

Using animal models to study cognitive and psychiatric comorbidities of epilepsy

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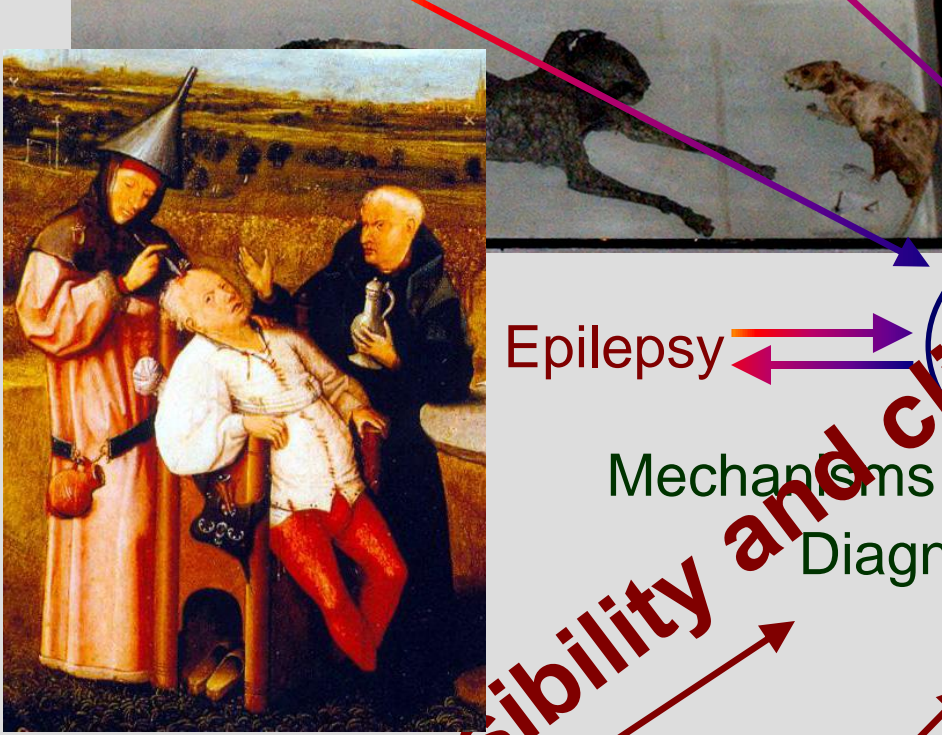
 UCLA Children's Discovery
and Innovation Institute

Genetics

Environment

Psychosocial factors

Medications



Epilepsy

Cognitive
Psychiatric
Behavioral
disorders

Mechanisms

Diagnosis

Prevention

Treatment

Ethical concerns

Safety concerns

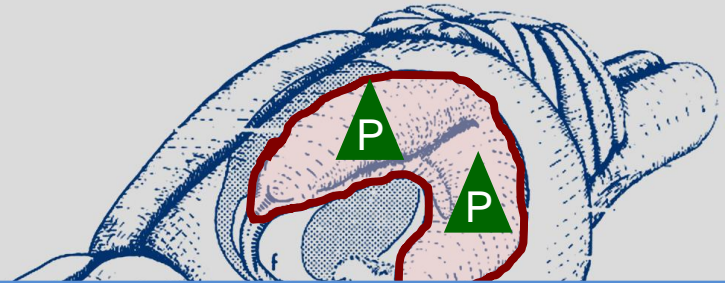
Enrollment

Compliance

Feasibility and clinical relevance?

Spatial cognition and memory

Morris Water Maze



Epilepsy & Behavior 22 (2011) 364–369

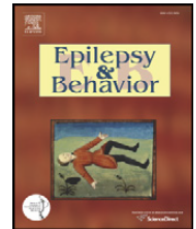


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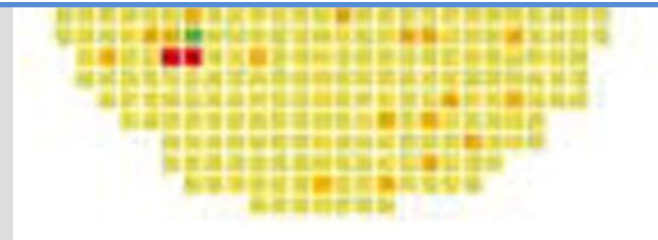
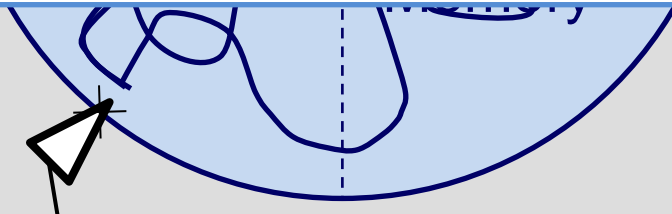
Epilepsy & Behavior

journal homepage: www.elsevier.com/locate/yebeh



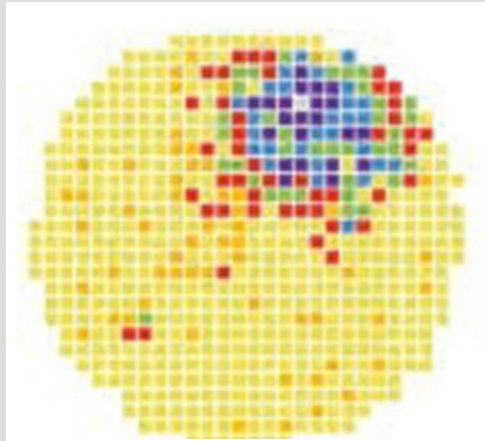
Spatial navigation impairment in patients with refractory temporal lobe epilepsy: Evidence from a new virtual reality-based task

Rosa Cánovas ^a, Irene León ^a, Pedro Serrano ^b, M^a. Dolores Roldán ^a, José Manuel Cimadevilla ^{a,*}

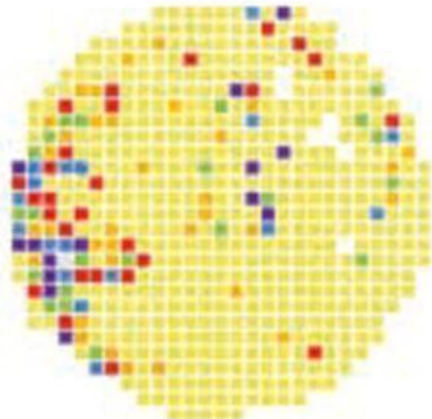


Liu et al., J Neurosci, 2003

Impaired function of hippocampal place cells in animals with epilepsy



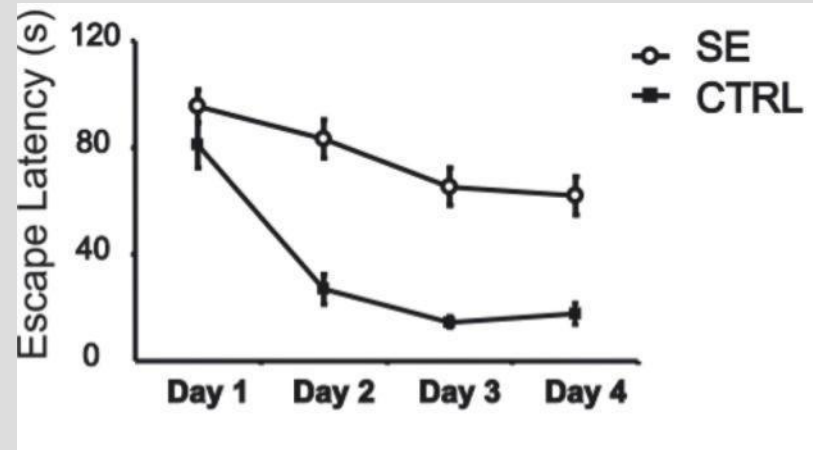
Naive



Epilepsy

Liu et al., J Neurosci, 2003

Memory impairments in animals with epilepsy



Lenck-Santini P and Holmes G. J. Neurosci 2008

Depression (30-50% of epilepsy patients)

300
250



Epilepsy & Behavior 24 (2012) 156–168

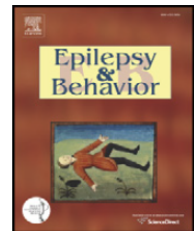


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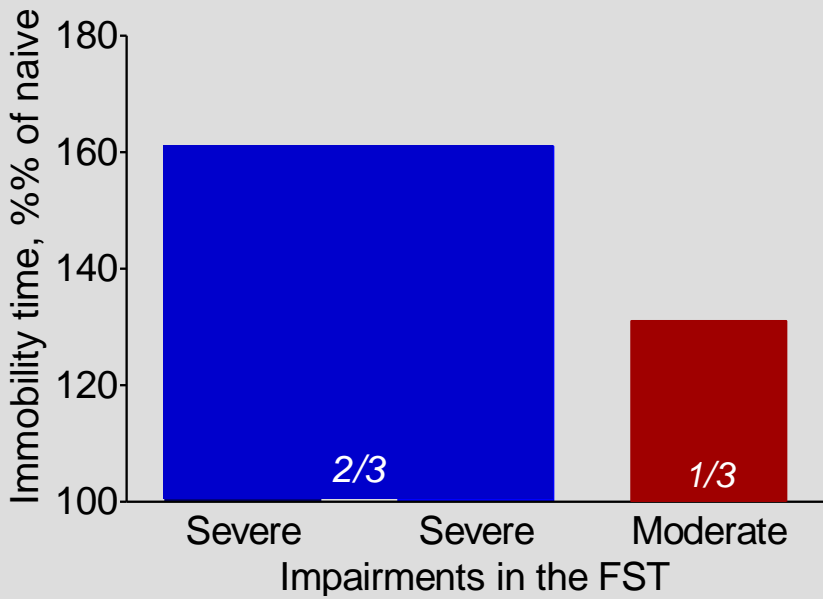
Review

Depression and epilepsy: Epidemiologic and neurobiologic perspectives that may explain their high comorbid occurrence ☆

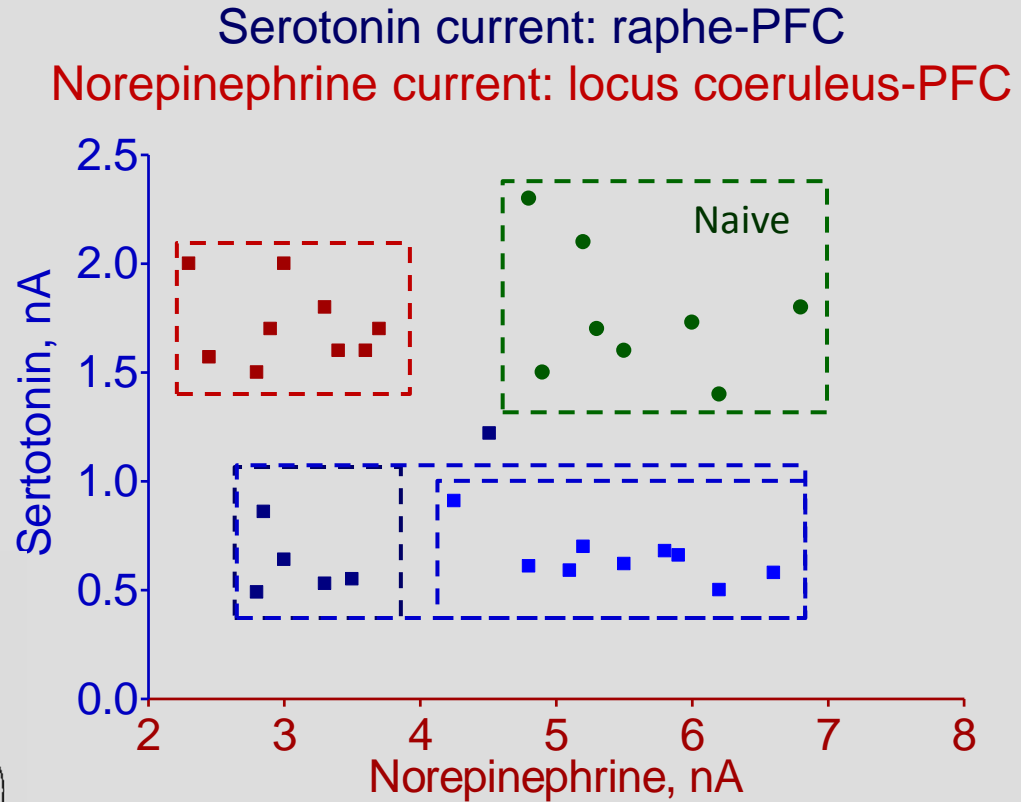
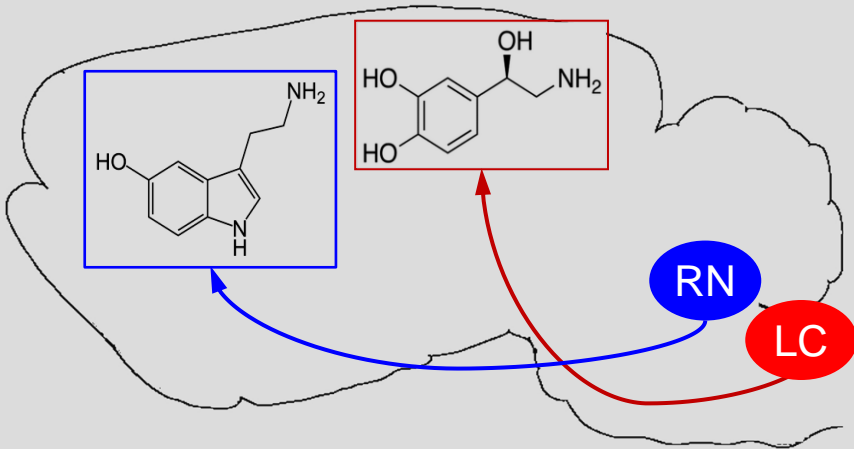
Andres M. Kanner*, Steven C. Schachter, John J. Barry, Dale C. Hersdorffer, Marco Mula, Michael Trimble, Bruce Hermann, Alan E. Ettinger, David Dunn, Rochelle Caplan, Philippe Ryvlin, Frank Gilliam

Depression in animals
with epilepsy

Forced swim test



Serotonin and norepinephrine



Mazarati, not yet published

Mazarati et al., Brain, 2008;

Pineda et al., Neuropsychopharmacol, 2011

Autism (1/3 of patients develop epilepsy)

Impaired social interaction , communication and restricted behaviour

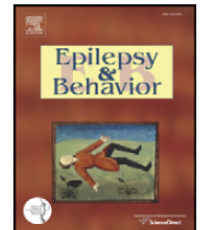
Epilepsy & Behavior 23 (2012) 193–198



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journal homepage: www.elsevier.com/locate/yebeh



Review

Epilepsy and autism: Is there a special relationship? ☆

Anne T. Berg ^{a,*}, Sigita Plioplys ^b



Viral infections during pregnancy as a risk factor for autism in children

PEDIATRICS Volume 130, Number 6, December 2012

ARTICLE

Autism After Infection, Febrile Episodes, and Antibiotic Use During Pregnancy: An Exploratory Study

AUTHORS: Hjördis Ósk Atladóttir, MD, PhD,^a Tine Brink Henriksen, MD, PhD,^b Diana E. Schendel, PhD,^c and Erik T. Parner, PhD^d



WHAT'S KNOWN ON THIS SUBJECT: It has been suggested that maternal immune activation during pregnancy is associated with cardinal behaviors of autism in the offspring. Epidemiologic

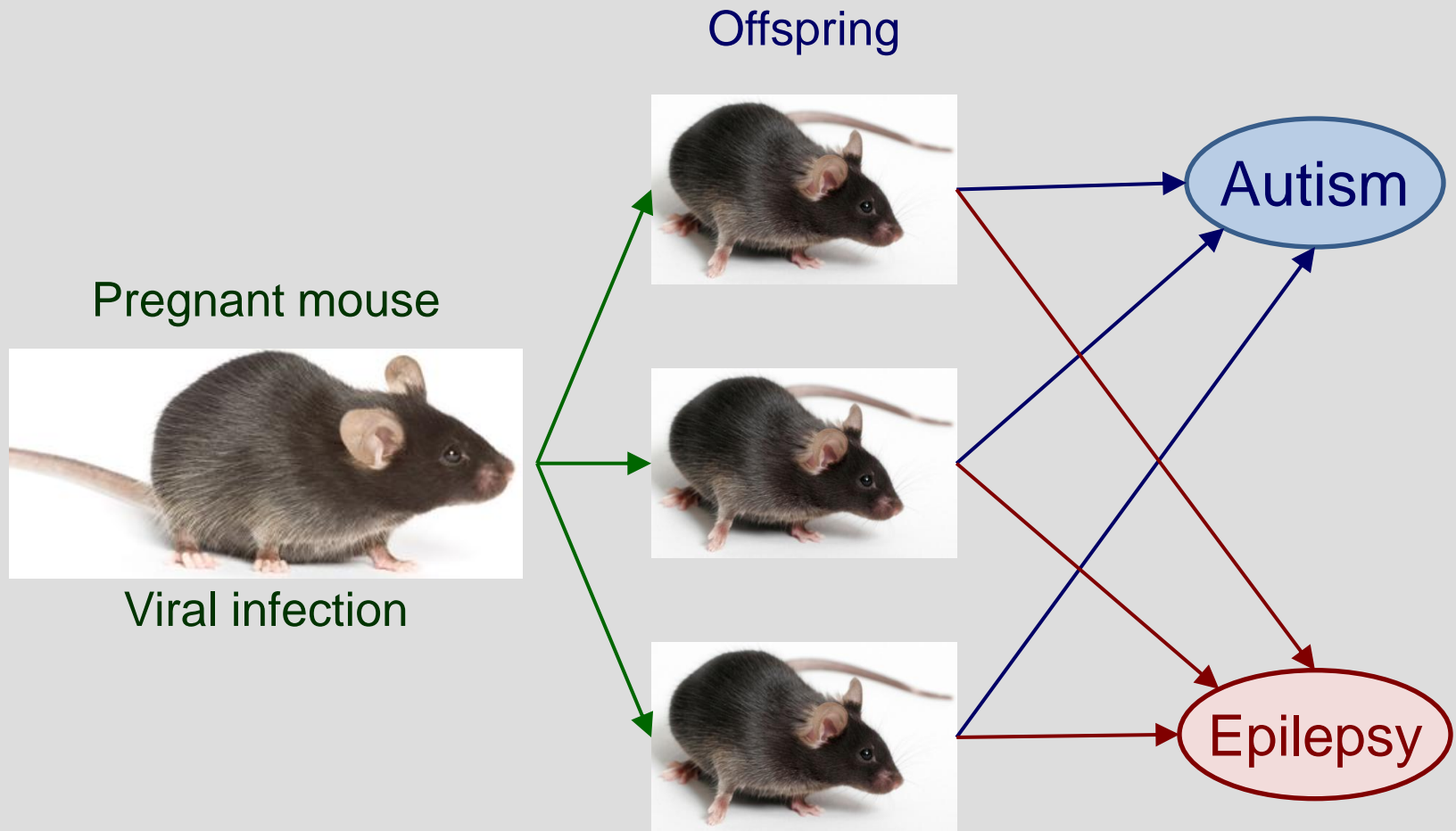
J Autism Dev Disord (2010) 40:1423–1430

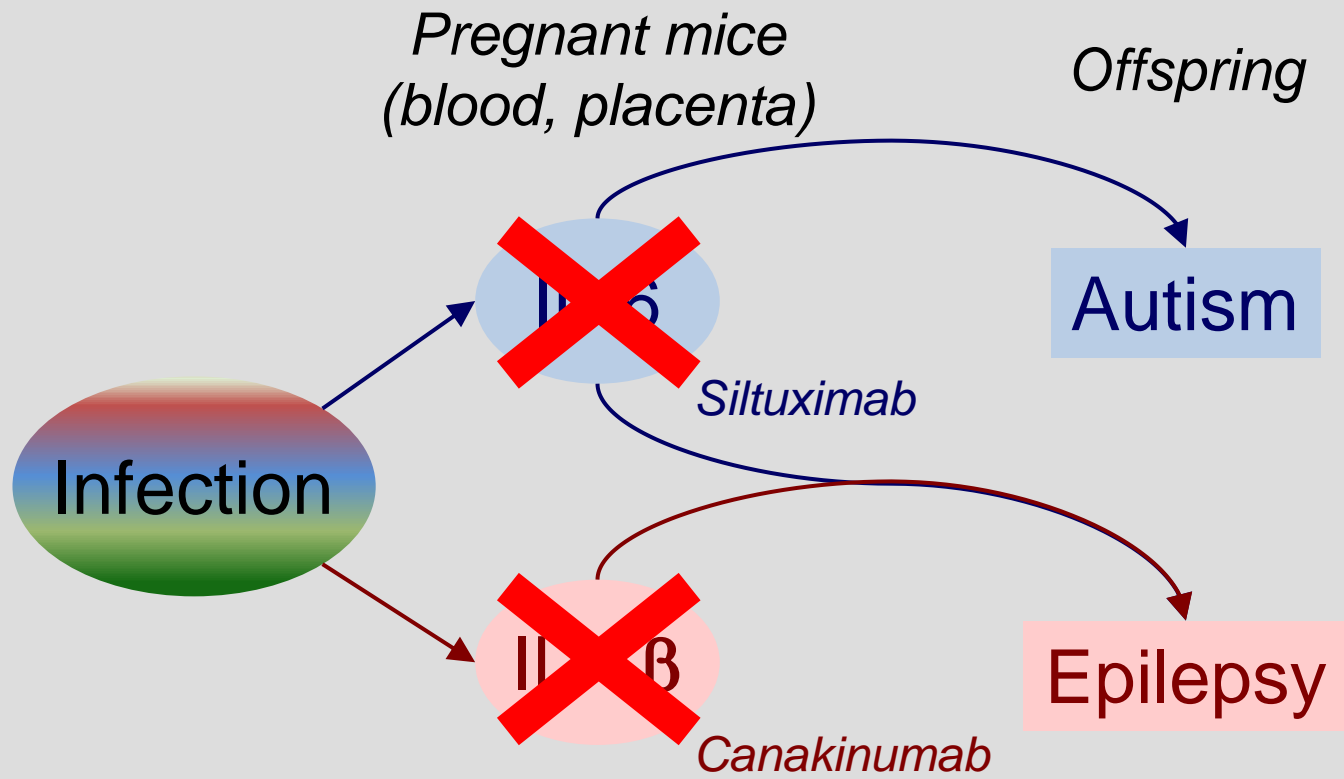
DOI 10.1007/s10803-010-1006-y

ORIGINAL PAPER

Maternal Infection Requiring Hospitalization During Pregnancy and Autism Spectrum Disorders

Hjördis Ó. Atladóttir · Poul Thorsen · Lars Østergaard ·
Diana E. Schendel · Sanne Lemcke · Morsi Abdallah ·
Erik T. Parner





Smith et al., J Neurosci, 2007

Pineda et al., Annals of Neurology, 2013

- Animal models allow reproducing not only epileptic seizures, but also various psychiatric, cognitive and behavioural abnormalities associated with epilepsy
- Animal models allow gaining insight into mechanisms of comorbidities using approaches and techniques that are prohibitive in patients
- Causes and mechanisms parallel those suggested for human disorders
- Based on effectiveness and safety data, animal studies narrow down the selection of candidates for, and improve the cost-effectiveness of preclinical trials of novel diagnostic, preventive and therapeutic tools