

Publishing in the field of brain plasticity, repair and rehabilitation: An emerging neuroscience niche journal

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Abstract. The journal *Restorative Neurology and Neuroscience* (RNN) is now published in its 25th volume since its inception in 1989. RNN focuses on the emerging field of brain plasticity, repair and rehabilitation, including original and review papers both in basic research (animal experiments, *in vitro* studies) and in the clinical domain, including brain imaging studies. During the last decade RNN has experienced a steady progress in its reference value and scientific impact. The ISI-impact factor has risen from 1.117 (1997) to 2.862 (2006). This places the journal at the 81st rank among all 200 neuroscience journals, i.e. 60% of all neuroscience journals have a lower impact factor. When compared to other journals in the field of rehabilitation, RNN ranks number 1. Causes for this positive development are, among others: (1) the field of neuroplasticity, regeneration, recovery and rehabilitation is an emerging field in medicine and therefore the number of publications and their citation rate overall increases, (2) the special issues strategy, (3) a top level editorial board, and (4) the quality of papers submitted to RNN continuously improves as RNN is gaining increasing acceptance in the scientific community. Thus, in the space of neuroscience in general, and rehabilitation in particular, RNN has become a visible, high impact journal and a leading source of original scientific information pertaining to brain plasticity, rehabilitation and repair. RNN is likely to gain more momentum as the field matures further.

1. Introduction

This year marks the 10th anniversary that the editor-in-chief, Bernhard Sabel, has taken over the helm of the journal RESTORATIVE NEUROLOGY AND NEUROSCIENCE (RNN). It is a good time to take a look back and reflect on the progress the journal has made since then.

RNN was first published in 1989 under the skilled and thoughtful editorship of Dr. Donald Stein (Emory University, Atlanta, USA), founder of the journal. After 8 years of productive and successful start-up activities, Stein resigned as editor-in-chief and asked Sabel (Otto-von-Guericke University of Magdeburg, Germany) to take over the helm and lead the journal into the future. As a graduate student, Sabel worked for

many years with Stein in basic neuroplasticity research. It was an honour to take the “RNN-flag” and run with it. But the honour had a price: a notable editing workload for over a decade.

RNN was the first journal to focus on the field of recovery of function, plasticity, regeneration and rehabilitation. There was no such journal at the time and it was clearly a modern and growing field of science. Because of the obvious clinical relevance of the subject matter, RNN has the particularly important mission to help the scientific advancement so that new treatments of the nervous system disorders can be found. After all, the brain possesses a remarkable degree of plasticity and repair potential and this needed to be addressed in a systematic and dependable fashion. In fact, back in 1989 there was no other journal on the horizon dedicated to the topic of brain restoration which published both basic research and clinical studies.

At the time of the editorial transition to Germany, RNN also changed hands of owners when Elsevier Sci-

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ence Publishers of Amsterdam (The Netherlands) sold the journal to a publisher next door (IOS Press). In 10 years the collaboration between the editorial office and IOS Press has been very productive and thanks to numerous editorial board members, authors, reviewers and the editorial assistant, Steffi Matzke, the journal has gradually built an international reputation in a specialized niche of the neuroscience journal market. Of course, the employees at IOS press that helped with the production process also had an important function. It is thanks to all the scientists, too many to be named here, and the many helping hands of non-scientists and the publisher, Einar Fredriksson, that the journal prospered so successfully. It is with a deep sense of gratitude and appreciation for the countless numbers of hours everyone has spent on writing their manuscripts and the many reviewers evaluating the papers that I would like to thank everyone for their support in making the journal such a success during the last 10 years.

2. Special issues

One major activity introduced in 1997 was the concept of "special issues". This turned out to be an important and successful step for the journal because it tremendously helped recruiting top quality manuscripts. Special issues are organized by special issue editors which are invited by the editor-in-chief to assemble a comprehensive collection of papers from their peers on a timely subject matter. The advantage of the special issues is that they cover an entire sub-discipline and they contain laboratory review papers where authors can summarize their own work without a need to write a comprehensive (labour intensive) review of the entire world literature. One advantage of this approach is that reviews are generally cited more often than original contributions and this alone had an overall impact on the journal and thus helped advance the field. The first special issue appeared in 1998, and until today RNN has published a total of 12 special issues, i.e. about 1 issue per year, including the following subject matters:

- 1998 Oxidative Stress and Neurodegenerative Mechanism (H. Manev, E. Costa, J. A. Flaherty; Chicago, USA)
- 1998 Glutamate, Neurodegeneration and Neuroprotection (L. Turski; London, UK)
- 1999 Neurotrauma and Plasticity (E. Neugebauer, R. Lefering, J. Noth; Köln, Aachen, Germany)
- 1999 Visual System Damage: Residual Vision and Plasticity (B. Sabel; Magdeburg, Germany)
- 2001 Microarrays (W.J. Freed, M.P. Vawter, Baltimore; Irvine, USA)
- 2001 Molecular and Cellular Mechanisms of Brain Repair (H.W. Müller, M. Bähr, Düsseldorf; Göttingen, Germany)
- 2001 Hippocampal Plasticity (J. Ramirez; Davidson, USA)
- 2002 Quality of Life after Multiple Trauma (E. Neugebauer; Köln, Germany)
- 2003 Molecular Markers of Brain Damage-Current State and Future Perspectives (M. Herrmann, P. Johnsson, B. Romner; Bremen, Germany and Lund, Sweden)
- 2004 Motor System Plasticity, Recovery and Rehabilitation (T. Platz; Berlin, Germany)
- 2006 Plasticity in Spatial Neglect – Recovery and Rehabilitation (G. Kerkhoff, Y. Rosetti; Saarbrücken, Germany and Bron, France)
- 2007 Auditory Plasticity (L. Jäncke; Zürich, Switzerland)

Currently scheduled or planned issues are:

- 2008 Visual System Plasticity and Rehabilitation
- 2008 CNS Regeneration
- Neuroplasticity in Psychiatric Disorders
- Vestibular plasticity and rehabilitation
- Cochlear implants and plasticity

On occasion, the journal has also published abstracts from specialized meetings that focused on the journal's scope. These meetings were the Conference on Cellular Signaling in Neuroprotection and Plasticity held in Magdeburg (2002), the 3rd Magdeburg Symposium on Neuroprotection and Neurorepair (2002), the Second Scientific Conference on "Restauración Neurológica 2004" in Havana, Cuba (2003), and the 7th International Neurotrauma Symposium in Adelaide, South Australia (2005).

3. Scientific topics published in RNN

An analysis of the previous two years (2005, 2006) of the publications in RNN gives an indication of the content that was published by RNN. In this time period, RNN did not publish any *in-vitro* or molecular work. All research reports described either animal experiments or clinical studies, both of which were roughly equally represented (26 animal studies, 38 clinical stud-

Table 1
List of the top 5 RNN papers for the years 2004–2006

year	first author	abbreviated title
2004	Genc, S.	Erythropoietin as a novel neuroprotectant
	Mark, V.W.	Constraint-induced movement therapy for chronic stroke. . .
	Johansson, B.B.	Functional and cellular effects of environmental enrichment. . .
	Kwakkel, G.	Understanding the pattern of functional recovery after stroke. . .
2005	He, J.	Allopregnanolone, a progesterone metabolite. . .
	Belkas, J.S.	Peripheral nerve regeneration through a synthetic hydrogel. . .
	Platz, T.	Amphetamine fails to facilitate motor performance. . .
	Jang, S.H.	Diffusion anisotropy in the early stages of stroke. . .
	Marklund, N.	Administration of monoclonal antibodies neutralizing. . .
2006	Blits, B.	Lentiviral vector-mediated transduction of neural progenitor cells. . .
	Sung, H.J.	Peri-infarct reorganization in a patient. . .
	Schmeer, C.	Stain-mediated protective effects. . .
	Taupin, P.	Adult neurogenesis and neuroplasticity
	Kerckhoff, G.	Repetitive optokinetic stimulation induces lasting recovery. . .
	Jehkonen, M.	Impact of neglect on functional outcome after stroke. . .

ies). The slight over-representation of clinical studies can be explained by the special issue on neglect.

Studies describing *basic animal experiments* included research on peripheral nerve regeneration, a field which has been regularly covered by RNN in prior years. The studies described either the effects of peripheral nerve injury (Mert et al., 2005) or they specifically aimed at finding new ways to enhance regeneration through different methods such as synthetic nerve tubes (Belkas et al., 2005), drug effects (Brenner et al., 2005), surgical techniques (Abrams & Widenfalk, 2005; Puigdellívol-Sánchez et al., 2005; Scherman et al., 2005; Keune et al., 2006) or electrical stimulation (Dow et al., 2006).

The majority of animal studies reported in RNN were on the central nervous system (CNS). Here, the studies were focused on the cellular responses to injury and neuroprotection (Thees et al., 2005; Byler et al., 2006; Kunz et al., 2006; Schmeer et al., 2006; Thompson et al., 2006), with only one study discussing neurogenesis (Taupin, 2006). Three publications addressed the subject of plasticity, spontaneous recovery/regeneration and the role of experience (Hartonian & de Lacalle, 2005; Heiduschka et al., 2005; Sonninen et al., 2006) and several others described novel approaches to the treatment of CNS damage. They included behavioral training approaches and experience (Allred et al., 2005; Almaguer et al., 2005; Moon et al., 2006), genetic engineering approaches (Blits et al., 2005), electrical stimulation (Bergado et al., 2006) and different drugs, such as dimeric fibroblast growth factor-2 (Berry et al., 2005), erythropoietin (Boran et al., 2005), magnesium (Hoane, 2005), tumor necrosis factor alpha and interleukin -6 (Marklund et al., 2005) as well as the NMDA receptor antagonist CGS 19755 (Federico et al., 2006).

More than half of the papers were *clinical*. Many authors discussed neurological and neuropsychological diagnostic issues relevant to various aspect of CNS injury (Nicotra et al., 2005; Rong et al., 2005; Schiemann et al., 2005; Chung et al., 2006; Tai et al., 2006), with a particular focus on the diagnosis of neglect within the special issue (Ansuini et al., 2006; Azouvi et al., 2006; Brozzoli et al., 2006; Bublak et al., 2006; Glocker et al., 2006; Ishiai, 2006; Lincoln & Bowen, 2006; Pérennou, 2006; Snow & Mattingley, 2006; Vallar & Ronchi, 2006). For research on recovery from brain damage the question of outcome prediction is a particularly important one. Here, the goal is to find parameters which are either associated with recovery or are able to predict it; this question was addressed by Bazarian, Jang and Jehkonen and their colleagues (Jang et al., 2005a; Bazarian et al., 2006; Jehkonen et al., 2006).

Modern methods of stimulation and imaging are increasingly used to demonstrate reorganization in patients after lesions. In RNN several authors used such methods including transcranial magnetic stimulation (TMS), functional MRI or diffusion tensor tractography (Jang et al., 2005b; Jang et al., 2005c; Jang et al., 2006; Lotze et al., 2006; Sung et al., 2006).

Fortunately, many papers in RNN focused on new therapeutic approaches to help patients recover from CNS injury. Finding new treatments is perhaps the most important mission of RNN and several approaches are presented included electrical stimulation with TMS and prosthesis (Carey et al., 2006; Duret et al., 2006; Eskes & Butler, 2006), training through repetitive behavioral practice (Peurala et al., 2005; Julkunen et al., 2006) – with a special emphasis on the treatment of neglect (Kerckhoff & Rossetti, 2006; Kerckhoff

et al., 2006; Luauté et al., 2006; Pizzamiglio et al., 2006; Rode et al., 2006; Sturm et al., 2006) – and finally pharmacotherapy with amphetamine (Platz et al., 2005).

In summary, the journal has covered a wide range of topics in both animal research and the clinical domain which shows that RNN is a rich interdisciplinary source of information in the field of neuroplasticity, repair and rehabilitation.

4. RNN in reference systems

Today, RNN is listed in all major references systems and articles published in RNN are abstracted in E-Psyche database, EBSCO database, EMBASE, Journal Citation Reports/Science Edition, Neuroscience Citation Index, PsycINFO, Pubmed, SCOPUS and in the Science Citation Index-Expanded (SciSearch®).

5. Impact and citations of RNN publications

One of the major milestones of the journal was its inclusion in medline in 2000, i.e. about 2 years after the editorial transition. Ever since RNN was listed in medline the journal's impact factor has risen gradually (Fig. 1) and the quality of the manuscript submissions has also steadily improved, although there is still room for improvement.

One may argue over the real value and methodology of the impact factor, but despite its limitations it clearly is a bibliographic measure used by many scientists and administrators to judge the quality and productivity of scientific accomplishments. Therefore, it is worth taking a look at the development of the RNN impact factor during the last decade.

The impact factor is computed by the ISI Institute and reflects how often papers, published in the previous two years, are cited during the citation year. The more frequently the average paper is cited in a given journal, the higher its "impact" in science. The impact factor is thus a "quality" control measure for journals and is closely observed by scientists and science administrators. As Fig. 1 shows, RNN had a low-ranking impact factor of 1.117 in 1997, but since then it gradually rose and has most recently reached an astonishing value of 2.862. This value places RNN at the 81th rank position among all 200 neuroscience journals and at the No. 1 position in the field of rehabilitation; this is reason to celebrate. Table 1 shows the top 5 RNN papers for the

Table 2
RNN ISI impact factor ranking compared to selected Neuroscience journals from the ISI pool of 200 journals in 2006

RANK	ABBREVIATED JOURNAL TITLE	IMPACT FACTOR
6	TRENDS NEUROSCI	13.494
13	ANN NEUROL	8.051
14	BRAIN	7.617
15	J NEUROSCI	7.453
43	EXP NEUROL	4.156
46	NEUROPSYCHOLOGIA	3.924
53	EUR J NEUROSCI	3.709
59	J NEUROSCI RES	3.476
62	J NEUROTRAUM	3.453
63	NEUROSCIENCE	3.427
81	RESTOR NEUROL NEUROS	2.862
95	BEHAV BRAIN RES	2.591
101	EUR J NEUROL	2.437
103	J NEUROL SCI	2.412
107	BRAIN RES	2.341
117	VISION RES	2.167
121	NEUROREPORT	2.137
123	NEURSOCI LETT	2.092
129	EXP BRAIN RES	1.959
130	NEUROSCI RES	1.953
148	NEUROL RES	1.484
150	VISUAL NEUROSCI	1.573
169	EUR NEUROL	1.031
177	NEUROL SCI	0.894
178	INT J NEUROSCI	0.831
180	CLIN NEUROSCI RES	0.692
186	FUNCT NEUROL	0.569

years 2004–2006. As the titles of these publications indicate, both basic studies and clinical research papers are cited well. The current impact factor is a tremendous development given that RNN covers a highly specialized sub-sector of the neurosciences. Even though it is just a niche journal, RNN ranks well among other Neuroscience journals that have been around for many decades such as Brain Research, Experimental Brain Research or the European Journal of Neuroscience (see Table 2). In the space of "recovery and rehabilitation", RNN is at the top of the list (see Table 3).

6. Conclusion

There are several reasons for the success of RNN. Among them: (i) active manuscript recruitment, (ii) top level editorial board, (iii) the special issue concept, and (iv) the advancement of the field of restoration and plasticity, an emerging field worldwide with an increasing number of scientists. This truly fortunate development also shows that the topic of brain repair and plasticity is gaining momentum and this will eventually also benefit many patients that have sustained injury to the peripheral or central nervous system.

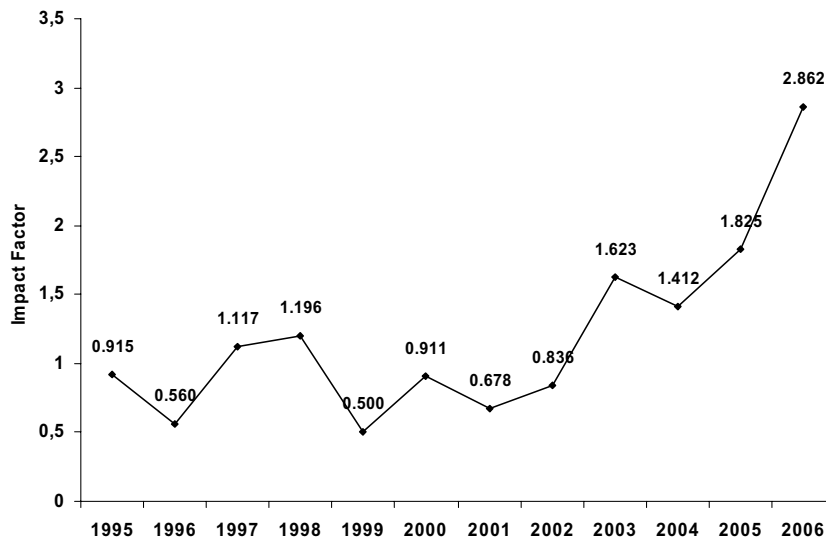


Fig. 1. ISI impact factor of RNN from 1995–2006.

Table 3

ISI impact factor ranking of RNN compared to selected journals in the space of rehabilitation from a total pool of 27 journals in 2006

RANK	ABBREVIATED JOURNAL TITLE	IMPACT FACTOR
1	RESTOR NEUROL NEUROS	2.862
2	NEUROREHAB NEURAL RE	2.403
3	J REHABIL MED	2.168
6	IEEE T NEUR SYS REH	1.842
7	ARCH PHYS MED REHAB	1.826
8	PHYS MED REHAB KUROR	1.746
13	CLIN REHABIL	1.500
15	AM J PHYS MED REHAB	1.300
17	BRAIN INJURY	1.182
18	DISABIL REHABIL	1.164
20	J REHABIL RES DEV	1.005
24	J SPORT REHABIL	0.566
26	PHYS THER SPORT	0.522

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