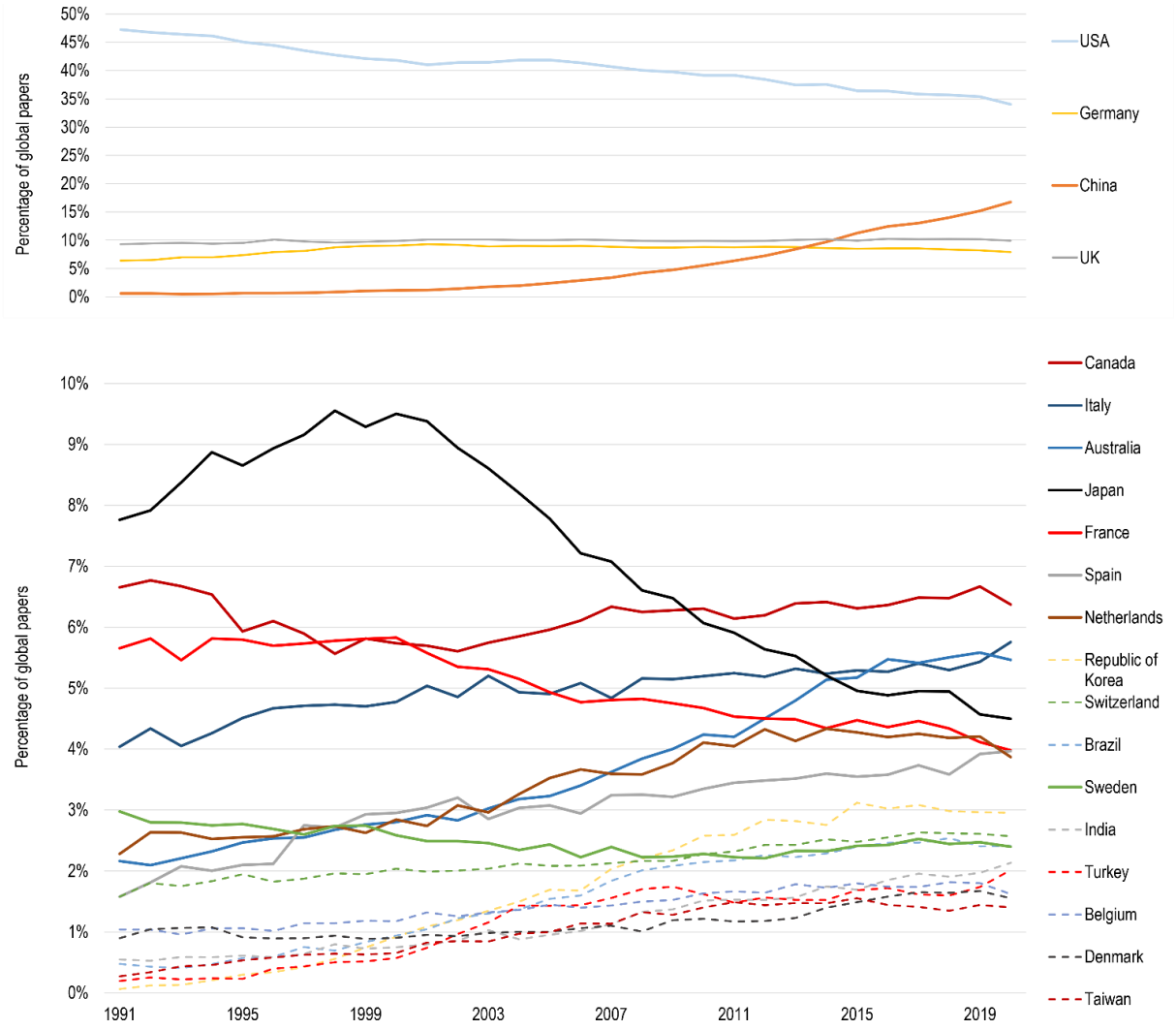
and Switzerland (1.30). At the other end of the spectrum, India (0.44), Iran (0.54), and China (0.60) are considerably less active than expected in brain research.

Figure 2. Specialization in brain research by country. Blue indicates that the country is relatively more active in brain research; orange indicates that the country is relatively less active in the field; grey indicates that the country is performing brain research in the same percentage as expected values. 2011-2020.



The relative contribution of countries in the field has varied significantly over the last three decades (Figure 3). The decline of the United States—also observed across all domains combined—is quite striking. While the country accounted for more than 47% of all brain-related papers in 1991, this percentage is now at 34%. Complementary to this decline is the rise of China's research activities in the field, which rose from less than 1% at the beginning of this millennium to 17% in 2020 (a growth of 2750%). Other countries whose contribution to brain research is declining includes Japan, whose share of global papers has decreased from 10% in the late 1990s to 5% in 2020; France, which decreased from 6% in 1991 to 4% in 2020; and Germany, which decreased from 9% in the early 2000s to 8% in 2020. Many nations, particularly in Europe, are now taking increasing space in the field: the Netherlands (170% increase in share of papers over the period), Spain (252% increase), Switzerland (162% increase), and Belgium (156% increase). In other parts of the world, notable increase includes the Republic of Korea (4626% increase), Turkey (1036% increase), Brazil (508%) and India (387%).

Figure 3. Percentage of world papers in brain research, by country, 1991-2020. Web of Science database. The top 20 countries with the highest number of papers are presented.



We then sought to assess the contribution of these countries to different subcategories of brain research. Figure 4 demonstrates the SI for each of the five areas of brain research: biomedical research, covering the biological or physiological aspects of research; clinical medicine, covering the clinical aspects; computer science, covering deep-learning-related research; public health; and psychology. Given that the majority of papers in the brain research field are published in clinical medicine, most countries are relatively close to the average (i.e., 1) in this domain. In biomedical research, China, Germany, Japan, France, and India are relatively more active, while the US, the UK, Canada, and Australia are relatively less active. Psychology and public health follow a similar pattern, with Western countries often being specialized in those areas, and Asian countries being relatively less active. In computer science, the relative strength of Asian countries (China, Korea, India, and Taiwan) and Spain is noteworthy.

Figure 4. Specialization in brain research, by area and country, 2011-2020. Specialization is obtained by dividing each country's percentage of world papers for a given area by their percentage of world papers for all areas combined. Blue (>1) indicates the country is relatively

more active in the area; orange (<1) indicates the country is relatively less active in the area; grey (≈1) indicates the country is performing brain research in the same percentage as expected values.

Country	Biomedical Research	Clinical Medicine	Computer Science	Health	Psychology
United States of America	0.9	1.0	0.6	1.2	1.3
China	1.3	1.0	2.4	0.4	0.4
United Kingdom	0.9	0.9	0.8	1.2	1.4
Germany	1.1	1.0	0.6	0.5	1.1
Canada	0.8	1.0	0.7	1.3	1.3
Italy	0.9	1.1	0.8	0.7	0.8
Australia	0.8	0.9	0.7	1.9	1.4
Japan	1.3	1.1	0.7	0.5	0.4
France	1.2	1.0	1.0	0.5	0.8
Netherlands	0.8	1.0	0.5	1.1	1.4
Spain	1.0	1.0	1.4	0.8	1.1
Republic of Korea	1.1	1.0	1.4	1.3	0.3
Switzerland	1.0	1.0	0.7	0.7	0.9
Sweden	1.0	1.0	0.5	1.7	0.8
Brazil	1.0	1.1	0.7	1.1	0.5
India	1.4	1.0	3.0	0.4	0.2
Belgium	0.9	1.0	0.6	0.9	1.4
Turkey	0.5	1.2	1.3	1.2	0.4
Denmark	0.9	1.1	0.5	1.0	0.6
Taiwan	1.1	1.0	1.7	1.6	0.6

Next, we calculated the scholarly impact of brain research papers for the top 20 countries with the highest number of papers (Figure 5). For all domains of brain research, this demonstrated an overall high scholarly impact for countries such as Denmark, the United Kingdom, the Netherlands, Switzerland, Sweden, and Belgium. However, many other countries have a strong scholarly index in specific categories of brain research, such as the United States, China, Canada, and Australia in the field of computer science.

Figure 5: Scholarly impact, by country and area, 2011-2020. ARC is obtained by dividing each papers' number of citations by the average citation rate of papers published in the same speciality and year. Blue (>1) indicates a higher scientific impact in the area; orange (<1) indicates a lower scientific impact in the area; grey (≈1) indicates a scientific impact on par with the world average.

Country	Biomedical Research	Clinical Medicine	Computer Science	Health	Psychology	All Domains
United States	1.4	1.4	1.6	1.2	1.2	1.3
China	0.9	1.0	1.6	1.3	0.9	1.0
United Kingdom	1.4	1.6	2.2	1.4	1.3	1.5
Germany	1.2	1.3	1.5	1.2	1.1	1.3
Canada	1.3	1.4	1.6	1.2	1.2	1.4
Italy	1.2	1.3	1.3	1.4	1.2	1.3
Australia	1.3	1.5	1.8	1.3	1.2	1.4
Japan	0.9	0.9	1.0	0.9	0.7	0.9
France	1.2	1.3	1.2	1.3	1.0	1.3
Netherlands	1.5	1.6	1.9	1.4	1.4	1.5
Spain	1.2	1.3	1.3	1.3	0.9	1.2
Republic of Korea	0.9	0.9	1.1	0.9	0.8	0.9
Switzerland	1.6	1.6	2.0	1.5	1.2	1.5
Sweden	1.5	1.6	1.4	1.2	1.2	1.5
Brazil	0.8	1.0	1.0	0.8	0.8	1.0
India	0.8	1.0	1.4	1.1	0.9	0.9
Belgium	1.5	1.5	1.6	1.5	1.3	1.5
Turkey	0.9	0.6	1.2	0.7	0.9	0.7
Denmark	1.6	1.6	1.6	1.5	1.3	1.6
Taiwan	0.7	0.9	0.9	1.1	0.8	0.9

4. Discussion and conclusions

Our results show that over the past 30 years, the number of brain-related papers has grown at a faster pace than the number of papers from all disciplines combined, with the Western world leading the charge in terms of specialization. There are likely multiple factors contributing to this growth in the proportion of brain-related research compared to all other disciplines combined: (1) the growth in funding and brain-related initiatives (Grillner et al., 2016), (2) a growth in the various neuroimaging technologies that allow for more precise studies of brain-related phenomena (NIH, 2021), (3) endogenous growth within the discipline (i.e. due to new discoveries and theories), and (4) exogenous growth related to increased awareness (i.e. on mental health) and demands from aging societies. Results have also shown the variation in the research contribution of countries over the past three decades, including the steady decline of the United States of America as a superpower in brain research and China's rise as a major player with a growth of 2750% over the past 20 years.

While previous articles have used bibliometrics to study various topics of brain research, our study is the first to offer a comprehensive overview of the evolution of brain research and its various specialties through over a long period of time. One of the main limitations of this study is the use of WoS as a bibliometrics source of data which may lead to an underestimation of regional and non-English scientific literature (Glänzel, 1996; Hicks, 1999; Archambault et al., 2006), especially in countries such as China where publishing in Chinese is strongly encouraged by funders and stakeholders, even more so since the beginning of the Covid-19 pandemic (Larivière et al., 2020). However, the effect of these policies has yet to make a considerable difference in the Chinese research ecosystem (Shu et al., 2022). Furthermore, in interpreting the results of this study, it should be noted that increased research output does not linearly reflect research progress. For example, mental health researchers have lamented the slow progress in treatment of mental disorders despite large investments in basic research (Torrey et al., 2021). With these caveats in mind, our findings provide a large scope snapshot of the evolution of brain research and its funding which may be used as a baseline for future studies on these topics.

Open science practices

Restrictions apply to the dataset used in this paper. The Web of Science data is owned by Clarivate Analytics. To obtain the bibliometric data in the same manner as authors (i.e. by purchasing them), readers can contact Clarivate Analytics at the following URL: https://clarivate.com/webofsciencegroup/solutions/web-of-science/contact-us/. Future versions of this paper may use open data sources or share and aggregated version of the dataset used.

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Author contributions

Conceptualization: MS, VL, CF, DK; Data curation: VL, DK, MS; Formal Analysis: VL, DK; Funding acquisition: VL, CF, MS; Investigation: MS; VL, CF; DK Methodology: VL, MS, CF, DK; Project administration: VL, CF; Resources: VL, CF; Supervision: VL, CF; Validation: MS, VL, CF, DK; Visualization: VL, MS; Writing – original draft: MS, JS, TS, VL; Writing – review & editing: MS, JS, TS, CF, VL, DK

Competing interests

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Appendix 1. Keywords used to retrieve papers outside the core journals

BRAIN
ALZHEIMERS-DISEASE
PREFRONTAL CORTEX
CORTEX
AMYOTROPHIC-LATERAL-SCLEROSIS
NEURONS
SYNAPTIC PLASTICITY
DEMENTIA
FUNCTIONAL CONNECTIVITY
CENTRAL-NERVOUS-SYSTEM
FMRI
WHITE-MATTER
FRONTOTEMPORAL LOBAR DEGENERATION
STRESS
SPINAL-CORD
ALS
MEMORY
SCHIZOPHRENIA
PARKINSONS-DISEASE
TRANSCRANIAL MAGNETIC STIMULATION
HUMAN BRAIN
MULTIPLE-SCLEROSIS
MILD COGNITIVE IMPAIRMENT
NERVOUS-SYSTEM
PERCEPTION
NEUROGENESIS
WORKING-MEMORY
STROKE
MAJOR DEPRESSION
COGNITIVE IMPAIRMENT
LONG-TERM POTENTIATION
NMDA RECEPTORS
AMYGDALA
VISUAL-CORTEX
DENDRITIC SPINES
DEPRESSION
CEREBROSPINAL-FLUID
ANXIETY
ANTERIOR CINGULATE CORTEX
CEREBRAL-CORTEX
NEUROPATHIC PAIN
RECOGNITION
NUCLEUS-ACCUMBENS
DENTATE GYRUS
LONG-TERM DEPRESSION
ALPHA-SYNUCLEIN
SYNAPTIC-TRANSMISSION
CORTICAL THICKNESS
HIPPOCAMPUS
PAIN
HIPPOCAMPAL-NEURONS
NEURONAL-ACTIVITY
HUMAN CEREBRAL-CORTEX
SUBVENTRICULAR ZONE
MOTOR CORTEX
A-BETA
RAT-BRAIN
BRAIN-DEVELOPMENT
BASAL GANGLIA
CORPUS-CALLOSUM
DIAGNOSTIC OBSERVATION SCHEDULE
MAGNETIC-RESONANCE-SPECTROSCOPY
NEUROTROPHIC FACTOR
NEURODEGENERATIVE DISEASES
MOTOR-NEURON DISEASE
MICROGLIA
ADULT HIPPOCAMPAL NEUROGENESIS
ATTENTION
SPATIAL MEMORY
CEREBRAL-BLOOD-FLOW
SPINAL-CORD-INJURY

EEG
MAJOR DEPRESSIVE DISORDER
MENTAL-RETARDATION
PROTEIN
ASTROCYTES
MENTAL-RETARDATION
AUTISM SPECTRUM DISORDER
VENTRAL TEGMENTAL AREA
EXECUTIVE FUNCTION
CRANIAL RADIATION
ADULT NEUROGENESIS
EPISODIC MEMORY
GRAY-MATTER
COGNITIVE CONTROL
MEDIAL TEMPORAL-LOBE
BIPOLAR DISORDER
AMPA RECEPTORS
PSYCHIATRIC-DISORDERS
HIPPOCAMPAL NEUROGENESIS
MOTOR-NEURON NEURODEGENERATION
PERIPHERAL-NERVE INJURY
NEUROINFLAMMATION
NEURAL ACTIVITY
SPECTRUM DISORDER
CHRONIC PAIN
POSTERIOR-FOSSA TUMORS
DOPAMINE
AMYLOID-BETA
INTRACORTICAL INHIBITION
AUTISM
CEREBRAL-ISCHEMIA
TRAUMATIC BRAIN-INJURY
DEFAULT MODE NETWORK
GRANULE CELLS
VOXEL-BASED MORPHOMETRY
CONNECTOME
MOTOR-NEURONS
NEURITE OUTGROWTH
RECOGNITION MEMORY
FUNCTIONAL MRI
NEUROLIGINS
HIGH-GRADE GLIOMAS
SPECTRUM DISORDERS
VASCULAR DEMENTIA
COGNITIVE FUNCTION
LATERALIZATION
HIPPOCAMPAL VOLUME
DOPAMINE NEURONS
REMYELINATION
NEURAL STEM-CELLS
DEEP BRAIN-STIMULATION
PREMOTOR CORTEX
CORTICAL-NEURONS
GLUCOCORTICOID-RECEPTOR
PSYCHOSIS
FRONTOTEMPORAL DEMENTIA
MOTOR-NEURON DEGENERATION
BRAIN-STIMULATION
PREPULSE INHIBITION
WHITE-MATTER HYPERINTENSITIES
N-ACETYLASPARTATE
TARDBP MUTATIONS
PARIETAL CORTEX
NORMAL BRAIN-DEVELOPMENT
SUPERIOR COLLICULUS
NEURONS BORN
PYRAMIDAL NEURONS
FRAGILE-X-SYNDROME
PTSD
AMYLOID PRECURSOR PROTEIN
SEIZURE EXPRESSION
AUTISM SPECTRUM DISORDERS
AXONAL-TRANSPORT
AXON GUIDANCE
NEUROSCIENCE RESEARCH
NEURONAL MIGRATION
TEMPORAL-LOBE EPILEPSY
DECISION-MAKING
LOCUS-COERULEUS
LEWY BODIES
EVENT-RELATED FMRI
MALIGNANT GLIOMAS
CORTICAL REORGANIZATION
EXPERIMENTAL AUTOIMMUNE ENCEPHALOMYELITIS
CEREBRAL-PALSY
BLOOD-BRAIN-BARRIER
RETROGRADE-AMNESIA
FOCAL CEREBRAL-ISCHEMIA
LONG-TERM-POTENTIATION
GLIAL-CELLS
NMDA RECEPTOR
BRAIN NETWORKS
ENDOCANNABINOID SYSTEM
SUBSTANTIA-NIGRA

CREUTZFELDT-JAKOB-DISEASE
GLIOMA
FEAR MEMORY
BRAIN-TUMORS
FRONTAL-CORTEX
LAMINA-I NEURONS
MOTOR CORTEX
EXCITABILITY
LOCOMOTOR-ACTIVITY
SEIZURES
GLUTAMATE RECEPTORS
FOREBRAIN
ADDICTION
SUPRACHIASMATIC NUCLEUS
ALZHEIMER-DISEASE
TDCS
COGNITIVE DECLINE
STATE FUNCTIONAL CONNECTIVITY
HEAD-INJURY
DORSOLATERAL PREFRONTAL CORTEX
EARLY BRAIN-INJURY
INSULAR CORTEX
MENTAL PRACTICE
ISCHEMIC-STROKE
GLIOBLASTOMA
MEMORY FORMATION
OLIGODENDROCYTES
INTELLECTUAL DISABILITY
SENSORY NEURONS
HUMAN MOTOR CORTEX
BRAIN ATROPHY
NEUROCOGNITIVE DEFICITS
SEMANTIC DEMENTIA
BRAIN ACTIVITY
SEROTONIN NEURONS
GLIA
HIGH-FUNCTIONING AUTISM
AMYLOID DEPOSITION
CINGULATE WHITE-MATTER
EPILEPSY
POSTERIOR PARIETAL CORTEX
NEUROTOXICITY
RADIAL GLIA
PRIMARY MOTOR CORTEX
MOUSE SPINAL-CORD
SPINAL MICROGLIA
COGNITION
MEDIAL PREFRONTAL CORTEX
NEUROSCIENCE
MOUSE-BRAIN
FUNCTIONAL NEUROANATOMY
MIDBRAIN DOPAMINE NEURONS
MOOD
POSTTRAUMATIC-STRESS-DISORDER
DOPAMINERGIC-NEURONS
CA1 REGION
DOPAMINE RELEASE
SOMATOSENSORY CORTEX
ATTENTION-DEFICIT/HYPERACTIVITY DISORDER
HIPPOCAMPAL
DEVELOPMENTAL DELAY
CORTICAL CONNECTIONS
MOTONEURONS
MEMORY IMPAIRMENT
CONTEXTUAL FEAR MEMORY
NEURODEGENERATIVE DISEASE
PSYCHOPATHOLOGY
GYRUS
MEDULLOBLASTOMA
STRUCTURAL CONNECTIVITY
MAMMALIAN BRAIN
INTERNEURONS
NEUROLOGICAL DISORDERS
UNDERLYING
NEUROPATHIC PAIN
NEURONAL OSCILLATIONS
AXONAL INJURY
GENERALIZED EPILEPSY
NEURAL MECHANISMS
CONSCIOUSNESS
ARTERIAL ISCHEMIC-STROKE
DORSAL-ROOT GANGLIA
SENSORIMOTOR INTEGRATION
MOOD DISORDERS

Appendix 2. Core journals for which all papers are included in the analyses

A N A E-Approche Neuropsychologique Des Apprentissages Chez L Enfant
Acs Chemical Neuroscience
Acta Neurobiologiae Experimentalis
Acta Neurochirurgica
Acta Neurologica Belgica
Acta Neurologica Scandinavica
Acta Neuropathologica
Acta Neuropathologica Communications
Acta Neuropsychiatrica
Acta Psychiatrica Scandinavica
Actas Luso-Espanolas De Neurologia Psiquiatria Y Ciencias Afines
Advances In Neuroimmunology
Advances In Neurology
Aging & Mental Health
Aging And Cognition
Aging Neuropsychology And Cognition
Aging Neuropsychology And Cognition
Aktuelle Neurologie
Alzheimer Disease & Associated Disorders
Alzheimers & Dementia
Alzheimers Research & Therapy
American Journal Of Electroneurodiagnostic Technology
American Journal Of Medical Genetics Part B-Neuropsychiatric Genetics
American Journal Of Neuroradiology
American Journal Of Psychiatry
Amyotrophic Lateral Sclerosis And Frontotemporal Degeneration
Amyotrophic Lateral Sclerosis And Other Motor Neuron Disorders
Annals Of Clinical And Translational Neurology
Annals Of Indian Academy Of Neurology
Annals Of Neurology
Annals Of Neurology
Annual Review Of Neuroscience
Applied Neuropsychology
Applied Neuropsychology-Adult
Applied Neuropsychology-Child
Aquivos De Neuro-Psiquiatria
Archives Of Clinical Neuropsychology
Archives Of Neurology
Asn Neuro
Audiology And Neuro-Otology
Auditory Neuroscience
Autism
Autonomic Neuroscience-Basic & Clinical
Baillieres Clinical Neurology
Behavioral And Brain Functions
Behavioral And Brain Sciences
Behavioral Neuroscience

Behavioural Brain Research
Behavioural Neurology
Biological Psychiatry
Biological Psychiatry-Cognitive Neuroscience And Neuroimaging
Biological Psychology
Bipolar Disorders
Bmc Neurology
Bmc Neurology
Bmc Neuroscience
Bmc Psychiatry
Brain
Brain & Development
Brain And Behavior
Brain And Cognition
Brain And Language
Brain Behavior And Evolution
Brain Behavior And Immunity
Brain Cell Biology
Brain Connectivity
Brain Imaging And Behavior
Brain Impairment
Brain Injury
Brain Pathology
Brain Research
Brain Research Bulletin
Brain Research Protocols
Brain Research Reviews
Brain Sciences
Brain Stimulation
Brain Structure & Function
Brain Structure & Function
Brain Topography
Brain Tumor Pathology
British Journal Of Neurosurgery
British Journal Of Psychiatry
Canadian Journal Of Neurological Sciences
Canadian Journal Of Neurological Sciences
Canadian Journal Of Psychiatry-Revue Canadienne De Psychiatrie
Cellular And Molecular Neurobiology
Cellular And Molecular Neurobiology
Central European Neurosurgery
Cerebellum
Cerebral Cortex
Cerebrovascular And Brain Metabolism Reviews
Ceska A Slovenska Neurologie A Neurochirurgie
Child Neuropsychology
Clinical Eeg And Neuroscience
Clinical Neurology And Neurosurgery
Clinical Neuropathology
Clinical Neuropharmacology

Clinical Neurophysiology
Clinical Neurophysiology
Clinical Neuropsychologist
Clinical Neuroradiology
Clinical Neuroscience
Clinical Neuroscience Research
Clinical Psychopharmacology And Neuroscience
Cns & Neurological Disorders-Drug Targets
Cns Neuroscience & Therapeutics
Cns Neuroscience & Therapeutics
Cognition
Cognitive Affective And Behavioral Neurology
Cognitive Brain Research
Cognitive Development
Cognitive Neurodynamics
Cognitive Neuropsychiatry
Cognitive Neuropsychology
Cognitive Neuroscience
Comprehensive Psychiatry
Computational Intelligence And Neuroscience
Cortex
Critical Reviews In Neurobiology
Critical Reviews In Neurosurgery
Current Neurology And Neuroscience Reports
Current Neuropharmacology
Current Neurovascular Research
Current Opinion In Neurobiology
Current Opinion In Neurology
Current Pain And Headache Reports
Current Psychiatry Reports
Current Treatment Options In Neurology
Dementia And Geriatric Cognitive Disorders
Depression And Anxiety
Develiomental Cognitive Neuroscience
Development And Psychopathology
Development Brain Research
Developmental Brain Dysfunction
Developmental Cognitive Neuroscience
Developmental Medicine And Child Neurology
Developmental Neurobiology
Developmental Neurobiology
Developmental Neuropsychology
Developmental Neuropsychology
Developmental Neurorehabilitation
Developmental Neuroscience
Dialogues In Clinical Neuroscience
Electroencephalography And Clinical Neurophysiology
Electromyography And Motor Control-Electroencephalography And Clinical Neurophysiology
Eneuro
Epilepsy & Behavior

European Archivers Of Psychiatry And Clinical Neuroscience
European Archives Of Psychiatry And Clinical Neuroscience
European Journal Of Neurology
European Journal Of Neuroscience
European Journal Of Neuroscience
European Journal Of Paediatric Neurology
European Neurology
European Neuropsychopharmacology
European Neuropsychopharmacology
Evoked Potentials-Electroencephalography And Clinical Neurophysiology
Experimental Brain Research
Experimental Brain Research
Experimental Neurobiology
Experimental Neurology
Expert Review Opf Neurotherapeutics
Folia Neuropathologica
Fortschritte Der Neurologie Psychiatrie
Frontiers In Aging Neuroscience
Frontiers In Aging Neuroscience
Frontiers In Behavioral Neuroscience
Frontiers In Cellular Neuroscience
Frontiers In Cellular Neuroscience
Frontiers In Computational Neuroscience
Frontiers In Human Neuroscience
Frontiers In Human Neuroscience
Frontiers In Integrative Neuroscience
Frontiers In Molecular Neuroscience
Frontiers In Molecular Neuroscience
Frontiers In Neural Circuits
Frontiers In Neuroanatomy
Frontiers In Neuroanatomy
Frontiers In Neuroendocrinology
Frontiers In Neuroinformatics
Frontiers In Neuroinformatics
Frontiers In Neurology
Frontiers In Neurology
Frontiers In Neurorobotics
Frontiers In Neuroscience
Frontiers In Neuroscience
Frontiers In Psychiatry
Frontiers In Psychology
Frontiers In Synaptic Neuroscience
Frontiers In Systems Neuroscience
Frontiers In Systems Neuroscience
Functional Neurology
Genes Brain And Behavior
Geriatrie Et Psychologie Neuropsychiatrie De Vieillissement
Giornale Di Neuropsichiatria Dell Eta Evolutiva
Giornale Di Neuropsicofarmacologia
Glia

Hippocampus
Human Brain Mapping
Human Brain Mapping
Ideggyogyaszati Szemle-Clinical Neuroscience
Internation Journal Of Neuroradiology
International Journal Of Developmental Neuroscience
International Journal Of Neuropsychopharmacology
International Journal Of Neuropsychopharmacology
International Journal Of Neuroscience
International Neurourology
International Psychogeriatrics
International Review Of Neurobiology
Jama Neurology
Jama Psychiatry
Journal Of Alzheimers Disease
Journal Of Autism And Developmental Disorders
Journal Of Brain Research-Journal Fur Hirnforschung
Journal Of Cerebral Blood Flow And Metabolism
Journal Of Clinical Neurology
Journal Of Clinical Neurophysiology
Journal Of Clinical Neuroscience
Journal Of Clinical Neuroscience
Journal Of Cognitive Neuroscience
Journal Of Cognitive Neuroscience
Journal Of Comparative Neurology
Journal Of Comparative Physiology A-Neuroethology Sensory Neural And Behavioral Physiology
Journal Of Computational Neuroscience
Journal Of Developmental And Behavioral Pediatrics
Journal Of Experimental Child Psychology
Journal Of Geriatric Psychiatry And Neurology
Journal Of Geriatric Psychiatry And Neurology
Journal Of Headache And Pain
Journal Of Integrative Neuroscience
Journal Of Korean Neurosurgical Society
Journal Of Korean Neurosurgical Society
Journal Of Mathematical Neuroscience
Journal Of Molecular Neuroscience
Journal Of Musculoskeletal & Neuronal Interactions
Journal Of Neurobiology
Journal Of Neurochemistry
Journal Of Neurochemistry
Journal Of Neurocytology
Journal Of Neurodevelopmental Disorders
Journal Of Neurodevelopmental Disorders
Journal Of Neuroendocrinology
Journal Of Neuroengineering And Rehabilitation
Journal Of Neurogastroenterology And Motility
Journal Of Neurogenetics
Journal Of Neuroimaging

Journal Of Neuroimaging
Journal Of Neuroimmune Pharmacology
Journal Of Neuroimmune Pharmacology
Journal Of Neuroimmunology
Journal Of Neuroinflammation
Journal Of Neuroinflammation
Journal Of Neurointerventional Surgery
Journal Of Neurolinguistics
Journal Of Neurolinguistics
Journal Of Neurologic Physical Therapy
Journal Of Neurologic Rehabilitation
Journal Of Neurologic Rehabilitation
Journal Of Neurological And Orthopaedic Medicine And Surgery
Journal Of Neurological Sciences-Turkish
Journal Of Neurological Surgery Part A- Central European Neurosurgery
Journal Of Neurological Surgery Part B-Skull Base
Journal Of Neurology
Journal Of Neurology Neurosurgery And Psychiatry
Journal Of Neurology Neurosurgery And Psychiatry
Journal Of Neuro-Oncology
Journal Of Neuro-Oncology
Journal Of Neuro-Ophtalmology
Journal Of Neuropathology And Experimental Neurology
Journal Of Neuropathology And Experimental Neurology
Journal Of Neurophysiology
Journal Of Neurophysiology
Journal Of Neuropsychiatry And Clinical Neurosciences
Journal Of Neuropsychology
Journal Of Neuroradiology
Journal Of Neuroradiology
Journal Of Neuroscience
Journal Of Neuroscience
Journal Of Neuroscience Methods
Journal Of Neuroscience Methods
Journal Of Neuroscience Nursing
Journal Of Neuroscience Research
Journal Of Neuroscience Research
Journal Of Neurosurgery
Journal Of Neurosurgery
Journal Of Neurosurgery-Pediatrics
Journal Of Neurosurgery-Pediatrics
Journal Of Neurosurgery-Spine
Journal Of Neurosurgery-Spine
Journal Of Neurosurgical Anesthesiology
Journal Of Neurosurgical Sciences
Journal Of Neurotrauma
Journal Of Neurotrauma
Journal Of Neurovirology
Journal Of Oral & Facial Pain And Headache
Journal Of Orofacial Pain

Journal Of Parkinsons Disease
Journal Of Pineal Research
Journal Of Psychiatry & Neuroscience
Journal Of Psychiatry & Neuroscience
Journal Of Psychopharmacology
Journal Of Spinal Cord Medicine
Journal Of The American Academy Of Child And Adolescent Psychiatry
Journal Of The International Neuropsychological Society
Journal Of The International Neuropsychological Society
Journal Of The Neurological Sciences
Journal Of The Neurological Sciences
Journl Of Neuroscience Psychology And Economics
Klinische Neurophysiologie
Lancet Neurology
Lancet Neurology
Language Cognition And Neuroscience
Learning & Memory
Metabolic Brain Disease
Mind Brain And Education
Minimally Invasive Neurosurgery
Molecular And Cellular Neuroscience
Molecular And Chemical Neuropathology
Molecular Autism
Molecular Brain
Molecular Brain Research
Molecular Neurobiology
Molecular Neurobiology
Molecular Neurodegeneration
Molecular Neurodegeneration
Molecular Psychiatry
Multiple Sclerosis And Related Disorders
Nature Clinical Practice Neurology
Nature Neuroscience
Nature Neuroscience
Nature Reviews Neurology
Nature Reviews Neuroscience
Nature Reviews Neuroscience
Neurobehavioral Toxicology
Neurobiology Of Aging
Neurobiology Of Aging
Neurobiology Of Aging
Neurobiology Of Disease
Neurobiology Of Disease
Neurobiology Of Learning And Memory
Neurobiology Of Learning And Memory
Neurobiology Of Stress
Neurocase
Neurocase
Neurochemical Journal
Neurochemical Research

Neurochemistry International
Neurochirurgie
Neurocirugia
Neurocomputing
Neurocritical Care
Neurodegeneration
Neurodegenerative Diseases
Neuroendocrinology
Neuroendocrinology Letters
Neuroepidemiology
Neuroforum
Neurogastroenterology And Motility
Neurogenetics
Neuroimage
Neuroimage
Neuroimage-Clinical
Neuroimage-Clinical
Neuroimaging Clinics Of North America
Neuroimmunomodulation
Neuroinformatics
Neurologia
Neurologia Croatica
Neurologia I Neurochirurgia Polska
Neurologia Medico-Chirurgica
Neurologic Clinics
Neurological Research
Neurological Sciences
Neurological Sciences And Neurophysiology
Neurological Surgery
Neurologist
Neurology
Neurology
Neurology Asia
Neurology India
Neurology Psychiatry And Brain Research
Neurology Psychiatry And Brain Research
Neurology-Genetics
Neurology-Neuroimmunology & Neuroinflammation
Neuromodulation
Neuromolecular Medicine
Neuromuscular Disorders
Neuron
Neuron
Neuron Glia Biology
Neuro-Oncology
Neuro-Oncology
Neuro-Ophtalmology
Neuro-Orthopedics
Neuropathology
Neuropathology And Applied Neurobiology

Neuropediatrics
Neuropeptides
Neuropharmacology
Neuropharmacology
Neurophotonics
Neurophotonics
Neurophysiologie Clinique-Clinical Neurophysiology
Neurophysiologie Clinique-Clinical Neurophysiology
Neurophysiology
Neuropsychiatric Disease And Treatment
Neuropsychiatric Disease And Treatment
Neuropsychiatrie
Neuropsychiatry
Neuropsychiatry Neuropsychology And Behavioral Neurology
Neuropsychobiology
Neuropsychologia
Neuropsychologia
Neuropsychological Rehabilitation
Neuropsychology
Neuropsychology
Neuropsychology Review
Neuropsychopharmacology
Neuropsychopharmacology
Neuroquantology
Neuroradiology
Neurorehabilitation
Neurorehabilitation And Neural Repair
Neuroreport
Neuroscience
Neuroscience
Neuroscience And Biobehavioral Reviews
Neuroscience And Biobehavioral Reviews
Neuroscience Bulletin
Neuroscience Letters
Neuroscience Letters
Neuroscience Research
Neuroscience Research Communications
Neurosciences
Neuroscientist
Neurosignals
Neurosurgery
Neurosurgery Clinics Of North America
Neurosurgery Quarterly
Neurosurgical Focus
Neurosurgical Focus
Neurosurgical Review
Neurotherapeutics
Neurotherapeutics
Neurotoxicity Research
Neurotoxicology

Neurotoxicology
Neurotoxicology And Teratology
Neurourology And Urodynamics
Noropsikiyatri Arsivi-Archives Of Neuropsychiatry
Npj Parkinsons Disease
Nutritional Neuroscience
Operative Neurosurgery
Operative Neurosurgery
Otology & Neurology
Pediatric Neurology
Pediatric Neurology
Pediatric Neurosurgery
Perception
Perspectives On Developmental Neurobiology
Pharmacopsychiatry
Progress In Brain Research
Progress In Neurobiology
Progress In Neuro-Psychopharmacology & Biological Psychiatry
Progress In Veterinary Neurology
Psn-Psychiatrie Sciences Humaines Neurosciences
Psychiatry And Clinical Neurosciences
Psychiatry Research-Neuroimaging
Psychiatry Research-Neuroimaging
Psychological Medicine
Psychologie & Neuropsychiatrie Du Vieillissement
Psychology And Aging
Psychoneuroendocrinology
Psychoneuroendocrinology
Psychopharmacology
Respiratory Physiology & Neurobiology
Restorative Neurology And Neuroscience
Reviews In The Neurosciences
Revista De Neurologia
Revista Ecuatoriana De Neurologia
Revue De Neuropsychologie
Revue Neurologique
Rivista Di Neuroradiologia
Saggi-Neuropsicologia Infantile Psicopedagogia Riabilitazione
Schizophrenia Bulletin
Schizophrenia Research
Seminars In Neurology
Seminars In Neuroscience
Seminars In Pediatric Neurology
Social Cognitive And Affective Neuroscience
Social Neuroscience
Stereotactic And Functional Neurosurgery
Stroke
Stroke And Vascular Neurology
Surgical Neurology
Techniques In Neurosurgery

Therapeutic Advances In Neurological Disorders
Therapeutic Advances In Neurological Disorders
Translational Neurodegeneration
Translational Neurodegeneration
Translational Neuroscience
Translational Psychiatry
Translational Stroke Research
Trends In Cognitive Sciences
Trends In Neurosciences
Trends In Neurosciences
Turkish Neurosurgery
Visual Neuroscience
Wiley Interdisciplinary Reviews-Cognitive Science
World Neurosurgery
Zeitschrift Fur Neuropsychologie
Zentralblatt Fur Neurochirurgie