

Editorial

Special issues in brain plasticity, repair and rehabilitation: 20 years of a publishing strategy

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Abstract. The journal *Restorative Neurology and Neuroscience* (RNN) is focused on the emerging field of brain plasticity, repair and rehabilitation, including original and review papers both in basic research (*in vitro* studies, animal experiments) and in the clinical domain, including brain imaging studies. The publication of special issues on vital topics, summarizing the work of leading experts in the field of restoration and plasticity has become a major strategy of RNN and has attracted worldwide attention. Special issues are typically organized by specialized guest-editors familiar with the respective science field. Special issues cover a particular sub-discipline and often contain laboratory review papers. The first special issue appeared in 1990, and until today RNN has published a total of 25 special issues on a variety of basic science and clinical matters. In this way, RNN promotes the dissemination of information in the field of neuroplasticity, repair and rehabilitation, providing the reader with up-to-date information prepared by leading experts in the field.

1. Introduction

This year marks the 20th anniversary of publishing “special issues” in the journal *Restorative Neurology and Neuroscience* (RNN). It is a good time to take a look of this important and successful step for the journal because it tremendously helped recruiting top quality manuscripts. Special issues are organized by special issue (guest) editors which are (i) invited by the editor-in-chief to assemble a comprehensive collection of papers from their peers on a timely subject matter or (ii) which offer the journal a collection of papers on a particular topic by themselves. The advantage of the special issues is that they cover a special sub-discipline of the field in a focussed manner. Special issues 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 read

(and cited) more often than original contributions and this alone had an overall impact on the journal which, in turn, helped advance the field. The first special issue appeared in 1990, and until today RNN published a total of 25 special issues, i.e. about 1 issue per year, including different subject matters listed in Table 1. In this manner RNN supports to publish papers both in basic research (*in vitro* studies, animal experiments) and in the clinical domain, including brain imaging studies. Primary criteria for publication are novelty, significant experimental or clinical importance and the interest to an interdisciplinary audience.

Special issues also give the opportunity to publish abstracts from specialised meetings that focused on the journal’s scope. These meetings were the 11th, 13th, and 14th Annual Meeting of the Japanese Society for Neural Growth, Regeneration and Transplantation (1995, 1998 and 2000), the International Symposium on Excitatory Amino Acids, “Ten Years Later” (1998),

Table 1

Special Issues published in RNN. The first special issue appeared in 1990, and until today RNN has published a total of 25 special issues, i.e. about 1 issue per year, including the listed subject matters

Year	Title	Guest-editor
1990	Regulators of peripheral Nerve Regeneration	A. Edström, M. Kanje (Lund, Sweden, London, UK)
1991	Neural Plasticity and Transplantation in Spinal Cord Injuries	J. Zimmer, T. Sørensen (Aarhus, Denmark)
1992	International Symposium on Neural Transplantation	W.J. Freed, J.M. Rosenstein (Washington, USA)
1993	Spinal Cord Neuroplasticity	M. Peschanski (Créteil, France)
1995	Novel therapeutics in the Nervous system. Gene Transfer and Trophic Factors	Guest Editor unknown
1996	Oxidative Stress, Apoptosis and Brain Damage	H. Manev (Pittsburgh, USA)
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. North (Köln, Aachen, Germany)
1999	Visual System Damage: Residual Vision and Plasticity	B.A. 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 (Zurich, Switzerland)
2008	Axonal Regeneration and Repair of the Central Nervous System	P. Anderson (London, UK)
2008	Visual Plasticity, Restoration and Rehabilitation	B. Sabel (Magdeburg, Germany)
2009	Cognitive Plasticity	M. Martin, J. Zöllig (Zurich, Switzerland)
2010	Vestibular, Ocular Motor and Locomotor Plasticity and Rehabilitation	T. Brandt, M. Dietrich, M. Strupp (Munich, Germany)
2010	Development and Plasticity of Multisensory Functions	B. Röder (Hamburg, Germany)
2010	Brain Stimulation and Brain Repair - rTMS	T. Platz (Greifswald, Germany)
2010	Abstracts of the 6 th International Symposium on Neuroprotection and Neurorepair, Rostock, Germany, October 1-4, 2010	G. Reiser, K. Reymann (Magdeburg, Germany), A. Kranz, J. Boltze, D.-C. Wagner (Leipzig, Germany),

the Neurotrauma and Plasticity Conference – A Conference of the German BMBF-Research Initiative (1999), the International Conference on Neuroprotection and Neurorepair (2000), the 5th International Neurotrauma Symposium (2000), the Conference on Cellular Signaling in Neuroprotection and Plasticity (2002), the 3rd Magdeburg Symposium on Neuroprotection and Neurorepair (2002), the 2nd Scientific Conference on “Restauración Neurológica 2004” (2003), the 7th International Neurotrauma Symposium 2004 (2005), the 5th International Symposium on Neuroprotection and Neurorepair 2008 (2009) and the 6th International Symposium on Neuroprotection and Neurorepair (2010).

2. Scientific topics published in special issues

The “special issues”-strategy has turned out to be an important and successful step for the journal (Sabel et al., 2009). An analysis of the current years (2008–2010) of the publications in special issues gives an indication of the content that was discussed by experts.

In his special issue “Axonal Regeneration and Repair of the Central Nervous System”, P. Anderson (2008) has invited the scientist to illustrate the recent progress in research into regenerative approaches to spinal cord injury. Here, different reviews give an overview about the current knowledge. Berry et al. (2008) and Ruitenberg et al. described different models and approaches of regeneration, Becker and Becker (2008) presented the zebrafish as a powerful genetic model for studies on the developing CNS as well as a model for CNS regeneration and Lee & Zheng (2008) described genetically modified mouse models. Other publications from Bolsover et al. (2008), Giger et al. (2008), Kwok et al. (2008), Nógrádi and Szabó (2008), White et al. (2008) and Zhang et al. (2008) discussed the reaction of CNS neurons to different inhibitory / repulsive and beneficial molecules. Carlstedt et al. reviews nerve injuries / nerve repair both in animal models and clinical studies.

The special issue with the main focus on “Visual Plasticity, Restoration and Rehabilitation” was edited by B.A. Sabel (2008). The papers included in this special issue cover aspects of visual plasticity and were

selected to focus on specific aspects of plasticity being discussed currently and attest to the view that the visual system has a remarkable capacity for plasticity. The attempt to understand and manipulate regeneration of cut retinofugal axons was the subject of the paper by Rose et al. (2008). These authors assessed the potential for axonal regeneration both *in vitro* and *in vivo* in organotypic cell cultures of monkey retina and studied molecular mechanisms involved in the regeneration process. Gaillard and Domballe (2008) used another approach to restore visual structure. They implanted fetal issue allografts in the damaged adult visual cortex and described the physiological properties of the grafts and the role of re-establishment of neuronal connections in the host brain. Stoerig (2008) discussed how surviving pathways that send visual information to higher cortical regions can be engaged and Chokron et al. (2008) discussed how blindsight can be used for purposes of rehabilitation after visual field defects. Another goal is to enhance visual functions in hemianopia by repetitively presenting training stimuli in "vision restoration training" (VRT). Within this field of study, several specific issues were addressed. Poggel et al. (2008) studied the issue of outcome prediction by using a Multifactorial analysis to discover possible variables that predict outcome after visual training in hemianopic patients. Gall et al. (2008) investigated vision- and health-related quality of life before and after VRT in hemianopic patients and Kasten et al. (2008) addressed a psychophysical debate. Bergsma and Van der Wildt (2008) presented a detailed description of perceptual properties of the restored visual field after training hemianopia patients and one paper reviewed the visual capacities in children with occipital lesions, hemispherectomy or hydranencephaly (Werth, 2008). Schumacher et al. (2008) published on reorganization of visual processing in macular degeneration. Other topics were training of vision in patients with retinal damage or amblyopia (Gudlin et al., 2008; Polat, 2008; Mitchell, 2008), and Prokosch and Thanos (2008) made a critical review and gave recommendations regarding emergent syphilitic optic neuropathic, and video games as a tool to train visual skills (Achtman et al., 2008).

In 2009, the special issue was edited by M. Martin and J. Zöllig and it addressed the subject of "Cognitive Plasticity and Training". In this issue, Willis and Schaie (2009) as well as Goh and Park (2009) give an overview about the theoretical fundamentals on cognitive plasticity. The review from Willis and Schaie were addressed on behavioural and neuroscience aspects on cognitive plasticity and Goh and Park discussed the role of neuro-

plasticity in the brain aging process. The other papers in this special issue are focused on experiments with human subjects. Dahlin et al. (2009) and Zöllig and Eschen (2009) review the relationship between brain function and behavioural correlates. Burgess et al. (2009), Noack et al. (2009), van Paasschen et al. (2009), Zehnder et al. (2009) and Zelinski (2009), highlighted the benefits and limits of training interventions in normal and pathological populations. Another aspect was discussed by Jäncke (2009) with the illustration of the potentials of musical training. Blanchard-Fields (2009) described a flexible and adaptive socio-emotional problem solving in adult development and aging and on the basis of a Piagetian approach Labouvie-Vief (2009) developed a plasticity regulation concept. Finally, Marcar (2009) analyzed different neurocognitive theories which conclude that the brain is able to restore lost or damaged processing systems.

In 2010 a total of four special issues were published by RNN. T. Brandt, M. Dieterich and M. Strupp (2010a) addressed their special issue on the topic of "Vestibular, Ocular Motor, and Locomotor Plasticity and Rehabilitation". Vertigo and dizziness are no self-contained diseases, but the most common symptoms of diseases of the nervous system. Therefore the management of vertigo and dizziness is of great significance. In this context in 2009 the Center for Research and Treatment of Vertigo, Balance and Ocular Motor Disorders was established in Munich (Brandt et al., 2010c). The review of Brandt et al. (2010b) is focused on the long-term course of selected peripheral vestibular disorders. The article by Bornstein and Lempert (2010) discussed the management of patients with chronic dizziness and presented the various symptoms and their history. These papers are focused on the acute unilateral loss of vestibular function. Lacour and Tighilet (2010) analyzed plastic events in the vestibular nuclei after unilateral vestibular loss in animals and Halmagyi et al. (2010) described the extent and mechanism of vestibular function recovery after unilateral loss and review published literature critically. Horak (2010) summarize the role of the vestibular system and presented specific and effective rehabilitation programs and the main objective in the article of Dieterich and Brandt (2010) was to discuss the current knowledge of vestibular structures and their function in the human cortex. Schubert and Zee (2010) and Liao et al. (2010) presented new knowledge in the field of vestibulo-ocular reflex. They described the usefulness of the ocular motor system as a model for studying the control of movement and investigated the translational

vestibulo-ocular reflex in humans. The articles written by Jahn and Zwergal (2010), Bötzel and Kraft (2010) and van Hedel and Dietz (2010), in turn, deal with the disorders of balance and locomotion. They give an overview of functional imaging techniques such as PET and fMRI (Jahn and Zwergal, 2010), of the current use of deep brain stimulation (Bötzel and Kraft, 2010) and of the rehabilitation and locomotion after spinal cord injury (van Hedel and Dietz, 2010).

Another special issue focused on the subject of brain stimulation and brain recovery which was the topic of a symposium in Greifswald, Germany in 2010. T. Platz edited this special issue on “Brain Stimulation and Brain Repair – rTMS” in 2010. The articles collected together in this special issue review the effects of rTMS in animal experiments (Funke and Benali, 2010) to clinical trials in conditions such as stroke, Parkinson disease and depression. The aim of the review by Hamada and Ugawa (2010) was to introduce the quadripulse stimulation protocol and to show the potential for clinical application. The specific effects of rTMS are discussed by Huang (2010), Kobayashi (2010), Lotze (2010) Stagg et al. (2010) and Todd and Ridding (2010). The clinical results by rTMS application in stroke were reviewed by several articles in this special issue. The papers include the treatment of motor impairment (Khedr and Abo-El Fetoh, 2010; Nowak et al., 2010), the treatment of dysphagia (Khedr and Abo-El Fetoh, 2010), the treatment of neglect (Cazzoli et al., 2010; Sack, 2010) and the treatment of aphasia (Naeser et al., 2010). The use of rTMS as treatment option for different diseases were discussed by Höppner et al. (2010), Koch (2010) and Schönfeldt-Lecuona et al. (2010). Koch (2010) reviewed possible effects of rTMS protocols to use rTMS in Parkinson disease with focus on motor symptoms. Schönfeldt-Lecuona et al. (2010) and Höppner et al. (2010) review the current status of knowledge concerning rTMS in depression and summarize important results with a focus on the symptom-oriented effects of rTMS in depression. Finally, Antal and Paulus (2010) summarize the results of several studies of their own laboratory on the treatment of pain by using of a special rTMS paradigm, the theta-burst stimulation.

Another special issue edited by B. Röder (2010) focused on “Development and Plasticity of Multisensory Functions”. The issue includes both reviews and research article with current results of studies using both human and animal models. The contributions of the authors were focused on the major themes of multisensory function following the restoration of vision or hear-

ing. The article written by Grossmann (2010) reviewed the literature on behavioral findings and new electrophysiological studies on the development of emotion perception during infancy with a special emphasis of visual and auditory signals. The review by Sathian and Stilla (2010) illustrate the cross-modal plasticity resulting from visual deprivation and describe the role of visual cortex in supporting non-visual functions both in sighted and blind patients. These findings were supported by Amedi et al. (2010), who showed that visual imagery is not an obligatory condition for object activation in visual cortex. This is confirmed by the review of Fiehler and Rösler (2010), who suggest that visual deprivation result in both cross-modal and compensatory intra-modal plasticity. The articles by Dye and Bavelier (2010) and Bottari et al. (2010) are focused on deficits in auditory functions. They review the role of visual attention in deaf adults and presented new data on visual detection and discrimination performance in deaf versus hearing adults. Royal et al. (2010) and Putzar et al. (2010) illustrate that early visual input is a prerequisite for a normal development of multisensory functions both in animals and humans. The use of cochlear implants for restoration hearing is an additional main focus in this special issue and was discussed by Bergeson et al. (2010), Gilley et al. (2010), Peterson et al. (2010) and Tremblay et al. (2010). They review the literature, describe the cochlear implant efficacy and the effects of congenital hearing loss and cochlear implantation in infants and children.

In the latest special issue in 2010 the abstract of the 6th International Symposium on Neuroprotection and Neurorepair in Rostock, Germany were presented by G. Reiser, K. Reymann, J. Boltze, A. Kranz and D.-C. Wagner. The congress covered a variety of basic and clinical aspects of cerebral ischemia and stroke.

In summary, special issues published in RNN had covered a wide range of topics in both animal research and the clinical domain. Special issues are beneficial to discuss important new information in the field of neuroplasticity, repair and rehabilitation.

3. Acceptance and response to special issues

The strategy to publish special issues on vital topics, summarizing the work of leading experts in the field of restoration and plasticity has worked out well for the journal. An analysis of the citations of articles published in special issues demonstrate that these publications were accepted by experts worldwide. When

Table 2

Number of citations from special issues published in RNN. The number of citations result from all articles (including editorials) which were published in special issues. For four special issues no information was available

Year	Title	Citations
1990	Regulators of peripheral Nerve Regeneration	Not available
1991	Neural Plasticity and Transplantation in Spinal Cord Injuries	164
1992	International Symposium on Neural Transplantation	Not available
1993	Spinal Cord Neuroplasticity	86
1995	Novel therapeutics in the Nervous system. Gene Transfer and Trophic Factors	Not available
1996	Oxidative Stress, Apoptosis and Brain Damage	170
1998	Oxidative Stress and Neurodegenerative Mechanism	308
1998	Glutamate, Neurodegeneration and Neuroprotection	131
1999	Neurotrauma and Plasticity	209
1999	Visual System Damage: Residual Vision and Plasticity	454
2001	Microarrays	125
2001	Molecular and Cellular Mechanisms of Brain Repair	181
2001	Hippocampal Plasticity	95
2002	Quality of Life after Multiple Trauma	206
2003	Molecular Markers of Brain Damage – Current State and Future Perspectives	413
2004	Motor System Plasticity, Recovery and Rehabilitation	556
2006	Plasticity in Spatial Neglect – Recovery and rehabilitation	221
2007	Auditory Plasticity	153
2008	Axonal Regeneration and Repair of the Central Nervous System	122
2008	Visual Plasticity, Restoration and Rehabilitation	92
2009	Cognitive Plasticity	24
2010	Vestibular, Ocular Motor and Locomotor Plasticity and Rehabilitation	5
2010	Development and Plasticity of Multisensory Functions	12
2010	Brain Stimulation and Brain Repair – rTMS	16
2010	Abstracts of the 6 th International Symposium on Neuroprotection and Neurorepair, Rostock, Germany, October 1–4, 2010	Not available
<i>total</i>		<i>3743</i>

counting the citation of all special issues an impressive total of 3743 citations is the result (Table 2). Of a total of 8507 citations of all RNN articles, special issues citations thus comprises a high ratio of 44 %.

4. Publications in regular issues

In regular issues there were also many RNN publication in the current years (2008–2010) which were not part of special issues. These papers are not solicited and the scientific topics are rather varied, including many different fields of study.

Most recently addressed topics in the area “*in vitro* / molecular studies” were: the use of human embryonic stem cells (Chen et al., 2009; Vazin et al., 2008, Vazin and Freed, 2010), the effect of Semax on survival of cholinergic basal forebrain neurons (Grivennikov et al., 2008), the use of Potassium Chloride (Gharbani et al., 2010) and the use of embryonic mesencephalon derived neurospheres (Khaing and Roberts, 2009). The contribution by Tass and Hauptmann (2009) focused on anti-kindling achieved by stimulation and described an mathematical model to investigate the effects of different stimulation techniques and Guzmán-Lenis et al.

(2009) screened neuroprotective agents in a rat organotypic spinal cord culture.

The majority of animal experiments reported in RNN were on the central nervous system (CNS). In the current years one focus was on axonal regeneration and repair of the CNS. The publications illustrate the recent progress in this field and describe different models and approaches of regeneration. DiGiorgio et al. (2008) discussed the reaction of CNS neurons to different inhibitory / repulsive and beneficial molecules whereas Beaumont et al. (2009) combined a chondroitinase ABC injection with acute electrical stimulation. Skouras et al. (2009) showed that electrical stimulation does not enhance facial nerve repair whereas manual stimulation promote long-term enhancement. The study of Weise et al. (2008) studied prion protein PrP^C after brain injury. Several publications described novel approaches to the treatment of CNS damage, including behavioral training approaches and experience (Shuchang et al., 2008), neurophysiological investigations (Rossi et al., 2008), genetic approaches (Ciriza et al., 2008; Conte et al., 2008; Groutsi et al., 2008; Müller et al., 2009; Ekmark-Lewén et al., 2010; Minnich et al., 2010), electrical stimulation (Sharma et al., 2009), progesterone treatment (Kasturi and Stein, 2009), and

rolipram treatment (Hätinen et al., 2008). The study of Sinis et al., (2009) was focused on local administration of Deferroxamine-loaded lipid particles that improved the postoperative outcome in the rat median nerve reconstruction model. Concerning damage to the brain, several animal studies were focused on the cellular responses to injury and neuroprotection (Abrams et al., 2009; Guzen et al., 2009; Lago et al., 2009; Nordblom et al., 2009; Shi et al., 2009; Wallenquist et al., 2009). Finally, Liu et al. (2009) reviewed the current literature for a better understanding of basic mechanisms of brain cell death as an important step to designing more effective therapeutic potentials in stroke.

In their contribution Landi and Rossini (2010) reviewed the concept of cerebral restorative plasticity from normal ageing to brain diseases. A basis for further investigations was created by LaPointe et al. (2009) who described cortical activation in healthy subjects.

In several clinical studies the authors discussed different therapeutic approaches related to stroke, such as non-invasive cortical stimulation (Kang et al., 2009), anodal transcranial direct current stimulation (Edwards et al., 2009), electrical stimulation (von Lewinski et al., 2009), constraint-induced therapy (Mark et al., 2008), constraint-induced movement therapy (Barzel et al., 2009), coupled bilateral load training (Cauraugh et al., 2009) and pharmacotherapy with L-Dopa (Acler et al., 2009). Suárez-Monteaugudo et al. (2009) demonstrate a transplantation methods of bone marrow stem cells in stroke patients. An comprehensive overview on potential mechanisms of umbilical cord blood cells for stroke therapy was written by Yu et al. (2009).

Hamed (2010) reviewed the usefulness of multimodal prospects for neuroprotection in epilepsy and Schmidt et al. (2010) described the navigated transcranial magnetic stimulation as an tool for presurgical evaluation of focal neocortical epilepsy. Several papers were concerned with the diagnosis and therapy of neglect (Thimm et al., 2008; Nys et al., 2008; Luukkainen-Markkula et al., 2009).

Much progress can be made if modern methods are used to demonstrate reorganization in patients after lesions. In the current years several authors used such methods including repeated transcranial magnetic stimulation (rTMS), functional MRI, working memory training, visual perceptual learning or whole-body vibration (Adamovich et al., 2009; Borich et al., 2009; Neary et al., 2009; Ness and Field-Fote, 2009; Vogt et al., 2009).

5. Conclusion

With the publication of special issues on vital topics edited by leading experts in the field of restoration and plasticity, RNN has become a visible leading source for original scientific information in the field of neural plasticity, rehabilitation and repair. By publishing special issues, RNN supports an ongoing scientific revolution: namely that the brain has much greater degree of plasticity than hitherto assumed, both in terms of its normal functioning and in response to damage and recovery from damage. This is an excellent base for developing new therapies of neurological diseases such as aging, stroke and brain or spinal cord injuries, and this is confirmed by the excellent citation results. We are certain to witness further scientific progress in this field and RNN hopes to continue to make a substantial contribution towards that goal.

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