



## Review

## Found in translation: Understanding the biology and behavior of experimental traumatic brain injury



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## ARTICLE INFO

## Article history:

Received 17 August 2014

Received in revised form 26 October 2014

Accepted 2 December 2014

Available online 10 December 2014

## Keywords:

Attentional set-shifting test (AST)

Closed head injury

Concussion

Controlled cortical impact (CCI)

Environmental enrichment (EE)

Fluid percussion (FP)

Neurorehabilitation

Pediatrics

Social behavior

## ABSTRACT

The aim of this review is to discuss in greater detail the topics covered in the recent symposium entitled "Traumatic brain injury: laboratory and clinical perspectives," presented at the 2014 International Behavioral Neuroscience Society annual meeting. Herein, we review contemporary laboratory models of traumatic brain injury (TBI) including common assays for sensorimotor and cognitive behavior. New modalities to evaluate social behavior after injury to the developing brain, as well as the attentional set-shifting test (AST) as a measure of executive function in TBI, will be highlighted. Environmental enrichment (EE) will be discussed as a preclinical model of neurorehabilitation, and finally, an evidence-based approach to sports-related concussion will be considered. The review consists predominantly of published data, but some discussion of ongoing or future directions is provided.

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**Abbreviations:** AST, attentional set-shifting test; bTBI, blast traumatic brain injury; BDNF, brain-derived neurotrophic factor; CCI, controlled cortical impact; CD, compound discrimination; CFC, contextual fear conditioning; ChAT, choline acetyltransferase; Cr, creatine; CTE, chronic traumatic encephalopathy; DA, dopamine; DAT, dopamine transporter; DTI, diffusion tensor imaging; ED, extradimensional; EE, environmental enrichment; FP, fluid percussion; ID, intradimensional; MWM, Morris water maze; NAA, N-acetylaspartate; NOR, novel-object recognition; NT-3, neurotrophin-3; OFC, orbitofrontal cortex; PFC, prefrontal cortex; PND, postnatal day; R1, first reversal; R2, second reversal; R3, third reversal; SD, simple discrimination; STD, standard; TBI, traumatic brain injury; USV, ultrasonic vocalizations; WCST, Wisconsin Card Sorting Test; 5-HT<sub>1A</sub>, serotonin<sub>1A</sub>; 8-OH-DPAT, 8-hydroxy-2-(di-*n*-propylamino) tetralin.

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<http://dx.doi.org/10.1016/j.neubiorev.2014.12.004>

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## Contents

1.	Introduction .....	125
2.	Contemporary laboratory models of traumatic brain injury .....	125
2.1.	Fluid percussion .....	125
2.1.1.	Rat midline fluid percussion .....	125
2.1.2.	Rat lateral fluid percussion .....	125
2.2.	Controlled cortical impact .....	125
2.2.1.	Rat controlled cortical impact .....	126
2.2.2.	Mouse controlled cortical impact .....	126
2.2.3.	Pig controlled cortical impact .....	126
2.3.	Closed head injury .....	127
2.4.	Blast relevant TBI .....	127
2.5.	Motor assessment tests .....	127
2.5.1.	Beam-balance and beam-walk tests .....	127
2.5.2.	Rotarod test .....	127
2.6.	Cognitive assessment tests .....	128
2.6.1.	Acquisition of spatial learning and memory .....	128
2.6.2.	Novel object recognition memory .....	128
2.6.3.	Contextual fear conditioning .....	128
2.7.	Limitations of TBI models .....	128
3.	Social behavior after injury to the developing brain .....	128
3.1.	Social deficits in young brain-injured patients .....	128
3.2.	Behavioral assays of social behavior in rodents .....	129
3.2.1.	Reciprocal social interactions .....	129
3.2.2.	Three-chamber social approach task .....	129
3.2.3.	Social aggression .....	130
3.2.4.	Social communication .....	130
3.2.5.	Considerations for study design .....	130
3.3.	Social deficits in experimental models of brain injury .....	130
3.4.	Social deficits after pediatric TBI in mice .....	131
3.5.	The challenge: understanding mechanisms of social dysfunction .....	132
4.	The attentional set-shifting test as a novel behavioral paradigm for TBI .....	132
4.1.	Neuropsychological tests of executive function .....	132
4.2.	The attentional set-shifting test: a measure of executive function in rodents .....	133
4.3.	The neurobiological basis of attentional set-shifting .....	133
4.4.	Novel assessment of executive function in experimental TBI .....	134
5.	Environmental enrichment: a preclinical model of neurorehabilitation after TBI .....	134
5.1.	Early and continuous enrichment: typical paradigm .....	135
5.1.1.	Effects of EE in males after TBI .....	135
5.1.2.	Effects of EE in females after TBI .....	135
5.1.3.	Endurance of EE benefits .....	135
5.2.	Delayed and abbreviated EE .....	135
5.2.1.	Delayed EE .....	135
5.2.2.	Abbreviated EE .....	136
5.3.	Combining EE with pharmacotherapies .....	136
5.3.1.	EE plus 8-hydroxy-2-(di- <i>n</i> -propylamino) tetralin (8-OH-DPAT) .....	136
5.3.2.	EE plus buspirone .....	136
5.4.	Potential mechanisms for EE-induced benefits after TBI .....	136
6.	Evidence-based approach to sports concussion management .....	137
6.1.	Sports concussions .....	137
6.2.	Post-concussive dysfunction .....	137
6.2.1.	Clinical concussion and acute management .....	137
6.2.2.	Animal models and outcome measures .....	137
6.3.	Vulnerability to second injury .....	137
6.3.1.	Clinical vulnerability and repeat concussion .....	137
6.3.2.	Animal models of repeat injury and impairment .....	138
6.4.	Activating the injured brain .....	138
6.4.1.	Recovery and return to activity in humans .....	138
6.4.2.	Neural activation following experimental injury .....	138
6.5.	Long-term consequences .....	138
6.5.1.	Chronic cognitive impairment or chronic traumatic encephalopathy? .....	138
6.5.2.	Biological linkage of early pathophysiology with neurodegeneration .....	139
7.	Conclusions .....	139
	Acknowledgements .....	140
	References .....	140

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