



INTS2022
BERLIN
GERMANY



15th International Neurotrauma Symposium

Improving lives after neurotrauma through research

17–20 July 2022

Pre-symposium-course scheduled for 17 July

PROGRAMME



The Operating Theatre Journal



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Welcome note	4
Organisation and imprint	5
General information	6
Programme overviews	
Sunday, 17 July	8
Monday, 18 July	9
Tuesday, 19 July	10
Wednesday, 20 July	11
Scientific programme	
Sunday, 17 July	12
Monday, 18 July	13
Tuesday, 19 July	24
Wednesday, 20 July	35
ePoster sessions	
Monday, 18 July	42
Tuesday, 19 July	49
Social programme	57
Funding	58
Sponsors and exhibitors	58
Industry symposia	59
Media cooperations	62
Index of presenting authors and chairs	64

WELCOME NOTE



Dear colleagues,

It is our pleasure to welcoming you to the 15th International Neurotrauma Symposium (INTS) from 17–20 July 2022 in Berlin, one of the most vibrant cities in Europe.

Join us in three full days of inspiring lectures, talks and poster presentations that provide ample opportunity for scientific and personal exchange.

The programme comprises an impressive lineup of plenary lectures given by leading scientists in the field of neurotraumatology that will provide highlights on new developments in all areas of neurotrauma and related disciplines.

We prepared an exciting programme that will enhance your knowledge about neurotrauma and emergency care thereby encouraging international exchange and providing interdisciplinary discussions.

The meeting venue is located at the Potsdamer Platz, the heart of the city of Berlin, in walking distance to Brandenburg Gate, the Reichstag, and other major attractions.

You are cordially invited to join the meeting thereby contributing to the success of the 2022 INTS Symposium in Berlin.

Kind regards

Andreas Unterberg
Nikolaus Plesnila
Klaus Zweckberger
Conference chairs INTS 2022

Congress venue

Berlin Marriott Hotel
Inge-Beisheim-Platz 1
10785 Berlin

Hosting society

International Neurotrauma Society (INTS)
www.internationalneurotraumasociety.org

**Conference chairs**

Prof. Dr. med. Andreas Unterberg
Department of Neurosurgery
University of Heidelberg

Prof. Dr. med. Nikolaus Plesnila
Institute for Stroke and Dementia Research
University of Munich Medical Center

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Department of Neurosurgery
City Hospital Braunschweig

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Abstracts

You will find the abstracts, which have agreed to a publication of the 15th International Neurotrauma Symposium in the online archive of the “Journal of Neurotrauma“. All abstracts that have been published in the journal are marked with an ID in the programme. To access the publications, please follow www.liebertpub.com/loi/neu.



Awards

The International Neurotrauma Symposium will award prizes for the best oral and ePoster presentations. The three best presentations from the respective category will be awarded. The winners will be announced during the Farewell session and will receive an “INTS 2022 Best Oral/ePoster Award” certificate and a prize money. The nominated authors have already been informed by us.

Please note that the awarding of prizes requires the personal presence of the main author or a representative.



Catering

Catering will be provided during the official programme breaks within the exhibition areas.



Certification and CME Credits

The conference applied for certification by Ärztekammer Berlin and at the European Accreditation Council for Continuing Medical Education (EACCME®). The EACCME is an institution of the European Union of Medical Specialists (UEMS, www.uems.net). The American Medical Association (AMA) recognises EACCME credits as valid CME credits towards the Physician’s Recognition Award (PRA). To convert EACCME credits into AMA PRA category 1 credits, please contact AMA (www.ama-assn.org/education/earn-credit-participation-international-activities).

To obtain your CME credits, please provide daily proof of presence by scanning your name badge at the provided counter. Afterwards, you will receive a certificate of attendance indicating the amount of CME credits obtained via e-mail.

Each medical specialist should claim only those hours of credit that he/she actually spent in the educational activity. Later requests are discouraged.



Covid-19 health protection

General rules in Germany

Currently, there are no legal regulations for the implementation of corona protection measures. However, wearing a FFP2 mask (or comparable mask) is mandatory while visiting a doctor’s office or using public transportation such as: bus, subway, train, tram or ferries.

Masks are not required in the conference venue, but participants may choose to use masks which will be available at the check in if needed.



General terms and conditions

Please find all details on our website at www.neurotrauma2022.com.



Information for presenters and authors

Time allocation

Please prepare your presentation for the allotted amount of time. Chairs and moderators may interrupt should you overrun your time limit. The following speaking times are planned:

Lectures in plenary sessions	18 min	presentation + 4 min discussion
Presentations in scientific sessions	1–10: 7 min	presentation + 3 min discussion
Data blizz	1–2: 3 min	presentation + 1 min discussion
ePoster sessions	1–6: 3 min	presentation + 2 min discussion

Handing in your presentations

Please hand in your presentations on a storage medium with a USB port at the media check in. You have the opportunity to test and edit your presentation. ePoster presentations need to be handed in the latest until 10.07.2022.



Internet

A wireless network will be available throughout the Berlin Marriott Hotel and will be free of charge.

Use the following details to log into the wifi:

Network: Marriott Bonvoy Conf
Password: Berlin



Opening hour

	Check in	Media center	Ind. exhibition
Sunday	17:00–19:30	17:00–19:00	
Monday	07:00–17:30	07:00–17:30	08:15–17:30
Tuesday	07:00–18:00	07:00–17:30	08:15–17:30
Wednesday	07:00–16:00	07:00–16:00	08:15–16:00



Registration fees

	Regular registration	Onsite registration
Member (INTS, DGNC, EANS)	490 EUR	590 EUR
Non-Member	550 EUR	650 EUR
Resident, Postdoc, PhD Student	390 EUR	490 EUR
One Day	250 EUR	350 EUR
Social evening, 19 July	75 EUR	

Zürich

Berlin 1

08:00–12:30

Global Neuro

Session 1:

Traumatic brain Injury

p. 12

12:30–15:45

Global Neuro

Session 2:

Traumatic spinal
cord injury

p. 12

17:45–18:15

INTS Business Meeting

18:30–20:00

Welcome reception

Berlin 1	Berlin 2+3	Grand Ballroom 1	London	Paris	Moscow
07:15–08:15		07:15–08:15			
Data blizz 1		Early bird session 1 Clinical management of cSDH			
	p. 13	p. 15			
08:30–10:00					
Plenary session 1 Mild TBI & concussion					
	p. 15				
10:00–10:30					
Opening					
	p. 16				
11:00–12:30	11:00–12:30	11:00–12:30			
Symposium 1 Operative SCI	Scientific session 1 Clinical TBI: paediatric and outcome	Scientific session 2 Clinical TBI: surgical and intensive care			
p. 16	p. 16	p. 18			
12:45–13:45	12:45–13:45	12:45–13:45			
Industry symposium 1 Penumbra Europe GmbH	Industry symposium 2 IRRAS	Joint session AO Spine			
p. 59	p. 59	p. 20			
14:00–15:30	14:00–15:30	14:00–15:30			
Symposium 2 Cells matter	Scientific session 3 Clinical TBI: biomarkers	Scientific session 4 Experimental TBI: mechanism (part I)			
p. 20	p. 21	p. 22			
16:00–17:30					
Plenary session 2 Regeneration & SCI					
	p. 24				
			17:30–18:30	17:30–18:30	17:30–18:30
			ePoster session 1 Clinical and experimental SCI	ePoster session 2 Clinical TBI: diagnostics & treatment	ePoster session 3 Clinical TBI: management & outcome
			p. 42	p. 44	p. 46

PROGRAMME OVERVIEW | TUESDAY, 19 JULY

Berlin 1	Berlin 2+3	Grand Ballroom 1	London	Paris	Moscow
07:15–08:15 Data blizz 2 p. 24		07:15–08:15 Early bird session 2 aSDH p. 26			
08:30–09:40 Plenary session 3 Current perspective in SCI management p. 27					
09:40–10:30 Honours p. 27					
11:00–12:30 Symposium 3 Biomarkers of traumatic brain and spinal cord injury p. 27	11:00–12:30 Scientific session 5 Clinical TBI: miscellaneous p. 28	11:00–12:30 Scientific session 6 Experimental SCI: Neuroprotection p. 29			
12:45–13:45 Industry symposium 3 CSL Behring GmbH p. 59	12:45–13:45 Industry symposium 4 Integra p. 59	12:45–13:45 Joint Session DWG meets INTS p. 30			
14:00–15:30 Symposium 4 Repetitive military occupational blast p. 31	14:00–15:30 Scientific session 7 Experimental TBI: mechanism (part II) p. 31	14:00–15:30 Scientific session 8 Clinical TBI: imaging p. 32			
16:00–17:30 Plenary session 4 Recent clinical trials & global challenges p. 34					
			17:30–18:30 ePoster session 4 Clinical TBI: neurointensive care p. 49	17:30–18:30 ePoster session 5 Experimental TBI: diagnostics p. 52	17:30–18:30 ePoster session 6 Experimental TBI: mechanism p. 54

from 19:30

Social evening at Zollpachhof Berlin

Berlin 1	Berlin 2 + 3	Grand Ballroom 1
07:15–08:15		07:15–08:15
Symposium 5 Update on acute critical care p. 35		Early bird session 3 Rehabilitation and outcome p. 35
08:30–09:40		
Plenary session 5 Current perspective in TBI p. 35		
09:40–10:30		
Hand over presidency & INTS 2024 p. 36		
11:00–12:30	11:00–12:30	11:00–12:30
Symposium 6 Brain injury in intimate partner violence p. 36	Symposium 7 Spreading depolarisation in acute cerebral injuries p. 36	Scientific session 9 Clinical TBI: outcome and big data p. 37
12:45–13:45	12:45–13:45	
Industry symposium 5 BALT INTERNATIONAL SAS p. 60	Industry symposium 6 Abbvie p. 60	
14:00–15:30	14:00–15:30	14:00–15:30
Symposium 8 The brain exposed to repetitive head impacts p. 38	Symposium 9 Post-Traumatic Epilepsy p. 39	Scientific session 10 Clinical & experimental SCI: miscellaneous p. 39
16:00–17:30		
Plenary Session 6 Neuroprotection SCI & TBI p. 41		
17:30–17:45		
Farewell & award ceremony p. 41		

Opening / Closing
Miscellaneous
Symposium
Data blizz
Scientific session
Social programme
Plenary session
Industry symposium
ePoster session

**08:00–12:30**Zürich
Chair**Workshop session 1****Traumatic brain injury**

K. Zweckberger (Braunschweig /DE)

08:00

Welcome and introductions

M. Fehlings (Toronto/CA), P. Hutchinson (Cambridge/GB)

08:10

State of the art update on traumatic brain injury

P. Hutchinson, A. Helmy (Cambridge/GB)

08:40

Discussion

K. Zweckberger (Braunschweig /DE)

08:50

Interactive case discussions – challenging cases in brain and cranial trauma

P. Hutchinson (Cambridge/GB), K. Zweckberger (Braunschweig /DE),
A. Peraud (Ulm/DE), N. Terpolilli (Munich/DE), A. Helmy (Cambridge/GB),
C. Beynon (Heidelberg/DE)

10:00

Coffee break and networking

10:15

Hands-on session 1

- Drilling, craniotomy, neuromonitoring, EVD, cranioplasty, ICP-monitoring/ autoregulation ICP+ workshop by brain physics Cambridge
P. Smielewski, E. Beqiri (Cambridge/GB)
- Complex cases/pitfalls/management of complications

11:30

Lunch with panel discussion on challenges in setting up a translational research in neurotrauma

M. Fehlings (Toronto/CA), P. Hutchinson (Cambridge/GB),
K. Zweckberger (Braunschweig /DE), P. Vajkoczy (Berlin/DE),
M. Kotter (Cambridge/GB), N. Plesnila (Munich/DE),
W. Peul (Leiden/NL), V. ter Wengel (Amsterdam/NL),
A. Helmy (Cambridge/GB)**12:30–15:45**Zürich
Chair**Workshop session 2:****Traumatic spinal cord injury**

P. Vajkoczy (Berlin/DE), M. Fehlings (Toronto/CA)

12:30

State of the art update on traumatic spinal cord injury

M. Fehlings (Toronto/CA)

13:10

Discussion

P. Vajkoczy (Berlin/DE)

- 13:20 Interactive case discussions – challenging cases in spine and spinal cord injury
M. Fehlings (Toronto/CA), P. Vajkoczy (Berlin/DE), M. Kotter (Cambridge/GB),
W. Peul (Leiden/NL), V. ter Wengel (Amsterdam/NL), A. Younsi (Heidelberg/DE),
N. Hejrati (Toronto/CA)
- 14:30 Hands-on session 2
- Spinal stabilisation cervical/thoracic/lumbar, spinal Navigation
 - Complex cases/pitfalls/management of complications
- 15:30 Wrap-up and course evaluation

SCIENTIFIC PROGRAMME | MONDAY, 18 JULY

07:15–08:15**Data blitz 1**

Berlin 1–3

Chair

F. Roselli (Ulm/DE), A. Younsi (Heidelberg/DE)

07:15

Large-scale architecture of tyrosine kinase signaling in neurotrauma reveals HGF/Met as early inducers of reactive microglia

R. Rehman, A. Chandrasekar, F. Olde Heuvel, A. Froehlich, S. Li (Ulm/DE),
M. C. Morganti-Kossmann (Melbourne/AU), A. Takeoka (Leuven/BE),
F. Roselli (Ulm/DE)

07:19

ID 25

Genetic background determines the efficacy of anesthetic preconditioning in a *Drosophila melanogaster* (fruit fly) model of polytrauma with traumatic brain injury
M. Perouansky, D. Johnson-Schlitz, D. Wassarman (Madison, WI/US)

07:23

Development of an *in vitro* model of traumatic brain injury – a new platform to test protective effects of mesenchymal stromal cells derived secretomeF. Pischiutta (Milan/IT), H. Cavaleiro (Milan/IT, Braga/PT),
R. Pascente, E. Caruso (Milan/IT), A. J. Salgado (Braga/PT),
E. Roncati Zanier (Milan/IT)

07:27

Place avoidance tasks for the detection of neurocognitive changes associated with hippocampal damage after experimental traumatic brain injury in a rat model

M. Grutza, K. Große, J. Walter, A. Unterberg, K. Zweckberger,
A. Younsi (Heidelberg/DE)

- 07:31
ID 26 Cytotoxic brain edema is associated with neuroinflammation and retraction of perivascular aquaporin-4 following experimental severe traumatic brain injury: a multi-modal imaging study
C. Lindblad, N. Mitsios, A. Falk-Delgado, P. Mattsson (Stockholm/SE), M. C. Morganti-Kossmann (Melbourne/AU, Phoenix, AZ/US), A. Frostell, J. Mulder, M. Risling, P. Damberg, B.-M. Bellander, E. Thelin, M. Svensson (Stockholm/SE)
- 07:35 Altered cerebral blood flow and brain metabolites in the hippocampus following diffuse traumatic brain injury in mice
S. Arkan, I. Özen, S. Ansar, G. Michalettos, D. Talhada, K. Ruscher, M. Gottschalk, N. Marklund (Lund/SE)
- 07:39 Cis-4-[18F]fluoro-D-proline uptake as a marker for development of secondary neurodegeneration after experimental TBI
J. Friedrich, M. Müller (Aachen/DE), A. Willuweit (Juelich/DE), K.-J. Langen (Aachen, Juelich/DE), L. Liebenstund, F. M. Mottaghy (Aachen/DE), M. Coburn (Bonn/DE), A. Höllig (Aachen/DE)
- 07:43
ID 27 Music as a novel and non-invasive rehabilitative paradigm to promote motor, affect and cognitive recovery after experimental traumatic brain injury
E. Moschonas, V. J. Vozzella, I. N. Cooper, T. Ranellone, R. Reddy, P. L. Rennerfeldt, J. Cheng, J. M. Jarvis, E. L. Fink, C. Bondi, A. Kline (Pittsburgh, PA/US)
- 07:47 The impact of a high-fat high-sugar diet on mild traumatic brain injury and pain outcomes in the adolescent brain
S. Salberg, G. Yamakawa (Melbourne/AU), J. Beveridge, M. Noel (Calgary/CA), R. Mychasiuk (Melbourne/AU, Calgary/CA)
- 07:51
ID 28 Interleukin-13 and its receptor are synaptic proteins involved in plasticity and neuroprotection
S. Li, F. Olde Heuvel, R. Rehman, O. Aousji, A. Froehlich, Z. Li, F. Roselli (Ulm/DE)
- 07:55
ID 29 Multi-compartmental metabolic dynamics following severe traumatic brain injury highlight the necessity of focal monitoring
E. Hammarlund, C. Lindblad, C. Åkerlund, B.-M. Bellander, D. Nelson, E. Thelin (Stockholm/SE)
- 07:59
ID 30 Continuous pharmacological data extraction through computer vision: Improving continuous treatment data collection in TBI
L. Froese, A. Gomez, A. S. Sainbhi, C. Batson, K. Stein, T. Slack (Winnipeg/CA), F. Zeiler (Winnipeg/CA, Cambridge/GB)

- 08:03 Isolation and characterisation of neuronal precursor cell-derived exosomes for potential neuronal regeneration after traumatic spinal cord injury
H. Wang, G. Zheng, X. Zhou, M. Hatami, A. Schnaubelt, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)
- 08:07 Spinal cord injury-derived monocytes alter the viability and immunomodulatory phenotype of neural crest-derived dental pulp stem
ID 31 R. O'Hare Doig, S. Jenkner, R. Grose, M. Lewis, J. Clark, S. Gronthos (Adelaide/AU)
- 08:11 Long-term mortality after traumatic spinal cord injury
E. Johansson, E. Koskinen (Tampere/FI), A. Vainionpää (Seinäjoki/FI), T. Luoto (Tampere/FI)
- 07:15–08:15 Early bird session 1**
Grand Ballroom 1 **Clinical management of cSDH**
Chair N. Terpolilli (Munich/DE), J. Beck (Freiburg i. Br./DE)
- 07:15 Medical management of cSDH
P. Hutchinson (Cambridge/GB)
- 07:35 Surgical management of cSDH
B. Depreitere (Leuven/BE)
- 07:55 Interventional management of cSDH
tba
- 08:30–10:00 Plenary session 1**
Berlin 1–3 **Mild TBI and concussion**
Chair D. Brody (Bethesda, MY/US), N. Marklund (Lund/SE)
- 08:30 From T cells to Tik Tok – developmental considerations in paediatric TBI
ID 1 R. C. Mannix (Boston, MA/US)
- 08:52 A biological basis for persistent post-concussion symptoms:
ID 2 Endophenotypes & biomarkers
C. C. Giza (Los Angeles, CA/US)
- 09:14 The puzzle of persisting disability after mild TBI
ID 3 L. Wilson (Stirling/GB)
- 09:36 Neuroimaging and functional testing of athletes with persistent post
ID 4 concussion symptoms
N. Marklund (Lund/SE)

10:00–10:30

Opening

Berlin 1–3

N. Plesnila (Munich/DE), A. Unterberg (Heidelberg/DE),
K. Zweckberger (Braunschweig /DE)

11:00–12:30

Symposium 1

Berlin 1

Operative SCI

Chair

B. Ishak (Heidelberg/DE), W. Peul (Leiden/NL)

ID 18

11:00

Timing and operative strategies in SCI surgery
B. Ishak (Heidelberg/DE)

11:30

Central cord syndrome – modern management
D. O. Okonkwo (Pittsburgh, PA/US)

12:00

Role of intraspinal pressure and duroplasty
S. Saadoun (London/GB)

11:00–12:30

Scientific session 1

Berlin 2+3

Clinical TBI – paediatric population and outcome predictors

Chair

R. Diaz-Arrastia (Philadelphia, PA/US), V. Newcombe (Cambridge/GB)

11:00

The incidence of paediatric traumatic brain injury and later mortality – a Finnish nationwide register study
I. Kuitunen (Kuopio, Mikkeli/FI), V. Ponkilainen (Jyväskylä/FI),
T. Luoto (Tampere/FI), G. Iverson (Charlestown, MA/US), V. Mattila (Tampere/FI)

11:10

Associations between Cerebellum volume and executive function following paediatric TBI
F. Keleher (Salt Lake City, UT/US),
E. Wilde (Salt Lake City, UT/US, Houston, TX/US), H. Amiri (Kerman/IR),
R. Asarnow, T. Babikian (Los Angeles, CA/US),
E. Bigler (Salt Lake City, Provo, UT/US), K. Caeyenberghs (Geelong/AU),
L. Ewing-Cobbs (Houston, TX/US), C. C. Giza (Los Angeles, CA/US),
N. Goodrich-Hunsaker (Salt Lake City, UT/US), C. Hodges (Provo, UT/US),
K. Hoskinson (Columbus, OH/US), A. Irimia (Los Angeles, CA/US),
I. K. Körte (Munich/DE, Boston, MA/US), H. Lindsey (Salt Lake City, Provo, UT/US),
J. Max (La Jolla, San Diego, CA/US), M. Newsome (Houston, TX/US),
A. Olsen (Trondheim/NO), N. Ryan (Melbourne, Geelong/AU),
A. Schmidt (Lubbock, TX/US), A. Sitzmann (Salt Lake City, UT/US),
D. Stein (Cape Town/ZA), S. Suskauer (Baltimore, MD/US),
P. Thompson (Marina del Rey, Los Angeles, CA/US),
A. Ware (Calgary/CA, Salt Lake City, UT/US), R. Zafonte (Boston, MA/US),
B. Zielinski (Salt Lake City, UT/US), D. Tate (Provo, Salt Lake City, UT/US),
E. Dennis (Salt Lake City, UT/US)

- 11:20 Cerebrovascular pressure reactivity has a strong and independent association with outcome in children with severe traumatic brain injury
C. Smith (Cambridge/GB, Cape Town/ZA),
 U. Rohlwick (Cape Town/ZA, London/GB), K. Mauff (Rotterdam/NL),
 N. Thango, T. Hina, J. Enslin, A. Figaji (Cape Town/ZA)
- 11:30 Higher levels of neurofilament light associated with psychomotor function in
 ID 32 youth soccer players – a REPIMPACT study
T. L. T. Wiegand (Munich/DE, Boston, MA/US), M. Cente (Bratislava/SK),
 E. M. Bonke (Munich/DE, Boston, MA/US),
 J. Seitz-Holland (Boston, MA/US, Munich/DE),
 D. Kaufmann (Augsburg/DE, Boston, MA/US, Munich/DE),
 S. Bahr Sandmo (Oslo/NO), J. Hanes (Bratislava/SK), C. Seer (Leuven/BE),
 A. de Luca (Utrecht/NL), M. Muehlmann, M. V. Bonfert, F. Heinen (Munich/DE),
 J. Gooijers (Leuven/BE), N. Sochen (Tel-Aviv/IL),
 Al. Lin, Y. Tripodis (Boston, MA/US), R. Bahr (Oslo/NO),
 A. Leemans (Utrecht/NL), O. Pasternak (Boston, MA/US),
 S. P. Swinnen (Leuven/BE), P. Filipcik (Bratislava/SK),
 I. K. Körte (Munich/DE, Boston, MA/US)
- 11:40 Plasma osteopontin as an emerging biomarker for rehabilitation outcomes in
 paediatric traumatic brain injury
L. Blackwell, R. Howarth, I. Sayeed, M. Mulugeta, A. Reisner (Atlanta, GA/US)
- 11:50 Metabolomic predictors in recovery from mild traumatic brain injury
A. Dickens, J. Posti (Turku/FI), I. Thomas (Örebro/SE),
 O. Tenovuuo (Turku/FI), A. Maas (Antwerp/BE), A. Büki (Örebro/SE),
 E. Steyerberg (Rotterdam, Leiden/NL), T. Hyötyläinen (Örebro/SE),
 D. Menon (Cambridge/GB), M. Oresic (Turku/FI, Örebro/SE)
- 12:00 Myelination is associated with less tau spreading in individuals at risk for chronic
 ID 33 traumatic encephalopathy
T. L. T. Wiegand (Munich/DE, Boston, MA/US),
 A. Rubinski (Munich/DE), L. B. Jung (Boston, MA/US, Munich/DE),
 H. Arciniega, F. Tuz-Zahra (Boston, MA/US),
 P. Ravanfar (Boston, MA/US, Carlton South, VIC/AU), M. L. Alosco,
 Y. Tripodis (Boston, MA/US), Y. Su (Phoenix, AZ/US),
 Al. Lin (Boston, MA/US), K. Chen (Phoenix, AZ/US),
 S. Bouix (Boston, MA/US), M. Ewers (Munich/DE),
 J. L. Cummings (Las Vegas, Nevada, NV/US),
 R. A. Stern (Boston, MA/US), E. Reiman (Phoenix, AZ/US),
 M. E. Shenton (Boston, MA/US), I. K. Körte (Munich/DE, Boston, MA/US)

12:10 Sex differences in psychological disorders among military personnel following mild traumatic brain injury
A. MacGregor, J. Zouris, J. Casachahua, S. Jurick, A. Dougherty (San Diego, CA/US)

12:20 Post-injury alcohol use is associated with prolonged recovery after concussion
ID 34 in NCAA athletes
R. Chang, M. Singleton, S. Chrisman (Seattle, WA/US),
C. C. Giza (Los Angeles, CA/US), N. Murinova, A. Cuneo (Seattle, WA/US),
S. Broglio (Ann Arbor, MI/US), M. McCrea (Milwaukee, WI/US),
T. McAllister (Indianapolis, IN/US), T. Sharma (Seattle, WA/US)

11:00–12:30 Scientific session 2

Grand Ballroom 1 **Clinical TBI – surgical aspects and intensive care targets**

Chair D. Menon (Cambridge/GB), P. M. Kochanek (Pittsburgh, PA/US)

11:00 An international comparison of 685 cranioplasty outcomes across four major trauma centres
T. Korhonen (Cambridge/GB, Oulu/FI), I. Timofeev (Cambridge/GB),
S. Tetri (Oulu/FI), H. Mee, G. Whiting, E. Viaroli (Cambridge/GB),
S. Ketonen, J. Piitulainen (Turku/FI), A. Lindgren,
J. Huttunen (Kuopio/FI), A. Koliás, A. Helmy (Cambridge/GB),
J. Posti (Turku/FI), P. Hutchinson (Cambridge/GB)

11:10 COAST study development of a core outcome set for cranioplasty following stroke or TBI
H. Mee (Cambridge/GB), A. Castaño Leon (Madrid/ES),
I. Timofeev (Cambridge/GB), A. Adeleye (Ibadan/NG),
I. Devi (Nimhans/IN), N. Marklund (Lund/SE),
S. Muehlschlegel (Boston, MA/US), K. Bond (Cambridge/GB),
C. Clement (Bristol/GB), K. Grieve, N. Owen, G. Whiting,
C. Turner (Cambridge/GB), A. Rubiano (Cali/CO),
D. Shukla (Bangalore/IN), M. Paul (Adelaide/AU),
J. Allanson (Cambridge/GB), V. Pomeroy (Norwich/GB),
E. Viaroli, E. Warburton (Cambridge/GB), A. Wells (Adelaide/AU),
G. Hawryluk (Winnipeg/CA), A. Helmy, F. Anwar (Cambridge/GB),
S. Honeybul (Perth/AU), P. Hutchinson, A. Koliás (Cambridge/GB)

11:20 Comparative effectiveness of surgery for traumatic acute subdural haematoma
T. van Essen (Leiden/NL), H. Lingsma, D. Piscià (Rotterdam/NL),
R. Singh (Leiden/NL), H. Den Boogert (Nijmegen/NL),
A. Younsi (Heidelberg/DE), L. Peppel, M. Heijenbrok-Kal,
G. Ribbers (Rotterdam/NL), R. Walchenbach (Leiden/NL),
D. Menon, P. Hutchinson (Cambridge/GB), B. Depreitere (Leuven/BE),
E. Steyerberg (Rotterdam, Leiden/NL), A. Maas (Edegem/BE),
G. de Ruyter, W. Peul (Leiden/NL)

- 11:30 Standard craniectomy against laparotomy for the treatment of traumatic rise in intracranial pressure and the effect on long-term outcomes
B. Kölbl (Ulm/DE), A. Novotny (Munich/DE), U. M. Mauer (Ulm/DE), S. Krieg (Munich/DE)
- 11:40 Early surgery versus conservative treatment in patients with traumatic intracerebral haematoma – a CENTER-TBI study
I. van Erp, T. van Essen (Leiden/NL), H. Lingsma, D. Pisciă (Rotterdam/NL), R. Singh, J. van Dijck (Leiden/NL), V. Volivici (Rotterdam/NL), A. Koliass (Cambridge/GB), L. Peppel, M. Heijnenbroek-Kal, G. Ribbers (Rotterdam/NL), D. Menon, P. Hutchinson (Cambridge/GB), B. Depreitere (Leuven/BE), E. Steyerberg (Leiden/NL), A. Maas (Edegem/BE), G. de Ruiter, W. Peul (Leiden/NL)
- 11:50 The effect of anti-thrombotic drugs on the surgical outcome of chronic subdural haematoma treated operatively by twist drill craniostomy – a monocentric study with analysis of 300 cases
A. Elnewihi (Uelzen/DE), O. Sakowitz, A. Velalakan, A. Lätzer (Ludwigsburg/DE)
- 12:00 Does optimal cerebral perfusion pressure guided management actually improve cerebrovascular reactivity after traumatic brain injury? – Sub-analysis of the COGITATE trial data
E. Beqiri (Cambridge/GB), J. Tas (Maastricht/NL), M. Czosnyka (Cambridge/GB), R. C. van Kaam (Nijmegen/NL), J. Donnelly (Cambridge/GB), R. H. Haeren, I. C. C. van der Horst (Maastricht/NL), P. Hutchinson (Cambridge/GB), S. M. J. van Kuijk, A. L. Liberti (Maastricht/NL), D. Menon (Cambridge/GB), C. W. E. Hoedemaekers (Nijmegen/NL), B. Depreitere, G. Meyfroidt (Leuven/BE), A. Ercole (Cambridge/GB), M. J. H. Aries (Maastricht/NL), P. Smielewski (Cambridge/GB)
- 12:10 The lower limit of autoregulation as an individualised cerebral perfusion pressure target in traumatic brain injury – a center-TBI high-resolution sub-study analysis
E. Beqiri (Cambridge/GB), F. Zeiler (Winnipeg/CA), A. Ercole, M. M. Placek (Cambridge/GB), J. Tas (Maastricht/NL), J. Donnelly (Cambridge/GB), M. J. H. Aries (Maastricht/NL), P. Hutchinson (Cambridge/GB), N. Stocchetti (Milan/IT), M. Czosnyka, P. Smielewski (Cambridge/GB)
- 12:20 Post intensive care syndrome in patients sustaining a traumatic brain injury
M. Grutza, J. Walter, A. Unterberg, A. Younsi (Heidelberg/DE)

12:45–13:45 **Industry symposium** (p. 59)

12:45–13:45 **Joint session: AO Spine advanced symposium**

Grand Ballroom 1 **Cervical fractures – state of the art treatment**

Chair M. Scholz (Braunfels/DE)



12:45 Atlas fractures – C1/2 fusion or atlas osteosynthesis?

P. Schleicher (Frankfurt a. M./DE)

13:05 Geriatric odontoid fractures – Is surgery always the best option?

B. Ishak (Heidelberg/DE)

13:25 Subaxial facet dislocation – how to reduce and how to fuse

M. Scholz (Braunfels/DE)

14:00–15:30 **Symposium 2**

Berlin 1 **Cells matter – microglia as the linchpin for acute and chronic post-traumatic degeneration**

Chair D. J. Loane (Dublin/IE), R. Raghupathi (Philadelphia, PA/US)

ID 18A

14:00 Post-traumatic neuroinflammatory responses and metabolism – new therapeutic targets for human TBI

A. Helmy (Cambridge/GB)

14:20 Regulation of microglial PI3K signaling in paediatric traumatic brain injury

B. D. Semple (Melbourne/AU)

14:40 Microglia in traumatic brain injury, aging and dementia

J. Ojo (Sarasota, FL/US)

15:00 Sleep fragmentation stress modulates neuroinflammation after traumatic brain injury

O. Kokiko-Cochran (Columbus, OH/US)

15:20 Discussion

14:00–15:30

Berlin 2+3

Chair

Scientific session 3**Clinical TBI – biomarkers**

A. Büki (Örebro/SE), E. Rostami (Uppsala/SE)

14:00

ID 35

Blood biomarkers predict radiographic and clinical outcomes in paediatric traumatic brain injury – an analysis of 519 children

A. Reisner, I. Sayeed, J. J. Chern, K. R. Kramer, L. Blackwell (Atlanta, GA/US)

14:10

Do age, sex, and previous concussion influence blood biomarkers of interest in sport-related concussion in youth athletes?

J. Tabor, L. Penner (Calgary/CA), J. Cooper, M. Ghodsi, C. Wellington (Vancouver/CA), D. Fraser (London/CA), M. Mrazik (Edmonton/CA), C. Emery, C. Debert (Calgar/CA)

14:20

Reference intervals for plasma biomarkers of neurotrauma

J. Cooper, S. Stukas, M. Ghodsi, N. Ahmed, D. Holmes, C. Wellington (Vancouver/CA)

14:30

Longitudinal acute and sub-acute diagnostic biomarker analysis for traumatic brain injury – a TRACK-TBI study

A. Puccio (Pittsburgh, PA/US), F. Korley (Ann Arbor, MI/US), D. O. Okonkwo (Pittsburgh, PA/US), R. Diaz-Arrastia (Philadelphia, PA/US), E. Yuh, J. Yue, A. Ferguson, P. Mukherjee (San Francisco, CA/US), K. K. Wang (Gainesville, FL/US), X. Sun (San Diego, CA/US), A. Markowitz (San Francisco, CA/US), S. Jain (San Diego, CA/US), G. Manley, TRACK TBI Investigators (San Francisco, CA/US)

14:40

An outlier analysis for acute blood biomarkers of mild traumatic brain injury

O. Tenovuo, M. Mononen, O. Korhonen, M. Mohammadian (Turku/FI), D. Menon, V. Newcombe, P. Hutchinson (Cambridge/GB), H. Zetterberg, K. Blennow (Gothenburg/SE), J.-C. Sanchez (Geneva/CH), J. Posti (Turku/FI)

14:50

Post-acute blood biomarkers and disease progression in traumatic brain injury

V. Newcombe (Cambridge/GB), N. Ashton (London/GB, Gothenburg/SE), J. Posti (Turku/FI), B. Glocker (London/GB), A. Manktelow, D. Chatfield (Cambridge/GB), S. Winzeck (London, Cambridge/GB), E. Needham, M. Correia, G. Williams (Cambridge/GB), J. Simren (Gothenburg/SE), R. Takala, A. Katila, H.-R. Maanpää, J. Tallus, J. Frantzen (Turku/FI), K. Blennow (Gothenburg/SE), O. Tenovuo (Turku/FI), H. Zetterberg (Gothenburg/SE), D. Menon (Gothenburg/SE, Cambridge/GB)

15:00 Pre-intervention blood hyperphosphorylated tau and ubiquitin C-terminal
 ID 36 hydrolase-L1 concentrations are associated with magnitude of symptom improvement following targeted intervention in patients with chronic traumatic brain injury
S. Eagle, A. Puccio, M. Collins, A. Kontos, W. Schneider (Pittsburgh, PA/US), D. Agoston (Bethesda, MD/US), D. O. Okonkwo (Pittsburgh, PA/US)

15:10 Serum biomarkers compared to clinical decision rules for selecting patients with mild traumatic brain injury for CT scanning – a center TBI study
A. Mikolić (Rotterdam/NL), D. van Klaveren (Boston, MA/US, Rotterdam/NL), F. Lecky (Sheffield, Salford/GB), V. Newcombe (Cambridge/GB), K. Foks (Rotterdam/NL), E. Czeiter (Pecs/HU), A. Büki (Örebro/SE), H. Lingsma (Rotterdam/NL), S. Mondello (Messina/IT), K. K. Wang (Gainesville, FL/US), A. Maas (Edegem/BE), D. Menon (Cambridge/GB), E. Steyerberg (Leiden, Rotterdam/NL)

15:20 Association of blood-based biomarkers and diffusion tensor imaging metrics after traumatic brain injury
A. Walter, J. Gugger, C. Lynch, D. Parker, N. Smyk, J. Morrison, D. Petrov, A. Schneider, R. Verma, D. Sandsmark, R. Diaz-Arrastia (Philadelphia, PA/US)

14:00–15:30 Scientific session 4

Grand Ballroom 1 **Experimental TBI – mechanisms and therapeutic approaches (part I)**
 Chair N. A. Terpolilli (Munich/DE), E. Roncati Zanier (Milan/IT)

14:00 FLT3/FLT3L signaling is associated with fast maturation of splenic dendritic cells upon TBI
 J. Zhang, M. Huber-Lang, F. Roselli, F. Olde Heuvel (Ulm/DE)

14:10 Clots in cerebral microvessels are associated with opening of the blood-brain barrier after traumatic brain injury
I. Khalin, A. Wehn, M. Schifferer (Munich/DE), A. Klymchenko (Strasbourg/FR), N. Plesnila (Munich/DE)

14:20 White matter damage evaluated by MRI and acute plasma level of neurofilament light anticipate functional impairment in repetitive mild traumatic brain injured mice
F. Moro, G. Vegliante, R. Pascente, I. Lisi, E. Mazzone, D. Tolomeo, E. Micotti (Milan/IT), K. K. Wang (Gainesville, FL/US), E. Roncati Zanier (Milan/IT)

14:30 Neuroprotective effect on traumatic brain injury using redox nanoparticles in mice
A. Marushima, T. Takahashi, Y. Nagasaki, A. Hirayama, A. Muroi, S. Puentes, A. Mujagic, A. Matsumura, Y. Matsumaru, E. Ishikawa (Tsukuba/JP)

- 14:40 Axonal injury as a consequence of blast traumatic brain injury – evaluating a relevant fluid biomarker and electrophysiological outcomes in a rodent model
H. May, K. Tsikonofilos, M. Bruyins-Haylett, C. Donat, H. Duckworth, M. Ghajari, M. Sastre, D. Sharp (London/GB)
- 14:50 CHIMERA traumatic brain injury in a mouse model of tauopathy
ID 37 W. H. Cheng, H. Cheung, A. Kang, J. Fan, J. C. Barron, J. Cooper, A. Wilkinson, G. Hu, P. Crompton (Vancouver/CA), D. Vocadlo (Burnaby/CA), C. Wellington (Vancouver/CA)
- 15:00 Single-cell atlas across three murine TBI models yields heterogeneous transcriptome based on severity, sex, cortical region, and cell-subtype: identifying novel potential biomarkers and targets
ID 38 R. Jha (Phoenix, AZ/US), Z. Xiong, C. Sneiderman, C. O'Brien, I. Raphael, K. Janesko Feldman, V. Vagni, C. Bogomilsky (Pittsburgh, PA/US), B. Zusman (Boston, MA/US), J. Catapano, E. Winkler, S. Mihaljevic, A. Rani, S. Raikwar, K. Karahalios, A. Munoz Casabella (Phoenix, AZ/US), D. Rajasundaram, P. M. Kochanek, G. Kohanbash (Pittsburgh, PA/US)
- 15:10 Oligodendrocyte precursor cell proliferation in aged mice following traumatic brain injury
G. Michalettos, K. Ruscher, I. Özen, S. Arkan, N. Marklund (Lund/SE)
- 15:20 Neuroinflammatory response in the hippocampus after experimental traumatic brain injury in a rat model
K. Große, M. Grutza, J. Walter, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)

SCIENTIFIC PROGRAMME | MONDAY, 18 JULY

16:00–17:30

Plenary session 2

Berlin 1–3

Regeneration and SCI

Chair

S. Karimi (Winnipeg/CA), N. Weidner (Heidelberg/DE)

16:00

NeuroRegen® Scaffold for spinal cord injury repair – from animal models to clinical study

J. Dai (Beijing/CN)

16:22

Extracellular vesicles from mesenchymal stromal cells improve functional and structural outcomes after spinal cord injury in a rat model

ID 5

S. Couillard-Després (Salzburg/AT)

16:44

Glial cells in traumatic brain injury – Good friends or enemies?

ID 6

L. Dimou (Ulm/DE)

17:06

Shaping new circuits following spinal cord injury

F. M. Bareyre (Munich/DE)

SCIENTIFIC PROGRAMME | TUESDAY, 19 JULY

07:15–08:15

Data blitz 2

Berlin 1–3

Chair

A. Helmy (Cambridge/GB), A. Reisner (Atlanta, GA/US)

07:15

Ocular motor deficits and recovery in Australian rules football following a sports-related concussion

G. F. Symons, W. O'Brien (Melbourne/AU), L. Abel (Parkville/AU),

T. O'Brien (Melbourne, Parkville/AU), S. Kolbe (Melbourne/AU),

J. Fielding (Melbourne, Parkville/AU), S. Shultz (Parkville, Melbourne/AU),

M. Clough (Melbourne/AU)

07:19

Brain biochemical alterations associated with cognitive function in youth soccer players – a REPIMPACT study

ID 51

T. L. T. Wiegand (Boston, MA/US, Munich/DE)

E. M. Bonke (Munich/DE, Boston, MA/US), E. Yhang, A. Zimmermann,

S. Reddigari (Boston, MA/US), M. Gaubert (Munich/DE),

J. Seitz-Holland (Boston, MA/US, Munich/DE),

D. Kaufmann (Munich, Augsburg/DE, Boston, MA/US), S. Bahr Sandmo (Oslo/NO),

A. de Luca (Utrecht/NL), C. Seer (Leuven/BE), M. Muehlmann (Munich/DE),

M. Cente (Bratislava/SK), M. V. Bonfert, F. Heinen (Munich/DE),

N. Sochen (Tel-Aviv/IL), J. Gooijers (Leuven/BE), P. Filipcik (Bratislava/SK),

A. Leemans (Utrecht/NL), S. P. Swinnen (Leuven/BE), Y. Tripodis, O. Pasternak,

Al. Lin (Boston, MA/US), I. K. Körte (Munich/DE, Boston, MA/US)

- 07:23
ID 52 Volumetric brain changes in cortical and subcortical regions of former american football players years after exposure to repetitive head impacts
H. Arciniega, O. John (Boston, MA/US), Z. Baucom, Y. Tripodis (Boston, MA/DE), T. Billah, M. Coleman, O. Pasternak, M. L. Alosco (Boston, MA/US), I. K. Körte (Boston, MA/US, Munich/DE), Al. Lin (Boston, MA/US), J. L. Cummings (Las Vegas, NV/US), E. Reiman (Phoenix, AZ/US), R. A. Stern, M. E. Shenton, S. Bouix (Boston, MA/US)
- 07:27
ID 53 Pre-injury sleep as a moderator of cognitive functioning in children and adolescents with mild traumatic brain injury across the first 6 months post-injury
C. Luszczawski (Calgary/CA), N. Minich, A. Bacevice (Cleveland, OH/US), E. Bigler (Provo, UT/US), N. A. Zumberge, H. G. Taylor, D. M. Cohen, L. K. Mihalov (Columbus, OH/US), B. A. Bangert (Cleveland, OH/US), K. O. Yeates (Calgary/CA)
- 07:31 Cervical injury may complicate symptom presentation following combat-related mild traumatic brain injury
A. MacGregor, J. Casachua, A. Dougherty, J. Fraser (San Diego, CA/US)
- 07:35 Diffusion MRI based summary measure of extracellular water – a potential biomarker for mild traumatic brain injury
D. Parker, A. Walter, R. Diaz-Arrastia, R. Verma (Philadelphia, PA/US)
- 07:39 Novel approach to imaging-clinical associations for parsing mTBI heterogeneity
D. Parker, A. Walter, R. Diaz-Arrastia, R. Verma (Philadelphia, PA/US)
- 07:43 Quantifying and mapping the progression of cortical demyelination after mild traumatic brain injury
N. Chowdhury, S. Mahoney, V. Ngo, A. Irimia (Los Angeles, CA/US)
- 07:47 Age and sex differences in functional connectivity after mTBI correlate with cognition
P. Imms, A. Amgalan, A. S. Maher, A. Irimia (Los Angeles, CA/US)
- 07:51 Explaining outcome differences between men and women following mild traumatic brain injury
A. Mikolić, J. Oude Groeniger (Rotterdam/NL), M. Zeldovich (Goettingen/DE), L. Wilson (Stirling/GB), J. Roeters van Lennep (Rotterdam/NL), D. van Klaveren (Rotterdam/NL, Boston, MA/US), S. Polinder (Rotterdam/NL)
- 07:55
ID 54 Traumatic brain injury in elderly patients with pre-injury antithrombotic treatment – a retrospective study
R. A. Gavrilu Laic, J. Vander Sloten, B. Depreitere (Leuven/BE)

07:59
ID 55 Increasing the efficiency of cerebrovascular autoregulation-guided neuroprotection for traumatic brain injury patients
E. Chaleckas, V. Putnynaite, M. Deimantavicius, K. Boere, T. Tamosuitis, M. Kavaliauskas (Kaunas/LT), A. Preiksaitis, S. Rocka (Vilnius/LT), V. Petkus, A. Ragauskas (Kaunas/LT)

08:03
ID 56 Sedation and cerebral oximetry in traumatic brain injury – A potentially non-invasive avenue for personalised approaches in neurocritical care?
L. Froese, A. Gomez, A. S. Sainbhi, C. Batson, K. Stein, T. Slack (Winnipeg/CA), F. Zeiler (Cambridge/GB, Winnipeg/CA)

08:07
ID 57 Intracranial pressure pulse shape correlates with outcome in traumatic brain injury – a CENTER-TBI study
A. Kazimierska, A. Uryga, C. Mataczyński (Wroclaw/PL), M. Czosnyka (Warsaw/PL, Cambridge/GB), M. Kasprowicz (Wroclaw/PL), CENTER-TBI High-resolution sub-study participants

07:15–08:15 Early bird session 2

Grand Ballroom 1
Chair **aSDH**
P. Czorlich (Hamburg/DE), F. Servadei (Milano/IT)

07:15 Management of acute and chronic subdural haematoma: evidence from randomised trials
P. Hutchinson (Cambridge/GB)

07:35 Evidence of surgical evacuation in traumatic acute subdural haematoma
T. van Essen (Leiden/NL)

07:55 Traumatic acute subdural haematoma – complications, outcome, and the role of biomarkers in the postoperative management
M. Chihi (Essen/DE)

08:30–09:40

Berlin 1–3

Chair

Plenary session 3**Current perspective in SCI management**

E. Tsai (Ottawa/CA), K. Zweckberger (Braunschweig/DE)

08:30

ID 7

Time is spine – translational update on approaches to facilitate repair and regeneration on the injured spinal cord

M. Fehlings (Toronto/CA)

08:52

Why is there a failure of translation of promising animal therapies to humans?

E. Tsai (Ottawa/CA)

09:14

ID 8

Comprehensive SCI Care

N. Weidner (Heidelberg/DE)

09:40–10:30

Berlin 1–3

09:40

Honours

Laudatio to Dr. Shohami

A.-L. Sirén (Wuerzburg/DE)

09:45

Keynote speech

E. Shohami (Jerusalem/IL)

10:05

Laudatio to Prof. Servadei

A. Unterberg (Heidelberg/DE)

10:10

Keynote speech

F. Servadei (Milano/IT)

11:00–12:30

Berlin 1

Chair

ID 19

Symposium 3**Biomarkers of traumatic brain and spinal cord injury**

S. Mondello (Messina/IT), M. Oresic (Örebro/SE)

11:00

Clinical application of protein biomarkers in TBI

A. Büki (Örebro/SE)

11:20

Biomarkers of spinal cord injury

P. Tsiopoulos (Thessaloniki/GR)

11:40

Lipodomic and metabolomic markers of brain and spinal cord injury

M. Oresic (Örebro/SE)

12:00

Critical assessment of biomarker-related scientific information

S. Mondello (Messina/IT)

12:20

Discussion

11:00–12:30

Berlin 2+3

Chair

Scientific session 5

Clinical TBI – miscellaneous

B. Depreitere (Leuven/BE), J. Meixensberger (Leipzig/DE)

- 11:00 Age-related differences in the time course of coagulation and fibrinolytic parameters in patients with traumatic brain injury
R. Nakae, Y. Fujiki, Y. Takayama, T. Kanaya, Y. Igarashi, G. Suzuki, Y. Naoe, S. Yokobori (Tokyo/JP)
- 11:10 Anticoagulant therapy in the context of TBI – differences between patients on coumarins and factor Xa inhibitors
A. Younsi, C. Beynon (Heidelberg/DE), H. Güting, M. Maegele (Witten, Herdecke/DE), A. Unterberg (Heidelberg/DE)
- 11:20 Cell-free mitochondrial DNA in acute brain injury
S. Kayhanian, A. Glynos, R. Mair, A. Lakatos, P. Hutchinson, A. Helmy, P. Chinnery (Cambridge/GB)
- 11:30 Autonomic dysfunction after moderate-severe traumatic brain injury – symptom spectrum, impact and clinical testing outcomes
L. Li, E. Vichayanrat, M. del Giovane, H. Lai, V. Iodice (London/GB)
- 11:40 How do different classifications of mitochondrial dysfunction compare when applied to a cohort of patients with severe TBI undergoing multimodality monitoring?
S. Venturini, K. Carpenter, P. Hutchinson, M. R. Guilfoyle, A. Helmy (Cambridge/GB)
- 11:50 The artificial intelligence-enhanced management of severe traumatic brain injury observational trial of a novel traumatic intracranial hypertension prediction algorithm
R. McNamara (Perth, Bentley/AU), S. A. Meka (Perth/AU), J. Anstey (Melbourne/AU), D. Fatovich (Perth/AU), L. Haseler (Bentley/AU), A. Udy, R. Bellomo (Melbourne/AU), M. Fitzgerald (Bentley, Nedlands/AU)
- 12:00 The effect of methylphenidate on the dynamic functional connectivity of large-scale brain networks following traumatic brain injury
E.-J. Mallas, S. De Simoni (London/GB), N. Moreira da Silva (Newcastle, London/GB), N. Bourke (London/GB), P. Jenkins (London, Hampshire/GB), D. Sharp (London/GB)

- 12:10 Intramural health care consumption and costs after traumatic brain injury: a CENTER-TBI study
Z. L. R. Kaplan, M. van der Vlegel (Rotterdam/NL), J. van Dijck (Leiden/NL), D. Pisci , N. van Leeuwen, H. Lingsma (Rotterdam/NL), E. Steyerberg (Leiden/NL), J. A. Haagsma (Rotterdam/NL), M. Majdan (Trnava/SK), A. Maas (Edegem/BE), S. Polinder (Rotterdam/NL)
- 12:20 Traumatic brain injury in octo- and nonagenarians – a collaborative european neurotrauma effectiveness research in TBI analysis
M. Ivren, A. Unterberg, A. Younsi (Heidelberg/DE)
- 11:00–12:30 Scientific session 6**
 Grand Ballroom 1 **Experimental SCI – neuroprotection and neuroregeneration**
 Chair S. Couillard-Despr s (Salzburg/AT), A.-L. Sir n (Wuerzburg/DE)
- 11:00 Intrathecal administration of a neurokinin-1 receptor antagonist modulates the blood-spinal cord barrier and improves functional recovery after experimental spinal cord injury
G. Zheng, A.-K. Harms, M. Tail, H. Zhang (Heidelberg/DE), A. Nimmo (Cairns/AU), T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)
- 11:10 Targeting excessive lysosomal activity for prevention of cell death and enhanced tissue preservation after spinal cord injury
E. Eftekharpour, P. Nagakannan, A. Alizadeh, M. I. Islam, C. Hart, P. Tabeshmehr, S. Karimi (Winnipeg/CA)
- 11:20 Intraperitoneal IL-4 application attenuates systemic inflammation after traumatic spinal cord injury in rats
O. Alhalabi, S. Heene, G. Zheng, X. Zha, L. Ruebenacker, J. Walter, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)
- 11:30 Subcommissural organ-spondin-derived peptide promotes recovery in a rat clip compression-contusion model of cervical spinal cord injury
N. Punjani (Toronto/CA), S. Lemarchant (Lyon/FR), S. Altamentova, J. Chio, J. Wang (Toronto/CA), Y. Godfrin (Lyon, Caluire-et-Cuire/FR), M. Fehlings (Toronto/CA)
- 11:40 Traumatic brain and spinal cord injury inhibit bone formation through overlapping pathways in mice
A. Rahmani, D. Jahn, P. K hli, E. Otto, L. Waldmann, P. Vajkoczy, V. Hubertus, M. Pumberger (Berlin/DE), J. Keller (Hamburg/DE), S. Tsitsilonis (Berlin/DE)

- 11:50 Suppressing CSPG/LAR/PTP σ axis facilitates neuronal replacement and synaptogenesis by human neural precursor grafts and improves recovery after spinal cord injury
S. M. Hosseini, A. Alizadeh, N. Shahsavani, J. Chopek (Winnipeg/CA), J.-E. Ahlfors (Laval/CA), S. Karimi (Winnipeg/CA)
- 12:00 Distinctive response of neural progenitor cells with cortical and spinal cord identity to the Notch signaling in injured spinal cord microenvironment
M. Khazaei, C. S. Ahuja, M. Fehlings (Toronto/CA)
- 12:10 Survival and differentiation of transplanted neural precursor cells are improved by intrathecal administration of sonic hedgehog with effects on secondary injury processes and functional recovery after experimental spinal cord injury
A. Younsi, H. Zhang, M. Tail, G. Zheng, A.-K. Harms, M. Hatami, T. Skutella, A. Unterberg, K. Zweckberger (Heidelberg/DE)
- 12:20 Oral ketone esters have different effects than ketogenic diet on proteome expression and elicit discrete improvements in forelimb function after spinal cord injury
O. Seira, K. Kolehmainen, J. Liu, S. Kamakari, L. Raffaele, N. Janzen, W. Plunet, M. Beaulac, H. Briggs, S. Hourani, H. Park, A. Gupta, G. Stacey, K.-M. Moon, N. Alaeiilkhchi, L. Foster (Vancouver/CA), K. Clarke (Oxford/GB), W. Tetzlaff (Vancouver/CA)

12:45–13:45 Industry symposium (p. 59)

12:45–13:45 Joint Session: German Spine Society – DWG meets INTS
 Grand Ballroom 1 **Surgical management of spine trauma and spinal cord injury**
What is new? What is hot?



Chair M. Fehlings (Toronto/CA), P. Vajkoczy (Berlin/DE)

12:45 Welcome and introduction
 M. Fehlings (Toronto/CA), P. Vajkoczy (Berlin/DE)

12:50 Role and timing of surgery in central cord injury
 M. Fehlings (Toronto/CA)

13:00 Pearls and pitfalls in managing spine fractures in the osteoporotic individual
 M. Arand (Ludwigsburg/DE)

13:10 Management of geriatric odontoid fractures
 P. Vajkoczy (Berlin/DE)

13:20 Role and timing of surgery in ASIA A cervical cord injury
 V. ter Wengel (Amsterdam/NL)

13:30 Discussion

14:00–15:30

Berlin 1

Symposium 4**Repetitive military occupational blast – state-of-the-science on brain health and performance outcomes associated with low-level blast exposure**Chair
ID 20

S. Turner (Silver Spring, MD/US)

14:00

Brain health and performance outcomes following low-level blast exposure: evidence review and analysis

S. Sloley (Silver Spring, MD/US)

14:15

Characterisation of low-level blast exposure effects among US military in training – lessons learned and prospects

M. Skotak (Silver Spring, MD/US)

14:35

Multi-omics approaches for understanding the impact of repeated exposure to low-intensity occupational blast on health and performance in Canadian military members

S. Rhind (Toronto/CA)

14:55

NATO STO HFM RTG 338 strategy blast traumatic brain injury sustainable healthy employable

M. Philippens (Bleiswijk/NL)

15:10

Discussion

14:00–15:30

Berlin 2+3

Chair

Scientific session 7**Experimental TBI – mechanisms and treatment approaches (part II)**

J. Badaut (Bordeaux/FR), K. K. Wang (Gainesville, FL/US)

14:00

Chemogenetic control of cortical microcircuitry in neurotrauma enhances neuroprotection and reduces reactive microglia through neuro-gial crosstalk modulation

A. Froehlich, A. Chandrasekar, F. Olde Heuvel, R. Rehman,

S. Li (Ulm/DE), M. C. Morganti-Kossmann (Melbourne/AU), F. Roselli (Ulm/DE)

14:10

Effect of vitamin C for the pre-injury high ethanol intake in rats following traumatic brain injury

X. Mao, X. Wu (Beijing/CN)

14:20

Bradykinin 2 receptor mediates chronic inflammation after experimental TBI

A. Wehn, I. Khalin, S. Hu, N. Plesnila, N. A. Terpolilli (Munich/DE)

14:30

Delayed accumulation of Nogo A and LINGO-1 positive cells is associated with demyelination and cell death of oligodendrocytes after experimental traumatic brain injury

K. Ruscher, I. Özen, N. Marklund (Lund/SE)

- 14:40 Erythropoietin reduces white matter injury through oligodendrocyte progenitor cell modulation after traumatic brain injury with delayed hypoxemia
K. Shumilov Bartenev, M. Celorrio-Navarro, S. Xiao, F. Stuart (St. Louis, MO/US)
- 14:50 The administration of Interleukin-4 ameliorates secondary brain damage after experimental traumatic brain injury in mice
J. Walter, S. Hutagalung, J. Mende, C. Maurer, J. Kirsch, T. Skutella, A. Younsi, A. Unterberg, K. Zweckberger (Heidelberg/DE)
- 15:00 Neutralization of interleukin-1-beta after traumatic brain injury – preclinical evaluation using a blinded and randomised international multi-center trial protocol
C. Exner (Munich/DE), G. Štelfa (Jelgava, Riga/LV), C. Sjölund (Lund/SE), M.-L. Fournier (Bordeaux/FR), S. Schwarzmaier (Munich/DE), E. Stollburg, L. Kürzinger (Wuerzburg/DE), J. Badaut (Bordeaux/FR), L. Zvejniece (Riga/LV), A.-L. Sirén (Wuerzburg/DE), S. Liraz-Zaltsman (Kiryat Ono, Jerusalem, Ramat Gan/IL), E. Shohami (Jerusalem/IL), N. Marklund (Uppsala, Lund/SE), N. Plesnila (Munich/DE)
- 15:10 Long-term alteration of neuronal activity in freely-behaving mice after a juvenile mild traumatic brain injury
C. Dubois (Bordeaux/FR), J. Badaut (Bordeaux/FR, Loma Linda, CA/US)
- 15:20 Neuronal circular RNAs regulate post-traumatic recovery through BDNF
Z. Li, F. Olde Heuvel, S. Li, F. Roselli (Ulm/DE)

14:00–15:30 Scientific session 8

Grand Ballroom 1 **Clinical TBI – imaging**

Chair E. Dennis (Salt Lake City, UT/US), O. Sakowitz (Ludwigsburg/DE)

- 14:00 Intracranial lesions and their association with full recovery in adolescents and young people with mild traumatic brain injury
A. Younsi, L. Riemann (Heidelberg/DE), A. Mikolić (Rotterdam/NL), A. Maas (Edegem/BE), K. Zweckberger, A. Unterberg (Heidelberg/DE)
- 14:10 Outcome in mild traumatic brain injury patients with a normal computed tomography scan
S. Richter (Cambridge/GB), S. Winzeck (London, Cambridge/GB), E. Czeiter (Pécs/HU), D. Whitehouse (Cambridge/GB), E. Kornaropoulos (Lund/SE, Cambridge/GB), T. Das (Cambridge/GB), J. Verheyden (Leuven/BE), G. Williams (Cambridge/GB), K. Amrein (Pécs/HU), H. Xu, Z. Yang, K. K. Wang (Gainesville, FL/US), A. Büki (Pécs/HU), A. Maas (Edegem/BE), A. Vik (Trondheim/NO), M. Correia, D. Menon, V. Newcombe (Cambridge/GB), CENTER-TBI MRI substudy Participants and Investigators

- 14:20 Active elite rugby participation predicts alterations in cortical thickness
T. Parker, K. Zimmerman, E. Laverse, N. Bourke, A. Heslegrave (London/GB),
H. Zetterberg (Mölnal/SE, Clear Water Bay/HK, London/GB), S. Kemp,
H. Morris, D. Sharp (London/GB)
- 14:30 Cortical stiffness decreases following a collegiate ice hockey season
M. DiFabio (Newark, DE/US, Munich/DE), D. Smith, T. Buckley (Newark, DE/US),
K. Breedlove (Boston, MA/US), C. Johnson (Newark, DE/US)
- 14:40 Cavum Septi Pellucidi in former american football players and its association with
 ID 58 traumatic encephalopathy syndrome
H. Arciniega (Boston, MA/US), L. B. Jung (Boston, MA/US, Munich/DE),
I. K. Körte (Boston, MA/US, Munich/DE), Y. Tripodis (Boston, MA/DE),
T. Billah, M. Coleman, O. Pasternak, M. L. Alosco, Al. Lin (Boston, MA/US),
J. L. Cummings (Las Vegas, NV/US), E. Reiman (Phoenix, AZ/US),
R. A. Stern, S. Bouix, M. E. Shenton (Boston, MA/US)
- 14:50 Cerebellar volume links to cognitive and post traumatic stress symptoms in
 warfighters with mild traumatic brain injury
E. Dennis (Salt Lake City, UT/US),
E. Wilde (Houston, TX/US, Salt Lake City, UT/US), T. Abildskov,
E. Hovenden (Salt Lake City, UT/US), E. Bigler (Provo, Salt Lake City, UT/US),
A. Betts (San Antonio, TX/US, Bethesda, MD/US),
N. Davenport (Minneapolis, MN/US), T. Duncan (Portland, OR/US),
Je. Gill (Baltimore, MD/US), S. Hinds II, K. Kenney (Bethesda, MD/US),
M. Newsome (Houston, TX/US), M. J. Pugh (Salt Lake City, UT/US),
R. Scheibel (Houston, TX/US), P.-P. Shahim (Bethesda, MD/US), B. Taylor,
M. Troyanskaya (Houston, TX/US), W. Walker (Richmond, VA/US),
K. Werner (Bethesda, MD/US), G. York (Anchorage, AL/US),
D. Cifu (Richmond, VA/US), D. Tate (Provo, Salt Lake City, UT/US)
- 15:00 Perivascular space volume is associated with exposure to repetitive head
 ID 59 impacts and cognitive impairment in individuals at risk for chronic traumatic
 encephalopathy
L. B. Jung, T. L. T. Wiegand (Munich/DE, Boston, MA/US), H. Arciniega,
F. Tuz-Zahra (Boston, MA/US), E. M. Bonke (Munich/DE, Boston, MA/US),
M. L. Alosco, Y. Tripodis, Al. Lin, S. Bouix, O. Pasternak, M. Coleman,
T. Billah (Boston, MA/US), J. L. Cummings (Las Vegas, NV/US),
E. Reiman (Phoenix, AZ/US), R. A. Stern, M. E. Shenton (Boston, MA/US),
I. K. Körte (Boston, MA/US, Munich/DE)

- 15:10 Diffusion MRI based subtyping to parse heterogeneity in mild TBI
D. Parker, A. Walter (Philadelphia, PA/US), G. Manley,
P. Mukherjee (San Francisco, CA/US), R. Diaz-Arrastia,
R. Verma (Philadelphia, PA/US)
- 15:20 White matter abnormalities on 7T diffusion MRI in athletes with persistent post-concussive symptoms
A. Gard, E. Kornaropoulos, M. Portonova Wernersson,
I. Rorsman (Lund/SE), Y. Tegner (Luleå/SE), A. De Maio (Rome/IT),
K. Markenroth Bloch (Lund/SE), I. Björkman-Burtscher (Gothenburg/SE),
H. Pessah-Rasmussen, M. Nilsson, N. Marklund (Lund/SE)
- 16:00–17:30** **Plenary session 4**
Berlin 1–3 **Recent clinical trials and global challenges in neurotrauma**
Chair D. Menon (Cambridge/GB), R. Vink (Adelaide/AU)
- 16:00 Reconsidering priorities for effective neurotrauma research globally
A. Figaji (Cape Town/ZA)
- 16:20 ID 9 Awakening on traumatic coma in ICU
G. Gao (Shanghai/CN)
- 16:40 ID 10 Global challenges in neurotrauma
P. Hutchinson (Cambridge/GB)
- 17:00 NOSTRA III – early inhibition of iNOS improves outcome following moderate and severe TBI
J. Stover, F. Tegtmeier (Wuerzburg/DE),
E. Schmutzhard (Innsbruck/AT), NOSTRA III Investigators (Wuerzburg/DE)
- 17:10 Traumatic axonal injury influences the cognitive effect of non-invasive brain stimulation
L. Li (London/GB), I. Violante (Guildford/GB), K. Zimmerman,
A. Hampshire (London/GB), A. Opitz (Minneapolis, MN/US), D. Carmichael,
D. Sharp (London/GB)
- 17:20 A German national registry for traumatic brain injury – conception, implementation and first results
A. Younsi, A. Unterberg (Heidelberg/DE), I. Marzi (Frankfurt a. M./DE),
W.-I. Steudel (Homburg a. d. S./DE), E. Uhl (Giessen/DE), J. Lemcke,
F. Berg (Berlin/DE), M. Woschek (Frankfurt a. M./DE),
M. Friedrich (Giessen/DE), H. Clusmann, H. Aldin Hamou (Aachen/DE),
U. M. Mauer, M. Scheer (Ulm/DE), J. Meixensberger,
D. Lindner (Leipzig/DE), K. Schmieder,
M. Gierthmühlen (Bochum/DE), M. Maegele (Cologne/DE)

07:15–08:15

Berlin 1–3

Chair

Symposium 5**Update on acute critical care**

A. Büki (Örebro/SE), D. Menon (Cambridge/GB)

07:15

The role of decompressive craniectomy in the management of severe TBI
B. Liu (Beijing/CN)

07:30

Update on clinical trials in traumatic brain injury
G. Gao (Shanghai/CN)

07:45

Fluid management in traumatic brain injury patients
H. Cheng (Bristol/GB)

08:00

New insight from acute phase to chronic phase in traumatic brain injury
X. Mao (Beijing/CN)**07:15–08:15**

Grand Ballroom 1

Chair

Early bird session 3**Rehabilitation and outcome from neurotrauma**

K. Rauen (Zurich/CH), N. von Steinbüchel (Goettingen/DE)

07:15

Neurotrauma rehabilitation and outcome
K. Jahn (Munich/DE)

07:35

Traumatic brain injury – sex and gender considerations for neurotrauma rehabilitation
A. Colantonio (Toronto/CA)

07:55

Spinal cord injury – autonomic nervous system and outcome
E. Merete Hagen (London/GB)**08:30–10:00**

Berlin 1–3

Chair

Plenary session 5**Current perspective in TBI**

G. Manley (San Francisco, CA/US), A. Unterberg (Heidelberg/DE)

08:30

ID 11

TRACK-TBI – a 10 year journey to transform research and clinical knowledge in TBI
G. Manley (San Francisco, CA/US)

08:50

ID 12

Achieving precision medicine in TBI – Sprint or marathon?
D. Menon (Cambridge/GB)

09:10

ID 13

The impact of CENTER-TBI
D. Menon (Cambridge/GB)

09:30 CONNECTing FIELD to field – translating research in TBI related neurodegeneration
 ID 14 to game changing practice
 W. Stewart (Glasgow/GB)

10:00–10:30 Hand over presidency and invitation INTS 2024

Berlin 1–3

10:00 Hand over presidency
 R. Vink (Adelaide/AU), A. Unterberg (Heidelberg/DE)

10:15 Invitation INTS 2024
 P. Hutchinson (Cambridge/GB)

11:00–12:30 Symposium 6

Berlin 1

Chair

ID 21

Brain injury in intimate partner violence
 K. Mason (Kelowna/CA), S. Shultz (Melbourne/AU)

11:00 The psychological, cognitive and neural signatures of IPV-related head trauma
 C. Esopenko (Newark, NJ/US)

11:30 Supporting survivors of abuse and brain injury
 P. van Donkelaar (Kelowna/CA)

11:50 Intimate partner violence perpetration: associations with limbic microstructure
 P. Rojczyk (Munich/DE)

12:10 How rodent models can be applied to understand brain injury in intimate partner violence
 M. Sun (Melbourne/AU)

11:00–12:30 Symposium 7
Spreading depolarisation in acute cerebral injuries

Berlin 2+3

Chair

J. Dreier (Berlin/DE)

11:00 Spreading depolarisations in patients with acute cerebral injuries
 ID 23 J. Dreier (Berlin/DE)

11:30 Brainstem and cortical spreading depolarisation in a closed head injury rat model
 J. Dreier (Berlin/DE)

12:00 Real time glutamate dynamics during spreading depolarisations in a lateral fluid percussion brain injury in rats
 B. Balanca (Lyon/FR)

11:00–12:30 Scientific session 9Grand Ballroom 1 **Clinical TBI – outcome and big data**

Chair P. Smielewski (Cambridge/GB), E. Uhl (Giessen/DE)

- 11:00 Distinct patterns of neurodegeneration in the chronic phase after TBI and in Alzheimer's disease
N. Graham, J. Cole, J. Schott, D. Sharp (London/GB)
- 11:10 Health-related quality of life after trauma with or without TBI:
ID 65 a prospective cohort study
O. Kiwanuka, E. Thelin, B.-M. Bellander, A.-M. Fagerdahl,
L. Boström (Stockholm/SE)
- 11:20 Longterm outcome of elderly with mild TBI – the interaction of functional
outcome and quality of life
M. Bittencourt Villalpando, F. Aljassim, H. van der Horn, B. Jacobs,
H. Rasul, J. van der Naalt (Groningen/NL)
- 11:30 Associations of prior head injury with olfaction – results from the
atherosclerosis risk in communities study
A. Schneider (Philadelphia, PA/US), R. Gottesman (Bethesda, MD/US),
T. Mosley, S. Shrestha (Jackson, MS/US), N. Rowan,
A. R. Sharrett (Baltimore, MD/US), H. Chen (East Lansing, MI/US),
V. Kamath (Baltimore, MD/US)
- 11:40 Neuroimaging correlates of chronic head injury in an older community Dwelling
population – an ARIC study
A. Walter, J. Gugger, H. Elser (Philadelphia, PA/US),
T. Mosley (Jackson, MS/US), R. Reid, C. Jack (Rochester, MN/US),
R. Gottesman (Bethesda, MD/US), R. Diaz-Arrastia,
A. Schneider (Philadelphia, PA/US)
- 11:50 The circulating metabolome associates with severity of acute traumatic brain
injury, computed tomography findings, and patient outcomes
I. Thomas (Örebro/SE), A. Dickens, J. Posti (Turku/FI),
E. Czeiter (Pécs/HU), D. Duberg, T. Sinioja (Örebro/SE),
M. Kråkström (Turku/FI), I. R. A. Retel Helmrich (Rotterdam/NL),
K. K. Wang (Gainesville, FL/US), A. Maas (Antwerp/BE),
E. Steyerberg (Leiden, Rotterdam/NL), D. Menon (Cambridge/GB),
O. Tenovuo (Turku/FI), T. Hyötyläinen, A. Büki (Örebro/SE),
M. Oresic (Örebro/SE, Turku/FI)

12:00 The derivation of coagulation phenotypes and the association with in-hospital mortality in patients with traumatic brain injury – a cluster analysis of the nationwide multicenter neurotrauma database
G. Fujiwara (Ritto/JP), Y. Okada (Kyoto/JP), N. Shiomi (Ritto/JP), T. Sakakibara, T. Yamaki, N. Hashiomto (Kyoto/JP)

12:10 CONNECT – a platform for high-resolution multimodal data management for clinical trials of brain injured patients
E. Moyer (Philadelphia, PA/US), C. Maddux (San Francisco, CA/US), E. Rosenthal (Boston, MA/US), B. Foreman (Cincinnati, OH/US), J. Elmer (Pittsburgh, PA/US), K. Hirsch (Palo Alto, CA/US), R. Moberg (Philadelphia, PA/US)

12:20 The relationship between traumatic brain injury pathology and road traffic collision dynamics using in-depth collision data
 C. Baker (London, Wokingham/GB), P. Martin (Wokingham/GB), M. Wilson, M. Ghajari, D. Sharp (London/GB)

12:45–13:45 Industry symposium (p. 60)

14:00–15:30 Symposium 8

Berlin 1
 Chair
 ID 22

The brain exposed to repetitive head impacts – effects across the life span
 I. Körte (Munich/DE), W. Stewart (Glasgow/GB)

14:00 Mortality – epidemiology of neurodegeneration associated with RHI
 E. Russell (Glasgow/GB)

14:30 Morbidity – new insights into cognitive decline in former contact sports athletes later in life
 M. L. Alosco (Boston, MA/US)

15:00 Missed opportunity – developmental trajectories in youth athletes exposed to RHI
 E. M. Bonke (Munich/DE)

14:00–15:30

Berlin 2+3

Symposium 9

Post-traumatic epilepsy – a long-term complication of traumatic brain injury, translational and clinical studies identifying diagnostic and prognostic biomarkers

Chair
ID 25

P. Vespa (Los Angeles, CA/US)

14:00

Translational preclinical platform for biomarker discovery in PTE

A. Galanopoulou (New York, NY/US)

14:30

Blood based biomarkers of epileptogenesis after traumatic brain injury – clinical studies

D. Agoston (Bethesda, WI/US)

15:00

Multimodal tools for post-traumatic epilepsy research

D. Duncan (Los Angeles, CA/US)

14:00–15:30

Grand Ballroom 1

Scientific session 10

Clinical and experimental SCI – miscellaneous

Chair

F. M. Bareyre (Munich/DE), J. Lemcke (Berlin/DE)

14:00

A new murine polytrauma model of TBI, SCIs and femoral fracture for the study of complex pathophysiological interaction between central nervous system and peripheral organs

P. Köhli, E. Otto, A. Rahmani, D. Jahn, J. Appelt, M. Fuchs, V. Hubertus, P. Vajkoczy (Berlin/DE), J. Keller (Hamburg/DE), M. Pumberger, S. Tsitsilonis (Berlin/DE)

14:10

Characterising immune cell recruitment and activation states in humanised mice with spinal cord injury

E. Gillespie, L. Grice, T. Hassall, K. Radford, Q. Nguyen, M. J. Ruitenberg (Brisbane/AU)

14:20

ID 66

Functional recovery in relation to the posttraumatic restitution of the blood-spinal-cord-barrier after experimental spinal cord injury in the mouse

L. Meyer, L. Waldmann, N. Taheri, L. Roolfs, K. Kersting, M. Nieminen-Kelhä, I. Kremenetskaia, A. Ghorri, A. Rex (Berlin/DE), M. Fehlings (Toronto/CA), P. Vajkoczy, V. Hubertus (Berlin/DE)

14:30

Sonic Hedgehog improves locomotor function recovery and reduces the inflammatory response in an experimental spinal cord injury model

M. Tail, H. Zhang, G. Zheng, A.-K. Harms, M. Hatami, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)

- 14:40 Understanding lymphopenia – flow cytometric profiling of peripheral blood mononuclear cells from traumatic spinal cord injury patients
T. Jogia (Brisbane/AU), T. Lübstorf (Berlin/DE), E. Jacobson, E. Scriven, S. Atresh, D. Sester, E. Kuilamu, W.-C. Jung, E. Gillespie, Q. Nguyen (Brisbane/AU), T. Liebscher (Berlin/DE), J. M. Schwab (Columbus, OH/US, Berlin/DE), M. A. Kopp (Berlin/DE), J. Walsham, K. Campbell, M. J. Ruitenberg (Brisbane/AU)
- 14:50 Neurofilament light and glial fibrillary acidic protein are biomarkers of acute spinal cord injury
S. Stukas, J. Cooper, Ja. Gill, N. Fallah, M. Skinnider, L. Belanger, L. Ritchie, A. Tsang, K. Dong, F. Streijger, J. Street, S. Paquette, T. Ailon, N. Dea, R. Charest-Morin, C. Fisher (Vancouver/CA), C. Bailey (London/CA), S. Dhall (San Francisco, CA/US), J.-M. Mac-Thiong (Montréal/CA), J. Wilson (Toronto/CA), S. Christie (Halifax/CA), M. Dvorak, C. Wellington, B. Kwon (Vancouver/CA)
- 15:00
 ID 67 Evolutionarily conserved blood transcriptomic signatures as diagnostic biomarkers and pharmacological targets for spinal cord injury
 K. Fond, M. McCune, M. Por, P. Schupp, A. Torres-Espin, Am. Lin, C. Omondi, A. Ferguson, J. Bresnahan, M. Oldham, M. Beattie, N. Kyritsis (San Francisco, CA/US)
- 15:10 Severe pressure ulcers requiring surgery impair the functional outcome after acute spinal cord injury – implications for caregivers
M. Donhauser (Murnau/DE), L. Grassner (Murnau/DE, Innsbruck/AT), B. Klein (Innsbruck/AT), M. Voth (Frankfurt a. M./DE), O. Mach, M. Vogel, D. Maier (Murnau/DE), D. Schneidmüller (Murnau, Frankfurt a. M./DE)
- 15:20 Current practice of acute spinal cord injury management – results of an international survey
N. Hejrati, A. Moghaddamjou (Toronto/CA), J. Guest (Miami, FL/US), B. Kwon (Vancouver/CA), J. Harrop (Philadelphia, PA/US), V. Rahimi-Movaghar (Tehran/IR), S. Kurpad (Wauwatosa, WI/US), B. Aarabi (Baltimore, MD/US), M. Fehlings (Toronto/CA)

16:00–17:30

Berlin 1–3

Chair

Plenary session 6**Neuroprotection SCI and TBI**

N. Plesnila (Munich/DE), E. Shohami (Jerusalem/IL)

16:00

ID 15

Operation brain trauma therapy and beyond

P. M. Kochanek (Pittsburgh, PA/US)

16:22

TRACK-NET – a phase 2 master platform clinical trial network using biomarkers for TBI

D. O. Okonkwo (Pittsburgh, PA/US)

16:44

ID 16

Novel endogenous targets to promote neuroprotection in traumatic spinal cord injury

S. Karimi (Winnipeg/CA)

17:06

ID 17

TBI neuroimmune interactions – From the brain to body, and back again!

D. J. Loane (Dublin/IE)

17:30–17:45

Berlin 1–3

Farewell & award ceremony

N. Plesnila (Munich/DE), A. Unterberg (Heidelberg/DE),

K. Zweckberger (Braunschweig/DE)

The ePosters marked with times on the following pages will be presented as short presentations during the ePoster sessions by the authors.

17:30–18:30**ePoster session 1**

Paris

Clinical and experimental spinal cord injury

Chair

M. Khazaei (Toronto/CA), B. D. Semple (Melbourne/AU)

17:30
ID 39

Experimental spinal cord injury reveals novel heterogenic monocyte subpopulations in peripheral blood

S. Jenkner, J. Clark, S. Gronthos, R. Grose, M. Lewis, R. O'Hare Doig (Adelaide/AU)

17:35

Investigating the potential of gelatin methacrylate hydrogels as a drug delivery platform for preclinical spinal cord injury

C. Walsh (Dublin/IE), J. Wychowaniec (Davos/CH), D. Brougham, D. Dooley (Dublin/IE)17:40
ID 40

Characterising a murine model to diagnose and study concomitant spinal cord and brain injuries – Do co-occurring injuries affect deficits?

B. Kondiles, M. Anwer, W. H. Cheng, J. Fan, J. C. Barron, K. A. McInnes, H. Cheung, J. Earle, P. Cripton, C. Wellington, W. Tetzlaff (Vancouver/CA)17:45
ID 41An implanted spinal window chamber allows for chronic longitudinal *in vivo* microscopy following experimental spinal cord injury in the mouseL. Roofls, N. Taheri, L. Meyer, L. Waldmann, K. Kersting, M. Nieminen-Kelhä, K. C. Fischer, C. Uhl, J.-E. Ode, A. Rex (Berlin/DE), M. Fehlings (Toronto/CA), P. Vajkoczy, V. Hubertus (Berlin/DE)

17:50

Repurposing the astroglial scar after spinal cord injury by conversion of astrocytes to neurons – a proof-of-concept *in vitro* studyH. Wang, X. Zhou, G. Zheng, M. Hatami, A. Schnaubelt, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)

17:55

Acute Baclofen administration promotes functional recovery after spinal cord injury

N. de Sousa, A. G. Pinho, S. Monteiro, V. Liberato, D. J. Santos, J. Campos, J. R. Cibrão, N. A. Silva (Braga/PT), A. Barreiro-Iglesias (Santiago de Compostela/ES), A. J. Salgado (Braga/PT)

18:00

Systemic application of IL-4 attenuates secondary local inflammation processes and is associated with enhanced functional recovery after traumatic spinal cord injury in rats

S. Heene, O. Alhalabi, G. Zheng, X. Zha, L. Ruebenacker, J. Walter, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)

- 18:05
ID 42 Digestion of chondroitin sulphate proteoglycans by AAV5-ADAMTS4 gene therapy enhances non-neuronal responses to contusive spinal injury
C. Clemett, J. Sheehan, B. Fackelmeier, D. Fong, A. Mouravlev, D. Young, S. O'Carroll (Auckland/NZ)
- 18:10 New approach to modulate inflammatory processes after acute SCI – low dose lipopolysaccharide enhanced effects of G-CSF and bone marrow mesenchymal stem cell transplantation – ameliorate pathological changes and enhanced functional recovery
S. Hashemizadeh, M. Hadjighassem (Tehran/IR)
- 18:15 Influence of Substance P on early secondary injury processes after traumatic spinal cord injury
C. Wieckhusen, G. Zheng, H. Wang, O. Alhalabi, S. Heene, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)
- 18:20 Wearable powered exoskeletons for gait training in tetraplegia – a systematic review on feasibility, safety and potential health benefits
G. Rodríguez Tapia, I. Dumas (Brussels/BE)
- 18:25 Imaging strategies to identify cerebral infarction due to vertebral artery damage associated with blunt cervical spine injury
M. Ohtake, S. Ishikawa, T. Akimoto, T. Kawasaki, W. Shimohigoshi, T. Kawasaki, K. Sakata, M. Matsumoto, I. Takeuchi, T. Yamamoto (Yokohama/JP)

Self-study ePosters will not be presented as short presentation, but can be viewed.

ePoster self-study 1

- ID 68 Results in C1-C2 stabilisation according to the Goel/Harms-technique
F. Kilian, B. Bruchmann (Koblenz/DE)
- Is posterior C2-3 fusion a more rational way to address unstable Hangman's fracture?
K. Madhivanan, P. Salunke, S. Sahoo, P. K. Prasad (Chandigarh/IN)
- ID 69 Efficacy and safety of endovascular vertebral artery occlusion for traumatic vertebral artery injury
S. Miyamoto, A. Marushima, T. Takahashi, S. Nakao, Y. Watanabe, Y. Matsumoto, Y. Yanagisawa, H. Hosoo, Y. Ito, M. Hayakawa, E. Ishikawa, T. Inoue, Y. Matsumaru (Tsukuba/JP)

The CatWalk XT® gait analysis – a reliable behavioral assessment for severe thoracic spinal cord injury in rats

G. Zheng, H. Zhang, M. Tali, T. Skutella, K. Zweckberger, A. Unterberg, A. Younsi (Heidelberg/DE)

Targeted delivery of acrolein scavenger hydralazine in spinal cord injury using folate-drug conjugation

S. Herr, T. Mullin, S. Gardeen, P. Low, R. Shi (West Lafayette, IN/US)

Activation of the Shh-Pathway is associated with pro-neuronal differentiation, increased survival, and proliferation of neural progenitor cells under inflammatory stress *in vitro*

M. Tail, H. Zhang, G. Zheng, M. Hatami, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)

Biomaterial scaffold for axonal regeneration in complete spinal cord injury models

S. Park, J. K. Hyun (Cheonan/KR)

Deep learning based prediction of Decubitus Ulcer in patients with spinal cord injury

Y. Kim (Cheonan/KR), H.-Y. Jung, S. J. Park (Daejeon/KR), J. K. Hyun (Cheonan/KR)

The ePosters marked with times on the following pages will be presented as short presentations during the ePoster sessions by the authors.

17:30–18:30

ePoster session 2

London
Chair

Clinical TBI – diagnostics and treatment of mild TBI

L. Lippa (Senese/IT), T. Luoto (Tampere/FI)

17:30
ID 43

Using magnetic resonance imaging and big data machine learning to detect structural damage in patients with concussion

N. Simard (Hamilton/CA), D. A. Kumbhare (Toronto, Hamilton/CA), S. Ulmer (Kiel/DE, Zurich/CH, Hamilton/CA), M. D. Noseworthy (Hamilton/CA)

17:35

Disturbances of functional connectivity between default mode network and cerebellar structures in patients with mTBI in acute stage – rsfMRI and DTI study

M. Ublinskiy, N. Semenova, T. Akhadov, I. Melnikov, A. Manzhurtsev (Moscow/RU)

17:40
ID 44

Are mild traumatic brain injury and concussion separate entities? – a pilot study using fMRI

S. McCabe, J.-K. Chen, R. Singh Saluja, A. Ptito (Montréal/CA)

17:45

Serum NfL and GFAP trajectories after sports-related concussion in Australian football players

W. O'Brien, J. Bain, S. Mutimer, S. Brady, B. Major, D. Cappellari, V. Somma, T. Gore, B. Mitra, T. O'Brien, S. Shultz, S. McDonald (Melbourne/AU)

- 17:50
ID 45 An open-access data set to investigate the effects of repetitive sub concussive head impacts in sports on brain microstructure
A. Kwiatkowski (Aachen/DE), U. Habel (Aachen, Juelich/DE), S. Romanzetti, C. Huppertz (Aachen/DE)
- 17:55 Efficacy of neurosurgeons' direct intervention to sports organisations on the social awareness of sports head injuries in Japan
H. Nakayama, Y. Hiramoto, S. Sato, N. Kushida, S. Fujita, Y. Hirata, N. Saito, M. Hayashi, K. Ito, T. Sakurai, S. Iwabuchi (Tokyo/JP)
- 18:00 Aberrant basal ganglia resting state functional connectivity is related to walking performance in veterans with mTBI
M. Newsome, Q. Liu (Houston, TX/US), E. Wilde (Salt Lake City, UT/US, Houston, TX/US), J. Steinberg (Richmond, VA/US), D. Tate (Salt Lake City, UT/US), N. Davenport (Minneapolis, MN/US), J. Rowland (Salisbury, NC/US, Richmond, VA/US), S. Martindale (Salisbury, NC/US), C. Hodges (Salt Lake City, UT/US), R. Scheibel, H. Levin (Houston, TX/US), K. Kenney, K. Werner (Bethesda, MD/US), A. Mayer (Albuquerque, NM/US), C. Jaramillo (San Antonio, TX/US), W. Walker (Richmond, VA/US)
- 18:05 Quantitative pupillometry in patients with mild traumatic brain injury: a prospective pilot study
P. Lengua, P. Naser, M. Ivren, J. Martin, J. Neumann, A. Unterberg, C. Beynon (Heidelberg/DE)
- 18:10 Mild TBI patients who deteriorate and require neurorehabilitation: long-term functional and quality of life outcome
K. Rauen (Zurich/CH, Munich, Bad Aibling/DE), L. Reichelt (Bad Aibling, Munich/DE), P. Probst (Munich/DE), B. Schäpers, F. Müller (Bad Aibling/DE), K. Jahn (Munich, Bad Aibling/DE), N. Plesnila (Munich/DE)
- 18:15 Management of prolonged recovery after a mild traumatic brain injury: a national survey of clinical practice in the United Kingdom and Ireland
E. Karvandi, P. Hutchinson, A. Helmy (Cambridge/GB)
- 18:20 Care paths, clinical management and decision making in 740 mild TBI patients presenting to a neurosurgical emergency department
T. Schink, S. Bahtijari, A. Unterberg, A. Younsi (Heidelberg/DE)
- 18:25 Treating neurotrauma without neurosurgeon – the experience of a new level II trauma center
I. Zoarets (Ashdod, Be'er Sheva/IL), R. Abu Swai, D. Bider (Ashdod/IL), R. Ayalon (Petah-Tikva/IL)

Self-study ePosters will not be presented as short presentation, but can be viewed.

- ePoster self-study 2**
- ID 71 Using complexity analysis of resting state functional magnetic resonance imaging and machine learning to detect functional damage in patients with concussion
N. Simard (Hamilton/CA), D. A. Kumbhare (Hamilton, Toronto/CA),
 S. Ulmer (Hamilton/CA, Zurich/CH, Kiel/DE), M. D. Noseworthy (Hamilton/CA)
- Beyond conventional MRI – improving sensitivity in mTBI imaging of individual patients – a case-control-study
S. Ulmer (Zurich/CH, Kiel/DE), A. Palla, C. Fuchs (Zurich/CH), N. Simard,
 M. D. Noseworthy (Hamilton/CA)
- Evaluation of oculomotor functions as a diagnostic tool in mTBI – a pilot study using fMRI
 E. Lunkova, A. Ptitto, R. S. Saluja (Montreal/CA)
- ID 70 Impact of hypertonic solutions treatment in symptomatic mild traumatic brain injury patients with non-surgical abnormal CT findings
S. Calero (Cali/CO, Jena/DE), D. Sanchez, A. Villota, A. Clavijo (Cali/CO),
 A. Rubiano (Cambridge/DE, Cali/CO)

The ePosters marked with times on the following pages will be presented as short presentations during the ePoster sessions by the authors

- 17:30–18:30 ePoster session 3**
 Moscow **Clinical TBI: management and outcome**
 Chair A. Figaji (Cape Town/ZA), J. Walter (Heidelberg/DE)
- 17:30 Traumatic brain injury patients with and without focal lesions have similar cognitive deficits and widespread diffuse axonal injury
N. Bourke, K. Zimmerman, R. Ibitoye, E.-J. Mallas, L. Li, P. Jenkins,
 D. Sharp (London/GB)
- 17:35 Exploring interactions between traumatic brain injury and cognitive comorbidity: descriptive case analysis from real-world monitoring
 M. Parkinson, F. Curtis, M. Dani, M. Fertleman, M. Kolanko, E. Soreq,
 P. Barnaghi, D. Sharp, L. Li (London/GB)
- 17:40 Reduced speaking rate in persons with traumatic brain injury is
 ID 46 induced by underlying cognitive impairment – evidence from differential impact of task demands
A. L. Zaninotto, M. Eshghi (Boston, MA/US), V. Mayer, D. de Carvalho,
 W. Silva Paiva (São Paulo/BR), J. R. Green (Boston, MA/US)

- 17:45
ID 47 Cortical reorganisation after traumatic brain injury predicts verbal fluency outcomes
A. L. Zaninotto, N. Prunier (Boston, MA/US), F. Macruz (São Paulo/BR), F. Feltrin (Dallas, TX/US), C. Andrade, C. S. Leite, V. Guirado, W. Silva Paiva (São Paulo/BR), S. Bouix (Boston, MA/US)
- 17:50 Fixel-based analysis of the diffuse axonal injuries in patients with traumatic brain injury and chronic health symptoms
M. Adamson (Palo Alto, Stanford, CA/US), X. Kang (Palo Alto, CA/US), J. Coetzee (Palo Alto, Stanford, CA/US)
- 17:55 Timing and value of early MRI in severe traumatic brain injury
D. Pinggera, C. Preuss-Hernandez, R. Beer, C. Thomé, O. Petr (Innsbruck/AT)
- 18:00
ID 48 Association of initial trauma characteristics in severe traumatic brain injury with long term clinical outcomes and markers of neurodegeneration and neuro-inflammation – a pilot study
S. Friberg, C. Lindblad (Stockholm/SE), F. Zeiler (Winnipeg/CA), P. Svenningsson, T. Granberg, F. Piehl, E. Thelin (Stockholm/SE)
- 18:05 *Helicobacter pylori* infection with circulating miRNA changes is associated with the outcome in elder traumatic brain injury patients-experience from China National Clinical Research Center for Neurological Diseases
X. Mao (Beijing/CN)
- 18:10 Impact of Eppendorf Cologne Score vs. Glasgow Coma Score on predicting mortality in paediatric cases of severe traumatic brain injury
P. Emami, M. Westphal (Hamburg/DE), R. Lefering (Cologne/DE), M. Hoffmann, P. Czorlich (Hamburg/DE)
- 18:15
ID 49 MAST Trials – strengthening the evidence behind the use of antiepileptic drugs in TBI patients
E. Viaroli, H. Mee, C. Turner, A. Koliass, P. Hutchinson (Cambridge/GB)
- 18:20 Concomitant spine trauma in patients with traumatic brain injury: patient characteristics and outcome
O. Alhalabi, L. Riemann, A. Unterberg, A. Younsi (Heidelberg/DE), CENTER-TBI and Participants (Antwerp/BE)
- 18:25
ID 50 Global consensus-based registry for traumatic brain injury – GEO-TBI
T. Korhonen, S. Gnanakumar, D. Clark, A. Koliass, T. Bashford, K. Budohoski, R. Trivedi, D. Menon, P. Hutchinson, A. Joannides (Cambridge/GB)

Self-study ePosters will not be presented as short presentation, but can be viewed

ePoster self-study 3

Traumatic brain injury in the post-COVID era – the role for blood-based protein biomarkers in diagnosis, prognosis, treatment and assessment of the biological reserve

D. Agoston (Bethesda, WI/US)

MRI evaluation and guidelines for the management of growing skull fractures
G. Krishna, I. Singh, S. Rohilla (Rohtak/IN)

Impact of social media in promoting awareness of the fencing response and traumatic brain injury

K. R. Giordano, K. L. Roe, G. A. Ezzell, J. Lifshitz (Phoenix, AZ/US)

Informed consent procedures for emergency interventional research in patients with traumatic brain injury and ischaemic stroke

J. van Dijck (Leiden/NL), E. Kompanje, V. Chalos, S. van den Berg, P. Janssen (Rotterdam/NL), P. Nederkoorn (Amsterdam/NL), M. van der Jagt (Rotterdam/NL), G. Citerio, N. Stocchetti (Milan/IT), D. Dippel (Rotterdam/NL)

Neurotrauma care in low resource settings

T. Khan (Peshawar/PK)

Traumatic brain injury management in an Indian tertiary trauma care center: challenges and solutions

K. Madhivanan, S. K. Gupta, P. Salunke, S. Dhandapani (Chandigarh/IN)

The incidence of surgically treated post-traumatic hydrocephalus six months following a CT-scanned head injury

A. Heinonen, M. Rauhala (Tampere/FI), H. Isokuortti (Helsinki/FI), A. Kataja, M. Nikula, J. Öhman (Tampere/FI), G. Iverson (Boston, Charlestown, MA/US), T. Luoto (Tampere/FI)

The cognitive status of chronic subdural haematoma patients after treatment: a case control study

J. Blaauw (Groningen/NL), D. Holl (Rotterdam/NL), B. Jacobs (Groningen/NL), H. den Hertog (Zwolle/NL), H. Lingsma (Rotterdam/NL), J. van der Naalt (Groningen/NL)

A reliable grading system for prediction of chronic subdural haematoma recurrence requiring reoperation after initial burr-hole surgery

M. Stanisic, A. H. Pripp, J. Ivanovic (Oslo/NO)

Prolonged neurorehabilitation predicts neuropsychiatric long-term outcome after traumatic brain injury

K. Rauen (Zurich/CH, Bad Aibling, Munich/DE),
L. Reichelt (Bad Aibling, Munich/DE), P. Probst (Munich/DE),
A. Younsi (Heidelberg/DE), M. Claussen (Zurich/CH), B. Schäpers,
F. Müller (Bad Aibling/DE), K. Jahn (Bad Aibling, Munich/DE),
N. Plesnila (Munich/DE)

Birth order and the risk of paediatric traumatic brain injury

M. Omer (Heidelberg/DE), J. Posti (Turku/FI), M. Gissler (Turku, Helsinki/FI),
M. Merikukka (Helsinki/FI), T. Bärnighausen, M. Lowery Wilson (Heidelberg/DE)

Early inpatient rehabilitation and outcome in patients with severe traumatic brain injury

B. Frank, C. von Thomsen (Leezen/DE)

ID 72

Functional outcomes and wellbeing after traumatic brain injury in elderly patients – a 6-month follow-up prospective study

R. A. Gavrilă Laic, D. Bruyninckx, P. Lebegge, J. Vander Sloten,
B. Depreitere (Leuven/BE)

Successful rehabilitation of a patient with severe closed head injury – a case-report

K. Manyшева, N. Alieva (Makhachkala/RU)

The ePosters marked with times on the following pages will be presented as short presentations during the ePoster sessions by the authors.

17:30–18:30

ePoster session4

Paris

Clinical TBI – surgical and neurointensive care

Chair

C. Beynon (Heidelberg/DE), S. Wolf (Berlin/DE)

17:30

Post-traumatic cranial reconstruction using a 3D printed

ID 60

polycaprolactone implant after burr hole trephination

Y. Ming, Y. W. Eugene, V. Nga, Y. T. Tsai (Singapore/SG)

17:35

Is pre-injury socioeconomic status associated with outcomes in patients with traumatic brain injury? A systematic review

S. Venturini (Cambridge, Manchester/GB), M. Still (Gainesville, FL/US),

P. Hutchinson (Cambridge/GB), J. M. Gwinnutt (Manchester/GB)

- 17:40 A comparison of brain oxygen optimisation clinical trial design and enrollment: BOOST-3 and BONANZA
A. Puccio, L. Shutter (Pittsburgh, PA/US), A. Udy, D. J. Cooper, S. Vallance (Melbourne/AU), W. Barsan (Ann Arbor, MI/US), S. Yeatts (Charleston, SC/US), R. Diaz-Arrastia (Philadelphia, PA/US)
- 17:45 Pupil constrictor rate and pupil constrictor velocity correlate with severity of traumatic brain injury – a retrospective study
J. Nakao, A. Marushima, H. Takahashi, A. Muroi, Y. Inoue, Y. Matsumaru, E. Ishikawa (Tsukuba/JP)
- 17:50 Impact of sedative and vasopressor agents on cerebral physiology and ID 61 cerebrovascular reactivity in TBI – an exploration into continuous data analysis
L. Froese, A. Gomez, A. S. Sainbhi, C. Batson, K. Stein, T. Slack (Winnipeg/CA), F. Zeiler (Winnipeg/CA, Cambridge/GB)
- 17:55 Incidence and associated factors of anemia in patients with acute moderate and severe traumatic brain injury
H. Vanhala, E. Junttila, A. Kataja, H. Huhtala (Tampere/FI), T. Luostarinen (Helsinki/FI), T. Luoto (Tampere/FI)
- 18:00 Continuous monitoring of cerebral metabolic changes in traumatic brain injury using a microdialysis-coupled mid-infrared sensor
C. Zimphango, F. Alimaghani, M. Killen, A. Zakrzewska, N. Marco-García (Cambridge/GB), T. Hutter (Austin, TX/US), K. Carpenter, P. Hutchinson (Cambridge/GB)
- 18:05 An outlier analysis for blood biomarkers of moderate and severe traumatic brain injury
O. Korhonen, M. Mononen, O. Tenovuori, M. Mohammadian (Turku/FI), D. Menon, V. Newcombe, P. Hutchinson (Cambridge/GB), H. Zetterberg, K. Blennow (Gothenburg/SE), J.-C. Sanchez (Geneva/CH), J. Posti (Turku/FI)
- 18:10 Serum biomarkers for risk assessment of intra-hospital mortality in intensive care unit treated patients with isolated traumatic brain injury
K. Haferkorn (Giessen/DE), M. Friedrich (Giessen, Aschaffenburg/DE), M. Stein, E. Uhl, M. Bender (Giessen/DE)
- 18:15 The use of Biperiden as an antiepileptogenic drug in patients with moderate or severe traumatic brain injury
M. Teichner de Moraes, M. Licia Foresti, A. Ferreira de Andrade, W. Silva Paiva, M. Jacobsen Teixeira, E. Garzon, L. E. Araujo De Moraes Mello (São Paulo/BR)

- 18:20 Safety and efficacy of C1-inhibitor in traumatic brain injury (CIAO@TBI): study protocol for a randomised, placebo-controlled, multi-center trial
I. van Erp, T. van Essen, K. Fluiter, E. van Zwet, P. van Vliet, F. Baas (Leiden/NL), I. Haitsma (Rotterdam/NL), D. Verbaan, B. Coert (Amsterdam/NL), G. de Ruiter, W. Moojen (Leiden/NL), M. van der Jagt (Rotterdam/NL), W. Peul (Leiden/NL)
- 18:25 How frequent is mitochondrial dysfunction in patients with severe traumatic brain injury undergoing multimodality-directed therapy?
S. Venturini, K. Carpenter, P. Hutchinson, M. R. Guilfoyle, A. Helmy (Cambridge/GB)

Self-study ePosters will not be presented as short presentation, but can be viewed.

ePoster self-study 4

Expert consensus on the standard technique of large craniotomy for adult severe traumatic brain injury in China

X. Mao, B. Liu (Beijing/CN)

- ID 74 Three-dimensional printing in cranial trauma – history and future applications in cranioplasty surgery
A. Vogt (Cambridge/GB), S. Kanthasamy (Cambridge, Leicester/GB), B. Smith (Cambridge/GB)

Traumatic brain injury with rupture of the superior longitudinal sinus, prolonged surgery for acute trauma – case report

E. Villarreal Garcia (Durango/MX)

Unusual median neuropathy pattern: suggestive of marinacci anastomosis: a case report

S. Rahimi-Dehgolan (Tehran/IR), M. A. Babaki (Tehran/IR)

Spontaneous migration of a falling bullet in the cerebellum reveals the importance of intraoperative skull X-ray

A. Hammed, M. Mahfoud (Lattakia/SY)

Microdialysis-based classification of abnormal metabolic states following traumatic brain injury – a systematic review of the literature

S. Venturini, F. Bhatti, K. Carpenter, P. Hutchinson, M. R. Guilfoyle, I. Timofeev, A. Helmy (Cambridge/GB)

- ID 73 Sex steroids therapy using nanomedicine – A path for neurotrauma?
M. Fataki Likale (Sion/CH)

Levels of circulating cytokines measured acutely following traumatic brain injury do not improve on the pronostication of canonical neurodegenerative biomarkers for neurological outcome – a TRACK-TBI prospective cohort study
C. Lynch (Philadelphia, PA/US), J. Yue (San Francisco, CA/US),
 A. Schneider (Philadelphia, PA/US), F. Korley (Ann Arbor, MI/US),
 A. Puccio (Pittsburgh, PA/US), E. Yuh (San Francisco, CA/US),
 X. Sun (San Diego, CA/US), M. Rabinowitz (Pittsburgh, PA/US), M. J. Vassar,
 S. R. Taylor, E. Winkler (San Francisco, CA/US),
 R. C. Puffer (Pittsburgh, PA/US, Rochester, MN/US), H. Deng (Pittsburgh, PA/US),
 M. McCrea (Milwaukee, WI/US), M. B. Stein (San Diego, CA/US), C. S. Robertson,
 H. Levin (Houston, TX/US), S. Dikmen, N. R. Temkin (Seattle, WA/US),
 J. T. Giacino (Boston, MA/US), P. Mukherjee (San Francisco, CA/US),
 K. Wang (Gainesville, FL/US), D. O. Okonkwo (Pittsburgh, PA/US),
 A. Markowitz (San Francisco, CA/US), S. Jain (San Diego, CA/US),
 G. Manley (San Francisco, CA/US), R. Diaz-Arrastia (Philadelphia, PA/US)

Postoperative lumbar CSF leakage in a young woman with almost fatal brain herniation
 F. Epping (Luebeck/DE)

The ePosters marked with times on the following pages will be presented as short presentations during the ePoster sessions by the authors.

17:30–18:25

ePoster session 5

London
 Chair

Experimental TBI – diagnostics and treatments

I. Khalin (Munich/DE), P. M. Kochanek (Pittsburgh, PA/US)

17:30

Ethanol intoxication exerts distinct effect on blood-based biomarkers of cerebral injury in a mouse model of TBI
 Z. Li (Ulm/DE, Kaifeng/CN), J. Zhang, M. Huber-Lang (Ulm/DE),
 M. Otto (Halle a. d. S./DE), F. Roselli, F. Olde Heuvel (Ulm/DE)

17:35

Brain natriuretic peptide – potential reliable biomarker of traumatic acute subdural haematoma
M. Chihji, U. Sure, R. Jabbarli (Essen/DE)

17:40

The gut microbiome mediates social behaviour recovery from repetitive mild traumatic brain injury in adolescent rats
M. Sgro, Z. Kodila, G. Yamakawa, R. Mychasiuk (Melbourne/AU)

17:45
 ID 62

Timing of return to exercise after rTBI shapes inflammation and pain sensitivity in adolescent female rat athletes
M. Smith, H. Robert, J. Bailard, P. Flores, L. Ferguson,
 M. Prins (Los Angeles, CA/US)

- 17:50
ID 63 Optimising choice and timing of behavioral outcome tests following repetitive mild traumatic brain injury – a machine learning-based approach on multiple preclinical experiments
P. Lassarén (Stockholm/SE), G. Conley, M. Boucher, A. N. Conley, J. Qiu, R. C. Mannix (Boston, MA/US), E. Thelin (Stockholm/SE)
- 17:55 Target arterial oxygen pressure (paO₂) and acute subdural haematoma with hemorrhagic shock in pigs with pre-existing atherosclerosis
T. Datzmann, S. Zuech, T. Thebrath, R. Mathieu, S. Mayer, A. Hoffmann, M. Gröger, E. Calzia, P. Radermacher, T. Kapapa (Ulm/DE)
- 18:00 The nongenomic neuroprotective effects of estrogen, E2-BSA, and G1 following traumatic brain injury – PI3K/Akt and histopathological study
L. Amirkhosravi, M. Khaksari, S. Dabiri (Kerman/IR)
- 18:05 Positive effects of $\alpha 7$ nicotinic acetylcholinergic receptor modulation and environmental enrichment on sustained attention, cholinergic neurotransmission, and systemic inflammation after controlled cortical impact injury
N. Race, E. Moschonas, P. L. Rennerfeldt, R. Reddy, T. Ranellone, E. Annas, J. Cheng, S. Carlson, C. E. Dixon, A. Kline, C. Bondi (McMurray, PA/US)
- 18:10 The effect of environmental enrichment and social stimulation on hippocampal CYP1B1 and COX-2 expression following a fimbria-fornix lesion in rats
E. Lidin (Stockholm/SE), M. Gajhede Gram, H. Malá Rytter, J. Mogensen (Copenhagen/DK), M. Risling, M. K. Sköld (Stockholm/SE)
- 18:15 Human induced neurons in the study of emulated secondary injuries of traumatic brain injury and exploration of neurotherapeutics
C. Hall, K. Baranes, M. Killen, M. Kotter, K. Carpenter, P. Hutchinson (Cambridge/GB)
- 18:20 Reprogramming of astrocytes to neuronal precursor cells using lentiviral vectors for the potential treatment of CNS injuries
A. Schnaubelt, X. Zhou, G. Zheng, M. Hatami, H. Wang, T. Skutella, A. Unterberg, K. Zweckberger, A. Younsi (Heidelberg/DE)

Self-study ePosters will not be presented as short presentation, but can be viewed.

ePoster self-study 5

- ID 75 Novel, interesting, surprising and useful properties of a panel of NF-L monoclonal antibodies
G. Shaw, I. Madorsky, Y. Li, Y. S. Wang, S. Rana, D. Fuller (Gainesville, FL/US)
- Distinction between vasogenic and cytotoxic brain edema formation after experimental TBI by free water diffusion MRI
S. Hu, C. Exner, F. M. Boldoczki, Y. Guo (Munich/DE), M. Duering (Basel/CH), N. Plesnila, S. Schwarzmaier (Munich/DE)

A novel rat model of heterotopic ossification after polytrauma with traumatic brain injury

K. Wong, S. McDonald, P. Lee, D. Robinson, S. Shultz, R. Brady (Melbourne/AU)

Localised, time-dependent responses of rat cranial bone to repeated mild traumatic brain injuries

L. K. Dill, N. Sims, A. Shad (Melbourne/AU), C. Anyaegbu, A. Warnock, Y. Mao, M. Fitzgerald (Bentley, Nedlands/AU), B. D. Semple (Melbourne/AU)

Serum neurofilament light as a biomarker of vulnerability to repeated mild traumatic brain injury

W. O'Brien, A. LJJ. van Emmerik, J. Bain, R. Mychasiuk, M. Monif, S. Shultz, S. McDonald (Melbourne/AU)

Stimulating recovery – chronic intracerebroventricular administration of modafinil alters behavioural and immunohistological outcomes following repetitive mild traumatic brain injury in adult rats

J. Christensen, C. Li, G. Yamakawa, S. Shultz, R. Mychasiuk (Melbourne/AU)

Chronic intracerebroventricular administration of orexin – a does not modify behavioural outcomes following repetitive mild traumatic brain injury in rats

C. Li, J. Christensen, G. Yamakawa, S. Shultz, R. Mychasiuk (Melbourne/AU)

Short-chain fatty acids rescue neurogenesis and fear memory impaired by gut microbial dysbiosis after TBI

M. Celorrio-Navarro, K. Shumilov Bartenev, S. Xiao, S. Friess (St. Louis, MO/US)

The ePosters marked with times on the following pages will be presented as short presentations during the ePoster sessions by the authors.

17:30–18:30

ePoster session 6

Moscow

Experimental TBI – mechanisms and methods

Chair

S. Liraz-Zaltsman (Jerusalem/IL), A.-L. Sirén (Wuerzburg/DE)

17:30

EPO has potentially neuroprotective effects on astrocytes in ischemia via metabolism, sodium pump function and glutamate uptake

J. Blixt (Solna/SE), Y. Song (Stockholm/SE), M. Wanecek (Solna/SE), E. Gunnarson (Stockholm/SE)

17:35

Inflammatory modulation of probiotics after TBI through the gut microbiome

L. M. Rojas Valencia, K. R. Giordano, J. B. Ortiz, B. R. Tallent, D. R. Griffiths, J. Lifshitz (Phoenix, AZ/US)

- 17:40 Dopamine 2 receptors modulate GABAergic neurotransmission after focal cortical injury
D. Talhada, G. Michalettos, R. Nilsson, S. Walter, T. Wieloch, N. Marklund, K. Ruscher (Lund/SE)
- 17:45 Inoculation of human TBI-generated tau induces cognitive deficits and widespread tau pathology in wild-type mice
G. Vegliante, S. Gianoncelli, E. Restelli, I. Bertani, I. Lisi, F. Paredi, F. Ortolano, M. Carbonara, R. Chiesa, E. Roncati Zanier (Milan/IT)
- 17:50 Effect of traumatic brain injury and cortical spreading depolarisation on mitochondrial function
G. van Hameren, A. Friedman (Halifax/CA)
- 17:55 Traumatic brain injury and its effects on the reaction of glial cells
E. Nespoli, M. Hakani, T. M. Hein, P. Wehrich, B. Baumann, T. Wirth, L. Dimou (Ulm/DE)
- 18:00 The impact of a pre-existing *Toxoplasma gondii* infection on traumatic brain injury outcomes in mice
T. L. Baker, M. Sun (Melbourne/AU), B. D. Semple, R. Brady (Melbourne, Parkville/AU), A. D. Uboldi, S. Tyebji, S. McDonald, C. J. Tonkin, R. Mychasiuk (Melbourne/AU), S. Shultz (Melbourne, Parkville/AU)
- 18:05 Functional and biomechanical characterisation of CHIMERA murine model to investigate effect of impact direction in traumatic brain injury
M. Anwer, W. H. Cheng, J. Fan, K. A. McInnes, B. Kondiles, J. Earle, J. C. Barron, P. Cripton, C. Wellington (Vancouver/CA)
- 18:10 Perfusion pressure determines vascular integrity and histomorphological quality following perfusion fixation of the brain
M. R. O. Knarr, S. Hu, A. Ertürk, F. Hellal, N. Plesnila, S. Schwarzmaier (Munich/DE)
- 18:15 Assessment of gait and motor function using the CatWalk XT® adds valuable information to the evaluation of secondary brain damage after controlled cortical impact in mice
J. Walter, J. Mende, S. Hutagalung, M. Grutza, A. Younsi, A. Unterberg, K. Zweckberger (Heidelberg/DE)
- 18:20 ID 64 Using cleared tissues to investigate the role of Apolipoprotein E4 in traumatic vascular injury
H. Cheung, M. Anwer, J. Fan, W. H. Cheng, J. C. Barron, C. Wellington (Vancouver/CA)

- 18:25 A new rat model of intimate partner violence related brain injury
 M. Sun, R. Brady, M. Dowling, R. Mychasiuk, S. McDonald (Melbourne/AU),
S. Shultz (Melbourne/AU, Nanaimo/CA)

Self-study ePosters will not be presented as short presentation, but can be viewed.

ePoster self-study 6

Systemic perinatal inflammation followed by jmTBI causes astrocytic and neurovascular alterations

L. Hippauf, T. Clement, C. Dubois, J. Badaut (Bordeaux/FR), A. Delahaye-Duriez, J. Van Steenwinckel (Paris/FR), M.-L. Fournier, J. Aussudre (Bordeaux/FR), C. Blugeon, S. Lemoine, V. Faivre, M. Boccazzi (Paris/FR), J. P. Konsman (Bordeaux/FR), P. Gressens (Paris/FR)

Road to recovery – examining the effects of SHIP-1 on neuroimmune responses after paediatric head injuries

E. Chu, A. Zamani, L. K. Dill, R. Sharma, A. L. Raftery, E. Tsantikos, R. Mychasiuk, M. L. Hibbs, B. D. Semple (Melbourne/AU)

- ID 77 Characterisation of HMGB1 mediated neuroinflammation after modeled TBI
L. Siracusa, A. Baker, E. Park, E. Liu (Toronto/CA)

- ID 76 Comparison of neurovascular pathophysiology following low level primary blast and fluid percussion injury
E. Park, E. Liu, A. Baker (Toronto/CA)

Diffuse traumatic brain injury induces progressive and long-term pericyte loss in the white matter

I. Özen (Lund/SE)

Neural precursor cell activation after concussion – histopathological and metabolic assessments in a mild traumatic brain injury model

S. J. Blaschke, N. Rautenberg (Cologne, Juelich/DE), A. Jendro (Cologne/DE), J. Konrad (Juelich/DE), S. Vlachakis, H. L. Walter (Cologne/DE), S. Krueger (Cologne, Juelich/DE), B. Hoffmann (Juelich/DE), M. Schroeter, H. Endepols, B. Neumaier (Cologne, Juelich/DE), R. Merkel (Juelich/DE), G. R. Fink, M. A. Rueger (Cologne, Juelich/DE)

Increased synapse elimination by chronic microglial activation following single and repetitive mild traumatic brain injury

M. Chahin, J. Mutschler, C. Diertele, V. van Steenberg, F. M. Bareyre (Munich/DE)

Research and development of a highly sensitive single-photon-counting *in vivo* imaging system for diagnosis and analysis of traumatic central nervous system cell injury

A. Wetzel, A. Weber, E. Zhang, T. Engels, Y. Prokazov, W. Zuschratter, B. A. Sabel (Magdeburg/DE)

Sunday, 17 July 2022

18:30–20:00 **Welcome reception**

The organisers welcome all participants of the conference in the foyer. Meet your colleagues and other participants by fresh drinks and snacks.

Location Congress venue/Foyer

Fee Included in the conference fee, 15 EUR for accompanying persons

Tuesday, 19 July 2022

19:30–24:00 **Social evening**

We invite you to join a memorable evening at the Zollpackhof. Enjoy a familiar evening with colleagues and friends, have casual conversations and get to know each other even better – socialise and extend your network at the Zollpackhof across the Chancellery building!

Location Zollpackhof Restaurant

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12:45–13:45

Berlin 1

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New perspectives on the neurosurgical management of intracerebral hemorrhages

J. Beck (Freiburg i. Br./DE)

Penumbra **12:45–13:45**

Berlin 2+3

IRRAS

Early experience with IRRAflow to treat intracranial bleeding and facilitate drug delivery

N. Brandmeir (Morgantown, WV/US)

IRRAS

12:45–13:45

Berlin 1

CSL Behring GmbH

Coagulation disorders in traumatic brain injury: diagnosis and treatment

M. Marietta (Modena/IT)

CSL Behring

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Chair

12:45

Diagnosing coagulopathy in neurotrauma and – surgery by POC-methods
H. Schöchl (Salzburg/AT)

13:05

Treatment of TBI in anticoagulated patients
C. Beynon (Heidelberg/DE)

13:25

Mechanisms of coagulopathy in brain trauma
T. Juratli (Dresden/DE)**12:45–13:45**

Berlin 2+3

Integra

Medicine-based-evidence vs. evidence-based medicine: from changing the treatment paradigm to landmark trials in TBI

INTEGRA 
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12:45

Introduction
E. Tsai (Ottawa/CA)

12:50

SIBICC – Consensus
D. O. Okonkwo (Pittsburgh, PA/US)

13:05

Ongoing research on multimodal neuromonitoring
A. Udy (Melbourne/AU), R. Diaz-Arrastia (Philadelphia, PA/US)

13:25

Discussion

12:45–13:45

Berlin 1

BALT INTERNATIONAL SAS

A cooperative approach for treatment of chronic: subdural haematoma – Skane University Hospital experience



12:45

Management of chronic subdural haematoma – A neurosurgical challenge?
N. Marklund (Lund/SE)

13:10

Endovascular treatment of chronic subdural haematoma
J. Wassélius (Lund/SE)

13:35

Questions & discussion

12:45–13:45

Berlin 2+3

Abbvie

Overcoming the inhibitory environment of the injured spinal cord by targeting RGMA – from basic science to clinical translation



Chair

M. Fehlings (Toronto/CA)

12:45

Welcome and introductions
M. Fehlings (Toronto/CA)

12:50

Introduction to the translational challenges in spinal cord injury
M. Fehlings (Toronto/CA)

13:00

The challenge of the inhibitory micro-environment of the injured spinal cord
S. Karimi (Winnipeg/CA)

13:10

Targeting RGMA in traumatic spinal cord – summary of preclinical translational studies
A. Mothe (Toronto/CA)

13:20

Targeting RGMA in traumatic spinal cord injury – safety and efficacy study of intravenous elezanumab in acute traumatic cervical spinal cord injury (ELASCI)
M. Fehlings (Toronto/CA)

13:30

Discussion



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Nicholas Brandmeir, MD, MS
Associate Professor of Neurosurgery
West Virginia University Hospital



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12:45 to 13:45
room Berlin 1

*A cooperative approach for treatment
of Chronic Subdural Hematoma.
Skane University Hospital experience.*

Management of Chronic
Subdural Hematoma -
a neurosurgical challenge?

*Dr Niklas Marklund –
Skane University Hospital,
Lund, Sweden*

Endovascular treatment of
Chronic Subdural Hematoma.

*Dr Johan Wassélius –
Skane University Hospital,
Lund, Sweden*



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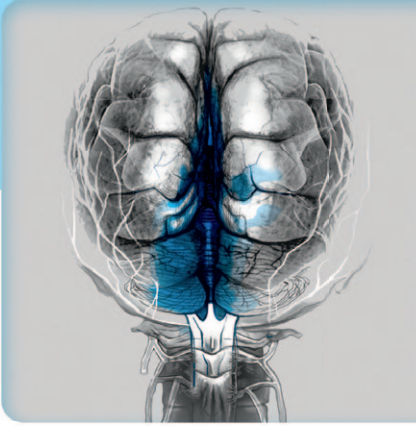
A

A Silva, N.	42	Ashton, N.	21	Beveridge, J.	14
Aarabi, B.	40	Atresh, S.	40	Beynon, C.	12, 28, 45, 49, 59
Abel, L.	24	Aussudre, J.	56	Bhatti, F.	51
Abildskov, T.	33	Ayalon, R.	45	Bider, D.	45
Abu Swai, R.	45			Bigler, E.	16, 25, 33
Adamson, M.	47	B		Billah, T.	25, 33
Adeleye, A.	18	Baas, F.	51	Bittencourt Villalpando, M.	37
Agoston, D.	22, 39, 48	Babaki, M. A.	51	Björkman-Burtscher, I.	34
Ahlfors, J.-E.	30	Babikian, T.	16	Blaauw, J.	48
Ahmed, N.	21	Bacevice, A.	25	Blackwell, L.	17, 21
Ahuja, C. S.	30	Badaut, J.	31, 32, 56	Blaschke, S. J.	56
Ailon, T.	40	Bahr, R.	17	Blennow, K.	21, 50
Åkerlund, C.	14	Bahr Sandmo, S.	17, 24	Blixt, J.	54
Akhadov, T.	44	Bahtijari, S.	45	Blugeon, C.	56
Akimoto, T.	43	Bailard, J.	52	Boccazzi, M.	56
Alaeiikhchi, N.	30	Bailey, C.	40	Boere, K.	26
Aldin Hamou, H.	34	Bain, J.	44, 54	Bogomilsky, C.	23
Alhalabi, O.	29, 42, 43, 47	Baker, A.	56	Boldoczki, F. M.	53
Alieva, N.	49	Baker, C.	38	Bond, K.	18
Alimagham, F.	50	Baker, T. L.	55	Bondi, C.	14, 53
Alizadeh, A.	29, 30	Balanca, B.	36	Bonfert, M. V.	17, 24
Aljassim, F.	37	Bangert, B. A.	25	Bonke, E. M.	17, 24, 33, 38
Allanson, J.	18	Baranes, K.	53	Boström, L.	37
Alosco, M. L.	17, 25, 33, 38	Bareyre, F. M.	24, 39, 56	Boucher, M.	53
Altamentova, S.	29	Barnaghi, P.	46	Bouix, S.	17, 25, 33, 47
Amgalan, A.	25	Bärnighausen, T.	49	Bourke, N.	28, 33, 46
Amiri, H.	16	Barreiro-Iglesias, A.	42	Brady, R.	54, 55, 56
Amirkhosravi, L.	53	Barron, J. C.	23, 42, 55	Brady, S.	44
Amrein, K.	32	Barsan, W.	50	Brandmeir, N.	59
Andrade, C.	47	Bashford, T.	47	Breedlove, K.	33
Annas, E.	53	Batson, C.	14, 26, 50	Bresnahan, J.	40
Ansar, S.	14	Baucom, Z.	25	Briggs, H.	30
Anstey, J.	28	Baumann, B.	55	Brody, D.	15
Anwar, F.	18	Beattie, M.	40	Broglio, S.	18
Anwer, M.	42, 55	Beaulac, M.	30	Brougham, D.	42
Anyaegbu, C.	54	Beck, J.	15, 59	Bruchmann, B.	43
Aousji, O.	14	Beer, R.	47	Bruyninckx, D.	49
Appelt, J.	39	Belanger, L.	40	Bruyns-Haylett, M.	23
Arand, M.	30	Bellander, B.-M.	14, 37	Buckley, T.	33
Araujo De Moraes Mello, L. E.	50	Bellomo, R.	28	Budohoski, K.	47
		Bender, M.	50	Büki, A.	17, 21, 22, 27, 32, 35
Arciniega, H.	17, 25, 33	Beqiri, E.	12, 19		37
Aries, M. J. H.	19	Berg, F.	34		
Arkan, S.	14, 23	Bertani, I.	55		
Asarnow, R.	16	Betts, A.	33		

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 **Thieme**

C

C. van Kaam, R.	19	Citerio, G.	48	de Ruiter, G.	18, 19, 51
C.C. van der Horst, I.	19	Clark, D.	47	De Simoni, S.	28
Caeyenberghs, K.	16	Clark, J.	15, 42	de Sousa, N.	42
Calero, S.	46	Clarke, K.	30	Dea, N.	40
Calzia, E.	53	Claussen, M.	49	Debert, C.	21
Campbell, K.	40	Clavijo, A.	46	Deimantavicius, M.	26
Campos, J.	42	Clement, C.	18	del Giovane, M.	28
Cappellari, D.	44	Clement, T.	56	Delahaye-Duriez, A.	56
Carbonara, M.	55	Clemett, C.	43	Den Boogert, H.	18
Carlson, S.	53	Clough, M.	24	den Hertog, H.	48
Carmichael, D.	34	Clusmann, H.	34	Deng, H.	52
Carpenter, K.	28, 50, 51, 53	Coburn, M.	14	Dennis, E.	16, 32, 33
Caruso, E.	13	Coert, B.	51	Depreitere, B.	15, 18, 19, 25, 28, 49
Casachahua, J.	18, 25	Coetzee, J.	47	Devi, I.	18
Castaña Leon, A.	18	Cohen, D. M.	25	Dhall, S.	40
Catapano, J.	23	Colantonio, A.	35	Dhandapani, S.	48
Cavaleiro, H.	13	Cole, J.	37	Diaz-Arrastia, R.	16, 21, 22, 25, 34, 37, 50, 52, 59
Celorrio-Navarro, M.	32, 54	Coleman, M.	25, 33	Dickens, A.	17, 37
Cente, M.	17, 24, 45	Collins, M.	22	Diertele, C.	56
Chahin, M.	56	Conley, A. N.	53	DiFabio, M.	33
Chaleckas, E.	26	Conley, G.	53	Dikmen, S.	52
Chalos, V.	48	Cooper, D. J.	50	Dill, L. K.	54, 56
Chandrasekar, A.	13, 31	Cooper, I. N.	14	Dimou, L.	24, 55
Chang, R.	18	Cooper, J.	21, 23, 40, 50	Dippel, D.	48
Charest-Morin, R.	40	Correia, M.	21, 32	Dixon, C. E.	53
Chatfield, D.	21	Couillard-Després, S.	24, 29	Donat, C.	23
Chen, H.	23, 35, 37, 42, 55	Cripton, P.	23, 42, 55	Dong, K.	40
Chen, J.-K.	44	Cummings, J. L.	17, 25, 33	Donhauser, M.	40
Chen, K.	17, 44	Cuneo, A.	18	Donnelly, J.	19
Cheng, H.	23, 35, 42, 55	Curtis, F.	46	Dooley, D.	42
Cheng, J.	14, 53	Czeiter, E.	22, 32, 37	Dougherty, A.	18, 25
Cheng, W. H.	23, 42, 55	Czorlich, P.	26, 47	Doumas, I.	43
Chern, J. J.	21	Czosnyka, M.	19, 26	Dowling, M.	56
Cheung, H.	23, 42, 55			Dreier, J.	36
Chiesa, R.	55	D		Duberg, D.	37
Chihi, M.	26, 52	Dabiri, S.	53	Dubois, C.	32, 56
Chinnery, P.	28	Dai, J.	24	Duckworth, H.	23
Chio, J.	29	Damberg, P.	14	Duering, M.	53
Chopek, J.	30	Dani, M.	46	Duncan, D.	39
Chowdhury, N.	25	Das, T.	32	Duncan, T.	33
Chrisman, S.	18	Datzmann, T.	53	Dvorak, M.	40
Christensen, J.	54	Davenport, N.	33, 45		
Christie, S.	40	de Carvalho, D.	46		
Chu, E.	56	de Luca, A.	17, 24		
Cifu, D.	33	De Maio, A.	34		

E

Eagle, S.	22	Fitzgerald, M.	28, 54	Gill, Je.	33
Earle, J.	42, 55	Flores, P.	52	Gillespie, E.	39, 40
Eftekharpour, E.	29	Fluiter, K.	51	Giordano, K. R.	48, 54
Elmer, J.	38	Foks, K.	22	Gissler, M.	49
Elnewihi, A.	19	Fond, K.	40	Giza, C. C.	15, 16, 18
Elser, H.	37	Fong, D.	43	Glocker, B.	21
Emami, P.	47	Foreman, B.	38	Glynos, A.	28
Emery, C.	21	Foster, L.	30	Gnanakumar, S.	47
Endepols, H.	56	Fournier, M.-L.	32, 56	Godfrin, Y.	29
Engels, T.	56	Frank, B.	49	Gomez, A.	14, 26, 50
Enslin, J.	17	Frantzen, J.	21	Goodrich-Hunsaker, N.	16
Epping, F.	52	Fraser, D.	21	Gooijers, J.	17, 24
Ercole, A.	19	Fraser, J.	25	Gore, T.	44
Ertürk, A.	55	Friberg, S.	47	Gottesman, R.	37
Eshghi, M.	46	Friedman, A.	55	Gottschalk, M.	14
Esopenko, C.	36	Friedrich, J.	14	Graham, N.	37
Eugene, Y. W.	49	Friedrich, M.	34, 50	Granberg, T.	47
Ewers, M.	17	Friess, S.	54	Grassner, L.	40
Ewing-Cobbs, L.	16	Froehlich, A.	13, 14, 31	Gressens, P.	56
Exner, C.	32, 53	Froese, L.	14, 26, 50	Grice, L.	39
Ezzell, G. A.	48	Frostell, A.	14	Grieve, K.	18

F

Fackelmeier, B.	43	Fuchs, C.	46	Griffiths, D. R.	54
Fagerdahl, A.-M.	37	Fuchs, M.	39	Gröger, M.	53
Faivre, V.	56	Fujita, S.	45	Gronthos, S.	15, 42
Falk-Delgado, A.	14	Fujiwara, G.	38	Große, K.	13, 23
Fallah, N.	40	Fuller, D.	53	Grose, R.	15, 42
Fan, J.	23, 42, 55			Grutza, M.	13, 19, 23, 55
Fataki Likale, M.	51	G		Guest, J.	40
Fatovich, D.	28	G Pinho, A.	42	Gugger, J.	22, 37
Fehlings, M.	12, 13, 27, 29, 30, 39, 40, 42, 60	Gajhede Gram, M.	53	Guilfoyle, M. R.	28, 51
Feltrin, F.	47	Galanopoulou, A.	39	Guirado, V.	47
Ferguson, A.	21, 40	Gao, G.	34, 35	Gunnarson, E.	54
Ferguson, L.	52	Gard, A.	34	Guo, Y.	53
Ferreira de Andrade, A.	50	Gardeen, S.	44	Gupta, A.	30
Fertleman, M.	46	Garzon, E.	50	Gupta, S. K.	48
Fielding, J.	24	Gaubert, M.	54	Güting, H.	28
Figaji, A.	17, 34, 46	Gavrila Laic, R. A.	25, 49	Gwinnutt, J. M.	49
Filipcik, P.	17, 24	Ghajari, M.	23, 38		
Fink, E. L.	14	Ghodsi, M.	21	H	
Fink, G. R.	56	Ghori, A.	39	H. Haeren, R.	19
Fischer, K. C.	42	Ghosdi, M.	21	Haagsma, J. A.	29
Fisher, C.	40	Giacino, J. T.	52	Habel, U.	45
		Gianoncelli, S.	55	Hadjighassem, M.	43
		Gierthmühlen, M.	34	Haferkorn, K.	50
		Gill, Ja.	40	Haitsma, I.	51

INDEX OF PRESENTING AUTHORS AND CHAIRS

Hakani, M.	55	Honeybul, S.	18	Jacobs, B.	37, 48
Hall, C.	53	Hoskinson, K.	16	Jacobsen Teixeira, M.	50
Hammarlund, E.	14	Hosoo, H.	43	Jacobson, E.	40
Hammed, A.	51	Hosseini, S. M.	30	Jahn, D.	29, 39
Hampshire, A.	34	Hourani, S.	30	Jahn, K.	35, 45, 49
Hanes, J.	17	Hovenden, E.	33	Jain, S.	21, 52
Harms, A.-K.	29, 30, 39	Howarth, R.	17	Janesko Feldman, K.	23
Harrop, J.	40	Hu, G.	23	Janssen, P.	48
Hart, C.	29	Hu, S.	31, 32, 53, 55	Janzen, N.	30
Haseler, L.	28	Huber-Lang, M.	22, 52	Jaramillo, C.	45
Hashemizadeh, S.	43	Hubertus, V.	29, 39, 42	Jarvis, J. M.	14
Hashiomto, N.	38	Huhtala, H.	50	Jendro, A.	56
Hassall, T.	39	Huppertz, C.	45	Jenkins, P.	28, 46
Hatami, M.	15, 30, 39, 42, 44	Hutagalung, S.	32, 55	Jenkner, S.	15, 42
		Hutchinson, P.	12, 15, 18, 19	Jha, R.	23
Hawryluk, G.	18		21, 26, 28, 34, 36, 45, 47	Joannides, A.	47
Hayakawa, M.	43		49, 50, 51, 53	Jogia, T.	40
Hayashi, M.	45	Hutter, T.	50	Johansson, E.	15
Heene, S.	29, 42, 43	Huttunen, J.	18	John, O.	25
Heijenbrok-Kal, M.	18, 19	Hyötyläinen, T.	17, 37	Johnson, C.	33
Hein, T. M.	55	Hyun, J. K.	44	Johnson-Schlit, D.	13
Heinen, F.	17, 24			Jung, H.-Y.	44
Heinonen, A.	48	I		Jung, L.	17, 33
Hejrati, N.	13, 40	Ibitoye, R.	46	Jung, W.-C.	40
Hellal, F.	55	Imms, P.	25	Junttila, E.	50
Helmy, A.	12, 18, 20, 24, 28	Inoue, T.	43	Juratti, T.	59
		Inoue, Y.	50	Jurick, S.	18
		Iodice, V.	28		
Herr, S.	44	Irimia, A.	16, 25	K	
Heslegrave, A.	33	Ishak, B.	16, 20	Kamakari, S.	30
Hibbs, M. L.	56	Ishikawa, E.	22, 43, 50	Kamath, V.	37
Hina, T.	17	Ishikawa, S.	43	Kang, A.	23
Hinds II, S.	33	Islam, M. I.	29	Kang, X.	47
Hippauf, L.	56	Isokuortti, H.	48	Kanthisamy, S.	51
Hiramoto, Y.	45	Ito, K.	45	Kapapa, T.	53
Hirata, Y.	45	Ito, Y.	43	Kaplan, Z. L. R.	29
Hirayama, A.	22	Ivanovic, J.	48	Karahalios, K.	23
Hirsch, K.	38	Iverson, G.	16, 48	Karimi, S.	24, 29, 30, 41, 60
Hodges, C.	16, 45	Ivren, M.	29, 45	Karvandi, E.	45
Hoedemaekers, C. W. E.	19	Iwabuchi, S.	45	Kasprowicz, M.	26
Hoffmann, A.	53			Kataja, A.	48, 50
Hoffmann, B.	56	J		Katila, A.	21
Hoffmann, M.	47	J Santos, D.	42	Kaufmann, D.	17, 24
Holl, D.	48	Jabbarli, R.	52	Kavaliauskas, M.	26
Höllig, A.	14	Jack, C.	37	Kawasaki, T.	43
Holmes, D.	21				

Journal of Neurological Surgery

PART

A

PART

B

 Thieme

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 Thieme

Kawasaki, T.	43	Kotter, M.	12, 13, 53	Liebenstund, L.	14
Kayhanian, S.	28	Kråkström, M.	37	Liebscher, T.	40
Kazimierska, A.	26	Kramer, K. R.	21	Lifshitz, J.	48, 54
Keleher, F.	16	Kremenetskaia, I.	39	Lin, Al.	17, 24, 25, 33
Keller, J.	29, 39	Krieg, S.	19	Lin, Am.	40
Kemp, S.	33	Krishna, G.	48	Lindblad, C.	14, 47
Kenney, K.	33, 45	Krüger, S.	56	Lindgren, A.	18
Kersting, K.	39, 42	Kuilamu, E.	40	Lindner, D.	34
Ketonen, S.	18	Kuitunen, I.	16	Lindsey, H.	16
Khaksari, M.	53	Kumbhare, D. A.	44, 46	Lingsma, H.	18, 19, 22, 29, 48
Khalin, I.	22, 31, 52	Kurpad, S.	40	Lippa, L.	44
Khan, T.	48	Kürzinger, L.	32	Liraz-Zaltsman, S.	32, 54
Khazaei, M.	30, 42	Kushida, N.	45	Lisi, I.	22, 55
Kilian, F.	43	Kwiatkowski, A.	45	Liu, B.	35, 51
Killen, M.	50, 53	Kwon, B.	40	Liu, E.	56
Kim, Y.	44	Kyritsis, N.	40	Liu, J.	30
Kirsch, J.	32			Liu, Q.	45
Kiwanuka, O.	37	L		Loane, D. J.	20, 41
Klein, B.	40	Lai, H.	28	Low, P.	44
Kline, A.	14, 53	Lakatos, A.	28	Lowery Wilson, M.	49
Klymchenko, A.	22	Langen, K.-J.	14	Lübstorf, T.	40
Knarr, M. R. O.	55	Lassarén, P.	53	Lunkova, E.	46
Kochanek, P. M.	18, 23, 41, 52	Lätzer, A.	19	Luostarinen, T.	50
Kodila, Z.	52	Laverse, E.	33	Luoto, T.	15, 16, 44, 48, 50
Kohanbash, G.	23	Lebegge, P.	49	Luszwski, C.	25
Köhli, P.	29, 39	Lecky, F.	22	Lynch, C.	22, 52
Kokiko-Cochran, O.	20	Lee, P.	54		
Kolanko, M.	46	Leite, C. S.	47	M	
Kolbe, S.	24	Leemans, A.	17, 24	Maanpää, H.-R.	21
Kölbl, B.	19	Lefering, R.	47	Maas, A.	17, 18, 19, 22, 29
Kolehmainen, K.	30	Lemarchant, S.	29		32, 37
Kolias, A.	18, 19, 47	Lemcke, J.	34, 39	Mac-Thiong, J.-M.	40
Kompanje, E.	48	Lemoine, S.	56	MacGregor, A.	18, 25
Kondiles, B.	42, 55	Lenga, P.	45	Mach, O.	40
Konrad, J.	56	Levin, H.	45, 52	Macruz, F.	47
Konsman, J. P.	56	Lewis, M.	15, 42	Maddux, C.	38
Kontos, A.	22	Li, C.	14, 47, 54	Madhivanan, K.	43, 48
Kopp, M. A.	40	Li, L.	14, 19, 28, 34, 44, 46	Madorsky, I.	53
Korhonen, O.	21, 50	Li, S.	13, 14, 31, 32, 43, 54	Maegele, M.	28, 34
Korhonen, T.	18, 47	Li, Y.	53	Maher, A. S.	25
Korley, F.	21, 52	Li, Z.	14, 32, 52	Mahfoud, M.	51
Kornaropoulos, E.	32, 34	Liberato, V.	42	Mahoney, S.	25
Körte, I. K.	16, 17, 24, 25, 33	Liberti, A. L.	19	Maier, D.	40
	38	Licia Foresti, M.	50	Mair, R.	28
Koskinen, E.	15	Lidin, E.	53	Majdan, M.	29

Major, B.	44	McNamara, R.	28	Mrazik, M.	21
Malá Rytter, H.	53	Mee, H.	18, 47	Muehlmann, M.	17, 24
Mallas, E.-J.	28, 46	Meixensberger, J.	28, 34	Muehlschlegel, S.	18
Manktelow, A.	21	Meka, S. A.	28	Mujagic, A.	22
Manley, G.	21, 34, 35, 52	Melnikov, I.	44	Mukherjee, P.	21, 34, 52
Mannix, R. C.	15, 53	Mende, J.	32, 55	Mulder, J.	14
Manysheva, K.	49	Menon, D.	17, 18, 19, 21, 22	Müller, F.	45, 49
Manzhurtsev, A.	44		32, 34, 35, 37, 47, 50	Müller, M.	14
Mao, X.	31, 35, 47, 51	Merete Hagen, E.	35	Mullin, T.	44
Mao, Y.	54	Merikukka, M.	49	Mulugeta, M.	17
Marco-García, N.	50	Merkel, R.	56	Munoz Casabella, A.	23
Marietta, M.	59	Meyer, L.	39, 42	Murinova, N.	18
Markenroth Bloch, K.	34	Meyfroidt, G.	19	Muroi, A.	22, 50
Marklund, N.	14, 15, 18, 23	Michalettos, G.	14, 23, 55	Mutimer, S.	44
	31, 32, 34, 55, 60	Micotti, E.	22	Mutschler, J.	56
Markowitz, A.	21, 52	Mihaljevic, S.	23	Mychasiuk, R.	14, 52, 54, 55
Martin, J.	45	Mihalov, L. K.	25		56
Martin, P.	38	Mikolić, A.	22, 25, 32		
Martindale, S.	45	Ming, Y.	49	N	
Marushima, A.	22, 43, 50	Minich, N.	25	Nagakannan, P.	29
Marzi, I.	34	Mitra, B.	44	Nagasaki, Y.	22
Mason, K.	36	Mitsios, N.	14	Nakao, J.	50
Mataczyński, C.	26	Miyamoto, S.	43	Nakao, S.	43
Mathieu, R.	53	Moberg, R.	38	Nakayama, H.	45
Matsumaru, Y.	22, 43, 50	Mogensen, J.	53	Naser, P.	45
Matsumoto, M.	43	Moghaddamjou, A.	40	Nederkoorn, P.	48
Matsumoto, Y.	43	Mohammadian, M.	21, 50	Needham, E.	21
Matsumura, A.	22	Mondello, S.	22, 27	Nelson, D.	14
Mattila, V.	16	Monif, M.	54	Nespoli, E.	55
Mattsson, P.	14	Mononen, M.	21, 50	Neumaier, B.	56
Mauer, U. M.	19, 34	Monteiro, S.	42	Neumann, J.	45
Mauff, K.	17	Moojen, W.	51	Newcombe, V.	16, 21, 22, 32
Maurer, C.	32	Moon, K.-M.	30		50
Max, J.	16	Moreira da Silva, N.	28	Newsome, M.	16, 33, 45
May, H.	23	Morganti-Kossmann, M. C.	13, 31	Nga, V.	49
Mayer, A.	45		14, 31	Ngo, V.	25
Mayer, S.	53	Moro, F.	22	Nguyen, Q.	39, 40
Mayer, V.	46	Morris, H.	33	Nieminen-Kelhä, M.	39, 42
Mazzone, E.	22	Morrison, J.	22	Nikula, M.	48
McAllister, T.	18	Moschonas, E.	14, 53	Nilsson, M.	34
McCabe, S.	44	Mosley, T.	37	Nilsson, R.	55
McCrea, M.	18, 52	Mothe, A.	60	Nimmo, A.	29
McCune, M.	40	Mottaghy, F. M.	14	Noel, M.	14
McDonald, S.	44, 54, 55, 56	Mouravlev, A.	43	Noseworthy, M. D.	44, 46
McInnes, K. A.	42, 55	Moyer, E.	38	Novotny, A.	19

INDEX OF PRESENTING AUTHORS AND CHAIRS

O

O'Brien, C.	23
O'Brien, T.	24
O'Brien, W.	24, 54
O'Carroll, S.	43
O'Hare Doig, R.	15, 42
Ode, J.-E.	42
Öhman, J.	48
Ohtake, M.	43
Ojo, J.	20
Okada, Y.	38
Okonkwo, D. O.	16, 21, 22, 41
	52, 59
Olde Heuvel, F.	13, 14, 22, 31
	32, 52
Oldham, M.	40
Olsen, A.	16
Omer, M.	49
Omondi, C.	40
Opitz, A.	34
Oresic, M.	17, 27, 37
Ortiz, J. B.	54
Ortolano, F.	55
Otto, E.	29, 39
Otto, M.	52
Oude Groeniger, J.	25
Owen, N.	18
Özen, I.	14, 23, 31, 56

P

Palla, A.	46
Paquette, S.	40
Paredi, F.	55
Park, E.	24, 55, 56
Park, H.	30
Park, S.	44
Park, S. J.	44
Parker, D.	22, 25, 34
Parker, T.	33
Parkinson, M.	46
Pascente, R.	13, 22
Pasternak, O.	17, 24, 25, 33
Paul, M.	18
Penner, L.	21
Peppel, L.	18, 19
Peraud, A.	12

Perouansky, M.	13
Pessah-Rasmussen, H.	34
Petkus, V.	26
Petr, O.	47
Petrov, D.	22
Peul, W.	12, 13, 16, 18, 19, 51
Philippens, M.	31
Piehl, F.	47
Piitulainen, J.	18
Pinggera, D.	47
Pischiutta, F.	13
Pisică, D.	18, 19, 29
Placek, M. M.	19
Plesniła, N.	12, 16, 22, 31, 32
	41, 45, 49, 53, 55
Plunet, W.	30
Polinder, S.	25, 29
Pomeroy, V.	18
Ponkilainen, V.	16
Por, M.	34, 40
Portonova Wernersson, M.	34
Posti, J.	17, 18, 21, 37, 49, 50
Prasad, P. K.	43
Preiksaitis, A.	26
Preuss-Hernandez, C.	47
Prins, M.	52
Prupp, A. H.	48
Probst, P.	45, 49
Prokazov, Y.	56
Prunier, N.	47
Ptito, A.	44, 46
Puccio, A.	21, 22, 50, 52
Puentes, S.	22
Puffer, R. C.	52
Pugh, M. J.	33
Pumberger, M.	29, 39
Punjani, N.	29
Putnynaite, V.	26

Q

Qiu, J.	53
---------	----

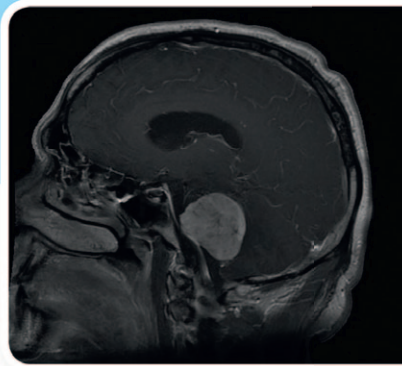
R

R Cibrão, J.	42
R. Green, J.	46
Rabinowitz, M.	52
Race, N.	53
Radermacher, P.	53
Radford, K.	39
Raffaele, L.	30
Raftery, A. L.	56
Ragauskas, A.	26
Raghupathi, R.	20
Rahimi-Dehghan, S.	51
Rahimi-Movaghar, V.	40
Rahmani, A.	29, 39
Raikwar, S.	23
Rajasundaram, D.	23
Rana, S.	53
Ranellone, T.	14, 53
Rani, A.	23
Raphael, I.	23
Rasul, H.	37
Rauen, K.	35, 45, 49
Rauhala, M.	48
Rautenberg, N.	56
Ravanfar, P.	17
Reddigari, S.	24
Reddy, R.	14, 53
Rehman, R.	13, 14, 31
Reichert, L.	45, 49
Reid, R.	37
Reiman, E.	17, 25, 33
Reisner, A.	17, 21, 24
Rennerfeldt, P. L.	14, 53
Restelli, E.	55
Retel Helmrich, I. R. A.	37
Rex, A.	39, 42
Rhind, S.	31
Ribbers, G.	18, 19
Richter, S.	32
Riemann, L.	32, 47
Risling, M.	14, 53
Ritchie, L.	40
Robert, H.	52
Robertson, C. S.	52
Robinson, D.	54
Rocka, S.	26

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 Thieme

Rodriguez Tapia, G.	43	Sayed, I.	17, 21	Shohami, E.	27, 32, 41
Roe, K. L.	48	Schäpers, B.	45, 49	Shrestha, S.	37
Roeters van Lennep, J.	25	Scheer, M.	34, 45	Shukla, D.	18
Rohilla, S.	48	Scheibel, R.	33, 45	Shultz, S.	24, 36, 44, 54, 55
Rohlwink, U.	17	Schiffener, M.	22		56
Rojas Valencia, L. M.	54	Schink, T.	45	Shumilov Bartenev, K.	32, 54
Rojczyk, P.	36	Schleicher, P.	20	Shutter, L.	50
Romanzetti, S.	45	Schmidt, A.	16	Silva Paiva, W.	46, 47, 50
Roncati Zanier, E.	13, 22, 55	Schmieder, K.	34	Simard, N.	44, 46
Roofs, L.	39, 42	Schmutzhard, E.	34	Simren, J.	21
Rorsman, I.	34	Schnaubelt, A.	15, 42, 53	Sims, N.	54
Roselli, F.	13, 14, 22, 31, 32	Schneider, A.	22, 37, 52	Singh, I.	48
		Schneider, W.	22	Singh, R.	18, 19, 44
Rosenthal, E.	38	Schneidmüller, D.	40	Singleton, M.	18
Rostami, E.	21	Schöchl, H.	59	Sinioja, T.	37
Rowan, N.	37	Scholz, M.	20	Siracusa, L.	56
Rowland, J.	45	Schott, J.	37	Sirén, A.-L.	27, 29, 32, 54
Rubiano, A.	18, 46	Schroeter, M.	56	Sitzmann, A.	16
Rubinski, A.	17	Schupp, P.	40	Sjölund, C.	32
Ruebenacker, L.	29, 42	Schwab, J. M.	40	Skinnider, M.	40
Rueger, M. A.	56	Schwarzmaier, S.	32, 53, 55	Sköld, M. K.	53
Ruitenbergh, M. J.	39, 40	Scriven, E.	40	Skotak, M.	31
Ruscher, K.	14, 23, 31, 55	Seer, C.	17, 24	Skutella, T.	15, 29, 30, 32, 39
Russell, E.	38	Seira, O.	30		42, 43, 44, 53
Ryan, N.	16	Seitz-Holland, J.	17, 24	Slack, T.	14, 26, 50
		Semenova, N.	44	Sloley, S.	31
S		Semple, B. D.	20, 42, 54, 55	Smielewski, P.	12, 19, 37
Saadoun, S.	16		56	Smith, B.	51
Sabel, B. A.	56	Servadei, F.	26, 27	Smith, C.	17
Sahoo, S.	43	Sester, D.	40	Smith, D.	33
Sainbhi, A. S.	14, 26, 50	Sgro, M.	52	Smith, M.	52
Saito, N.	45	Shad, A.	54	Smyk, N.	22
Sakakibara, T.	38	Shahim, P.-P.	33	Sneiderman, C.	23
Sakata, K.	43	Shahsavani, N.	30	Sochen, N.	17, 24
Sakowitz, O.	19, 32	Sharma, R.	56	Somma, V.	44
Sakurai, T.	45	Sharma, T.	18	Song, Y.	54
Salberg, S.	14	Sharp, D.	23, 28, 33, 34, 37	Soreq, E.	46
Salgado, A. J.	13, 42		38, 46	Stacey, G.	30
Saluja, R. S.	46	Sharrett, A. R.	37	Stanisic, M.	48
Salunke, P.	43, 48	Shaw, G.	53	Stein, D.	16
Sanchez, D.	46	Sheehan, J.	43	Stein, K.	14, 26, 50
Sanchez, J.-C.	21, 50	Shenton, M. E.	17, 25, 33	Stein, M.	50
Sandsmark, D.	22	Shi, R.	44	Stein, M. B.	52
Sastre, M.	23	Shimohigoshi, W.	43	Steinberg, J.	45
Sato, S.	45	Shiomi, N.	38	Stelfa, G.	32

Stern, R. A. 17, 25, 33
 Steudel, W.-I. 34
 Stewart, W. 36, 38
 Steyerberg, E. 17, 18, 19, 22
 29, 37
 Still, M. 49
 Stocchetti, N. 19, 48
 Stollburg, E. 32
 Stover, J. 34
 Street, J. 40
 Streijger, F. 40
 Stuart, F. 32
 Stukas, S. 21, 40
 Su, Y. 17
 Sun, M. 36, 55, 56
 Sun, X. 21, 52
 Sure, U. 52
 Suskauer, S. 16
 Svenningsson, P. 47
 Svensson, M. 14
 Swinnen, S. P. 17, 24
 Symons, G. F. 24

T

Tabeshmehr, P. 29
 Tabor, J. 21
 Taheri, N. 39, 42
 Tail, M. 29, 30, 39, 44
 Takahashi, H. 50
 Takahashi, T. 22, 43
 Takala, R. 21
 Takeoka, A. 13
 Takeuchi, I. 43
 Talhada, D. 14, 55
 Tallent, B. R. 54
 Tallus, J. 21
 Tamosiutis, T. 26
 Tas, J. 19
 Tate, D. 16, 33, 45
 Taylor, B. 33
 Taylor, H. G. 25
 Taylor, S. R. 52
 Tegner, Y. 34
 Tegtmeier, F. 34
 Teichner de Moraes, M. 50

Temkin, N. R. 52
 Tenovuo, O. 17, 21, 37, 50
 ter Wengel, V. 12, 13, 30
 Terpolilli, N. A. 22, 31
 Tetri, S. 18
 Tetzlaff, W. 30, 42
 Thango, N. 17
 Thebrath, T. 53
 Thelin, E. 14, 37, 47, 53
 Thomas, I. 17, 37
 Thomé, C. 47
 Thompson, P. 16
 Timofeev, I. 18, 51
 Tolomeo, D. 22
 Tonkin, C. J. 55
 Torres-Espin, A. 40
 Tripodis, Y. 17, 24, 25, 33
 Trivedi, R. 47
 Troyanskaya, M. 33
 Tsai, E. 27, 59
 Tsai, Y. T. 49
 Tsang, A. 40
 Tsantikos, E. 56
 Tsikonofilos, K. 23
 Tsitsilonis, S. 29, 39
 Tsitsopoulos, P. 27
 Turner, C. 18, 47
 Turner, S. 31
 Tuz-Zahra, F. 17, 33
 Tyebji, S. 55

U

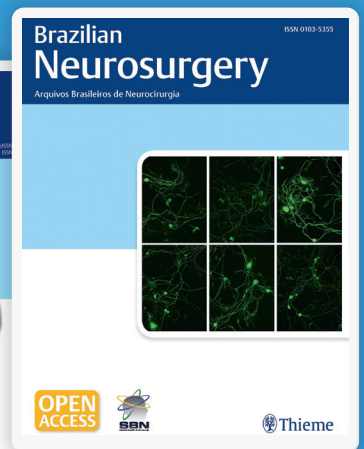
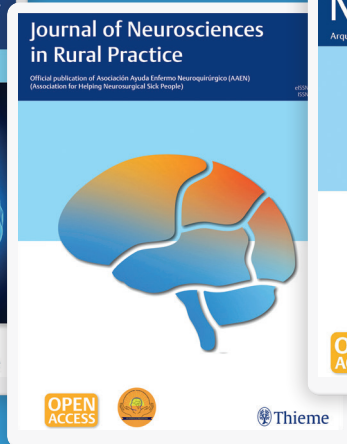
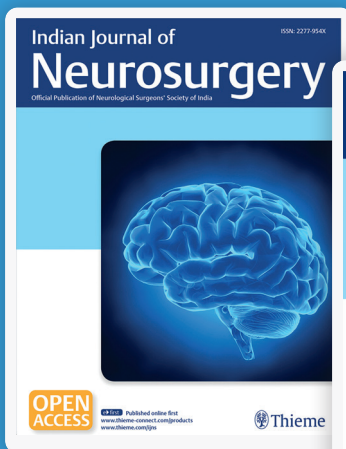
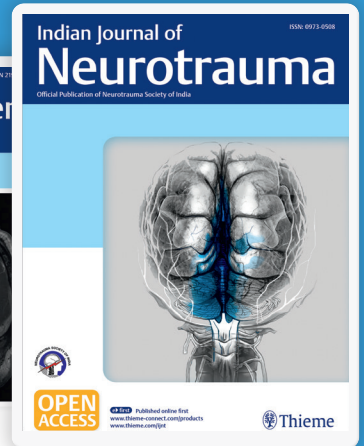
Ublinskiy, M. 44
 Uboldi, A. D. 55
 Udy, A. 28, 50, 59
 Uhl, C. 42
 Uhl, E. 34, 37, 50
 Ulmer, S. 44, 46
 Unterberg, A. 13, 15, 16, 19
 23, 27, 28, 29, 30, 32, 34
 35, 36, 39, 41, 42, 43, 44
 45, 47, 53, 55
 Uryga, A. 26

V

Vagni, V. 23
 Vainionpää, A. 15
 Vajkoczy, P. 12, 13, 29, 30, 39
 42
 Vallance, S. 50
 van den Berg, S. 48
 van der Horn, H. 37
 van der Jagt, M. 48, 51
 van der Naalt, J. 37, 48
 van der Vlegel, M. 29
 van Dijk, J. 19, 29, 48
 van Donkelaar, P. 36
 van Emmerik, A. LJJ. 54
 van Erp, I. 19, 51
 Van Essen, T. 18, 19, 26, 51
 van Hameren, G. 55
 van Klaveren, D. 22, 25
 van Kuijk, S. M. J. 19
 van Leeuwen, N. 29
 van Steenbergen, V. 56
 Van Steenwinckel, J. 56
 van Vliet, P. 51
 van Zwet, E. 51
 Vander Sloten, J. 25, 49
 Vanhala, H. 50
 Vassar, M. J. 52
 Vegliante, G. 22, 55
 Velalakan, A. 19
 Venturini, S. 28, 49, 51
 Verbaan, D. 51
 Verheyden, J. 32
 Verma, R. 22, 25, 34
 Vespa, P. 39
 Viaroli, E. 18, 47
 Vichayanrat, E. 28
 Vik, A. 32
 Villarreal García, E. 51
 Villota, A. 46
 Vink, R. 34, 36
 Violante, I. 34
 Vlachakis, S. 56
 Vocado, D. 23
 Vogel, M. 40
 Vogt, A. 51
 Volivici, V. 19

von Steinbüchel, N.	35	Wieckhusen, C.	43	Zafonte, R.	16
von Thomsen, C.	49	Wiegand, T. L. T.	17, 24, 33	Zakrzewska, A.	50
Voth, M.	40	Wieloch, T.	55	Zamani, A.	56
Vozzella, V. J.	14	Wilde, E.	16, 33, 45	Zaninotto, A. L.	46, 47
Z		Wilkinson, A.	23	Zeiler, F.	14, 19, 26, 47, 50
Walchenbach, R.	18	Williams, G.	21, 32	Zeldovich, M.	25
Waldmann, L.	29, 39, 42	Willuweit, A.	14	Zetterberg, H.	21, 33, 50
Walker, W.	33, 45	Wilson, J.	40	Zha, X.	29, 42
Walsh, C.	42	Wilson, L.	15, 25	Zhang, E.	56
Walsham, J.	40	Wilson, M.	38	Zhang, H.	29, 30, 39, 44
Walter, A.	22, 25, 34, 37	Winkler, E.	23, 52	Zhang, J.	22, 52
Walter, H. L.	56	Winzeck, S.	21, 32	Zheng, G.	15, 29, 30, 39, 42
Walter, J.	13, 19, 23, 29, 32	Wirth, T.	55	Zhou, X.	15, 42, 53
	42, 46, 55	Wolf, S.	49	Zielinski, B.	16
Walter, S.	55	Wong, K.	54	Zimmerman, K.	33, 34, 46
Wanecek, M.	54	Woschek, M.	34	Zimmermann, A.	24
Wang, H.	15, 42, 43, 53	Wu, X.	31	Zimphango, C.	50
Wang, J.	29	Wychowaniec, J.	42	Zoarets, I.	45
Wang, K.	21, 22, 31, 32, 37	X		Zouris, J.	18
	52	Xiao, S.	32, 54	Zuech, S.	53
Wang, Y. S.	53	Xiong, Z.	23	Zumberge, N. A.	25
Warburton, E.	18	Xu, H.	32	Zuschratter, W.	56
Ware, A.	16	Y		Zusman, B.	23
Warnock, A.	54	Yamakawa, G.	14, 52, 54	Zvejnice, L.	32
Wassarman, D.	13	Yamaki, T.	38	Zweckberger, K.	12, 13, 15
Wassélius, J.	60	Yamamoto, T.	43		16, 23, 27, 29, 30, 32, 39
Watanabe, Y.	43	Yanagisawa, Y.	43		41, 42, 43, 44, 53, 55
Weber, A.	56	Yang, Z.	32		
Wehn, A.	22, 31	Yeates, K. O.	25		
Weidner, N.	24, 27	Yeatts, S.	50		
Weihrich, P.	55	Yhang, E.	24		
Wellington, C.	21, 23, 40, 42	York, G.	33		
	55	Young, D.	43		
Wells, A.	18	Younsi, A.	13, 15, 18, 19, 23		
Werner, K.	33, 45		28, 29, 30, 32, 34, 39, 42		
Westphal, M.	47		43, 44, 45, 47, 49, 53, 55		
Wetzel, A.	56	Yue, J.	21, 52		
Whitehouse, D.	32	Yuh, E.	21, 52		
Whiting, G.	18				

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1 Vik et al, Relationship of "dose" of intracranial hypertension to outcome in severe traumatic brain injury, J Neurosurg 109:000–000, 2008.

2. Güiza et al; Visualizing the pressure and time burden of intracranial hypertension in adult and paediatric traumatic brain injury. Intensive Care Med. 2015;41(6):1067–76.

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Assoc.-Prof. H. Schoechl, Salzburg/AT
- 13:05 – 13:25 Treatment of TBI in anticoagulated patients
Prof. C. Beynon, Heidelberg/DE
- 13:25 – 13:45 Mechanisms of coagulopathy in Brain Trauma
Prof. T. Juratli, Dresden/DE