New insights about Zika virus infection using iPS cells

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Rio de Janeiro, Brasil

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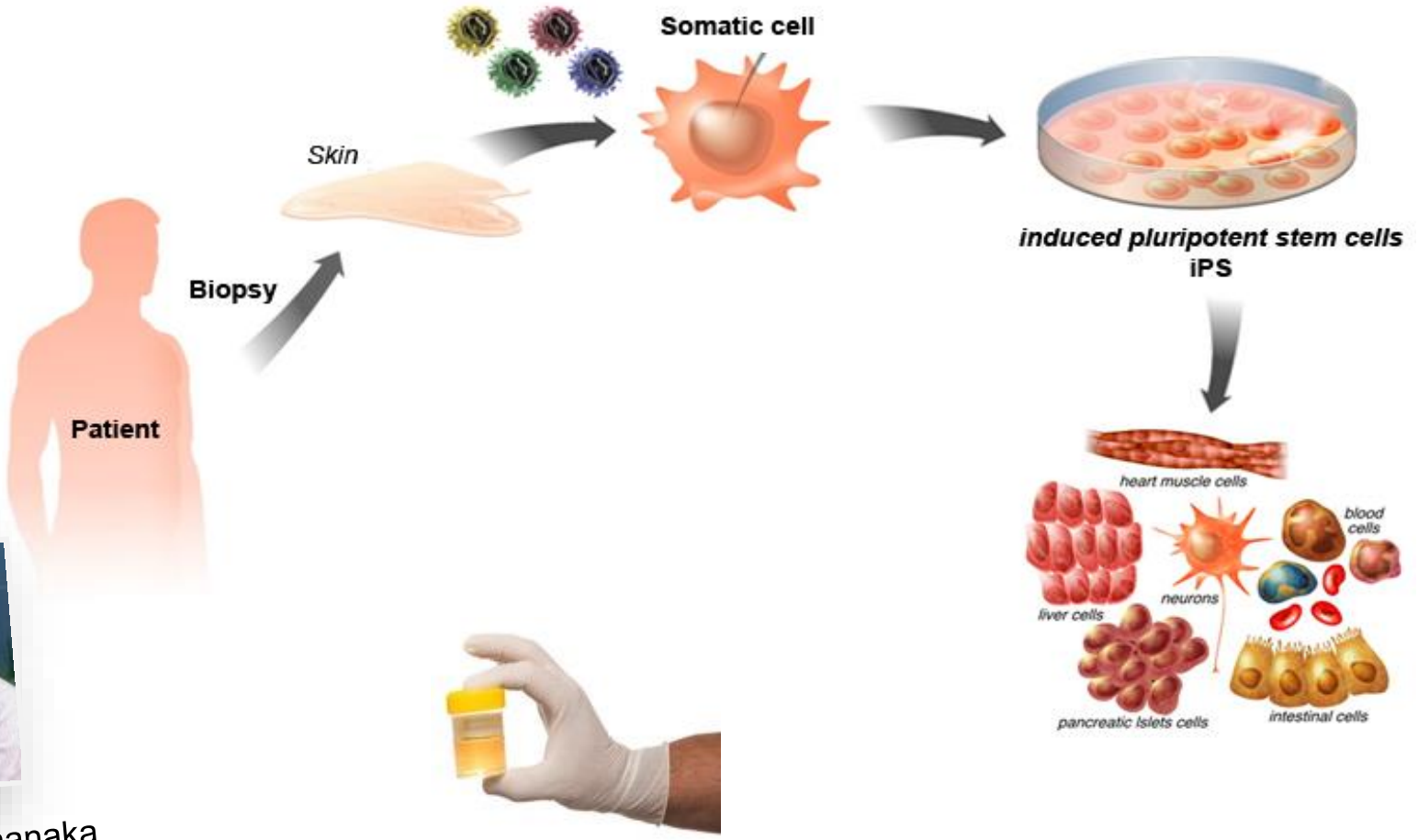
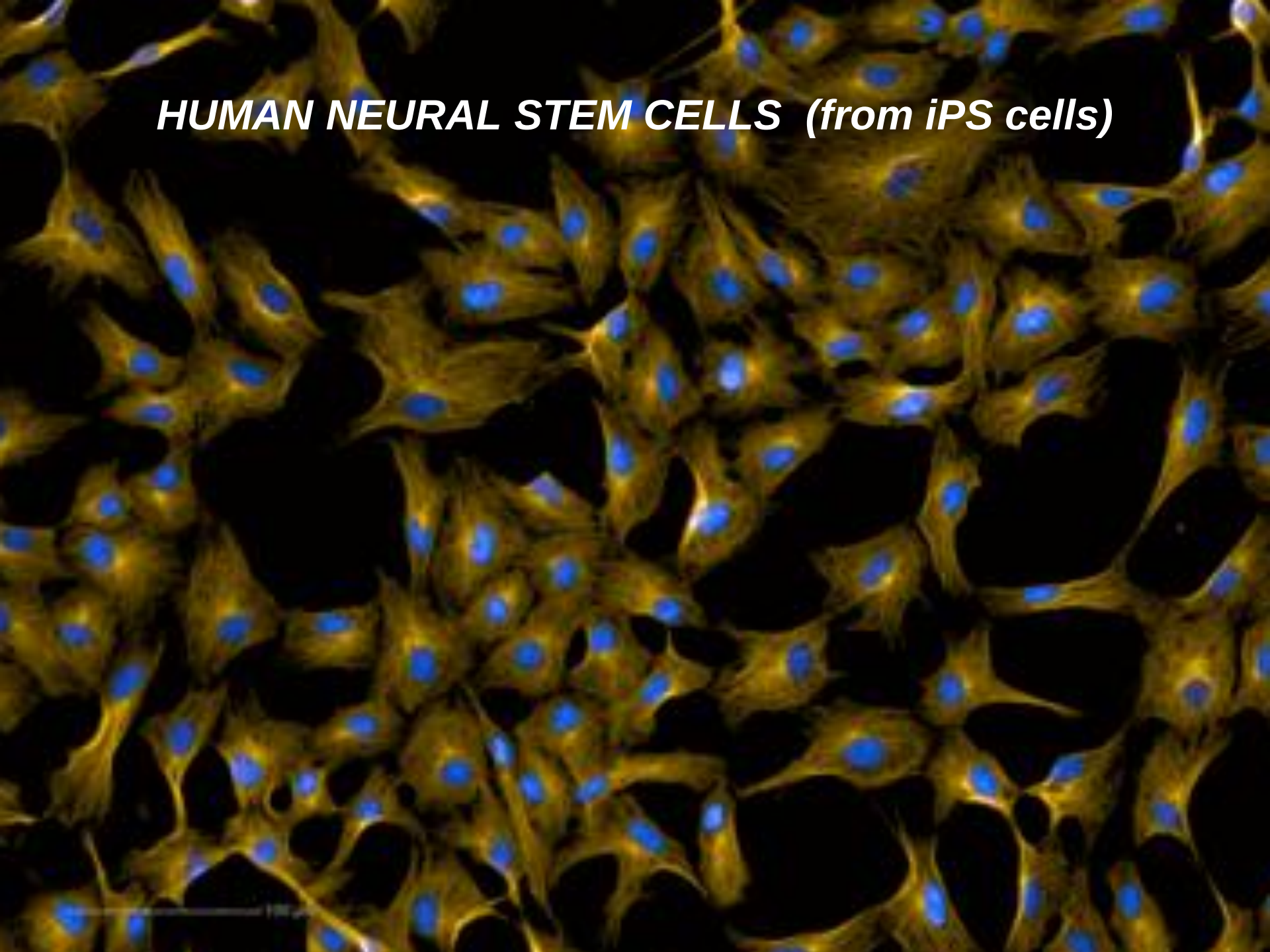
Human induced pluripotent stem cells

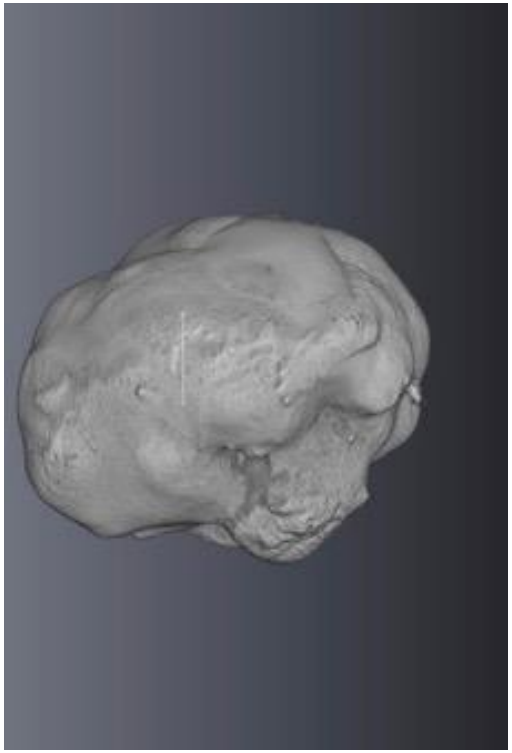


Shinya Yamanaka

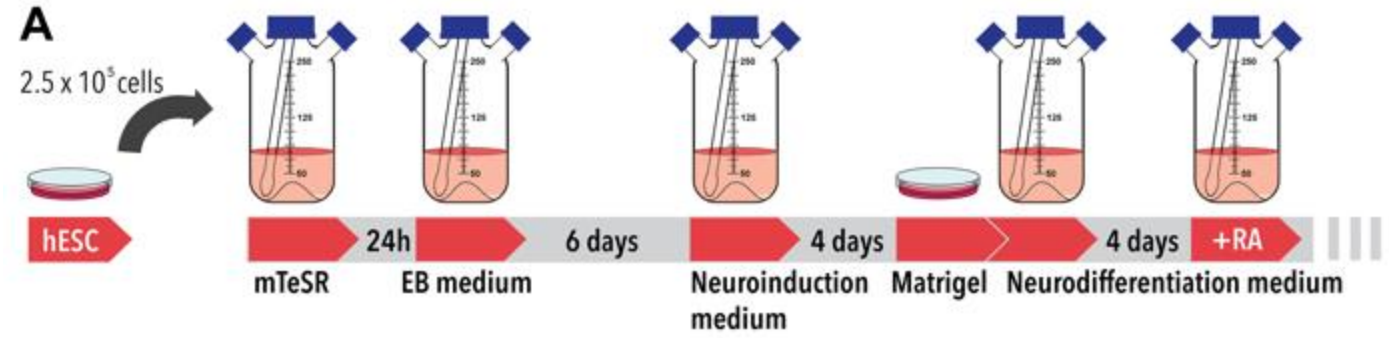

HUMAN NEURAL STEM CELLS (from iPS cells)

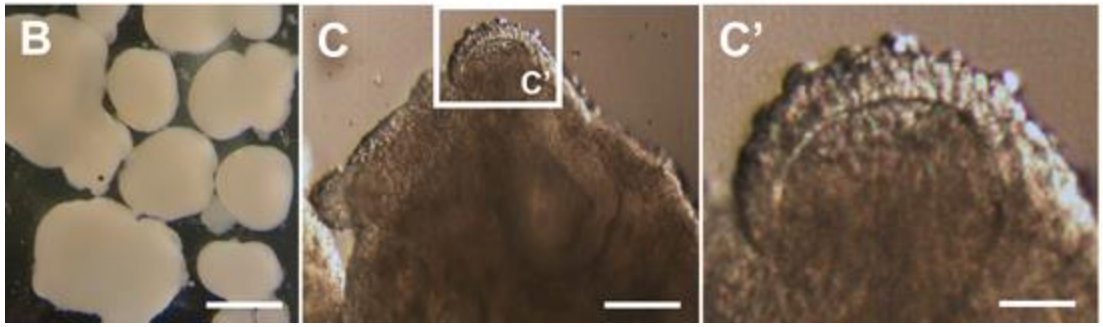
HUMAN BRAIN ORGANOIDS (MINIBRAINS)

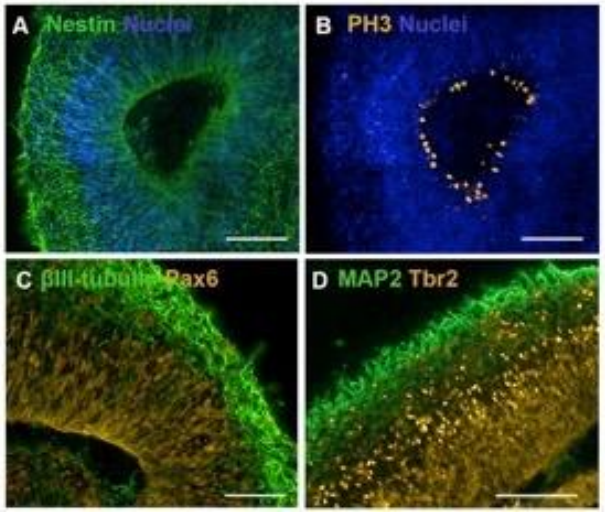
Sartore *et al*, PeerJ (2017)

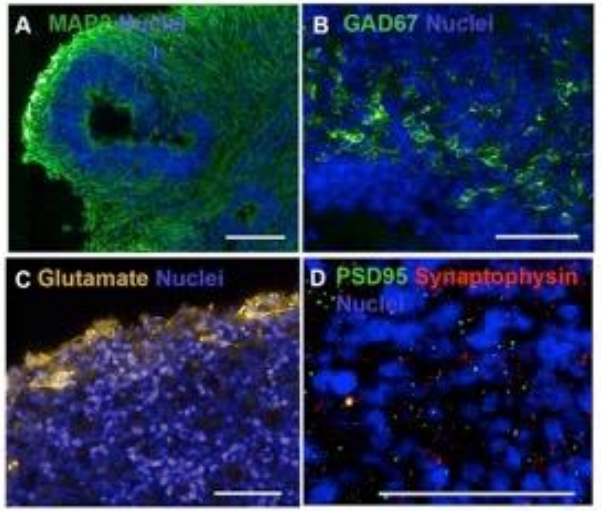


Sartore *et al*, PeerJ (2017)



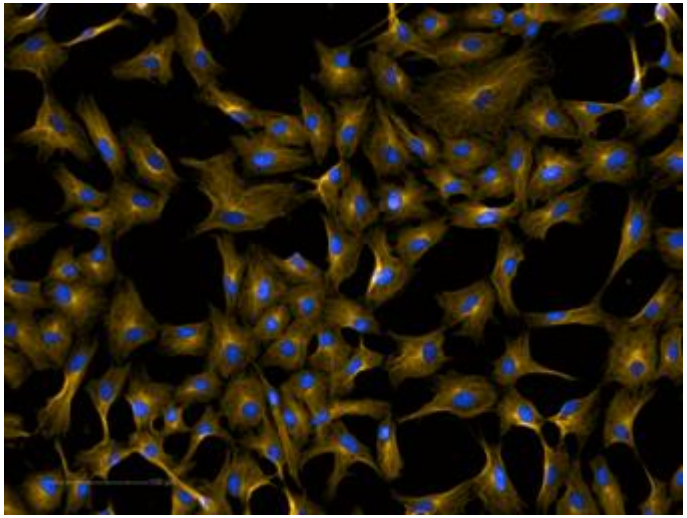


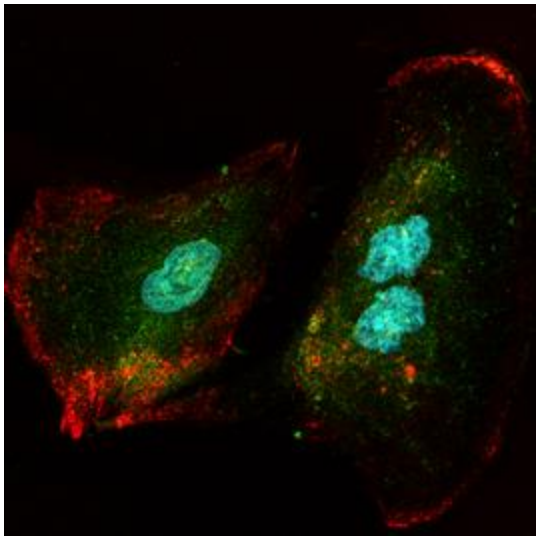


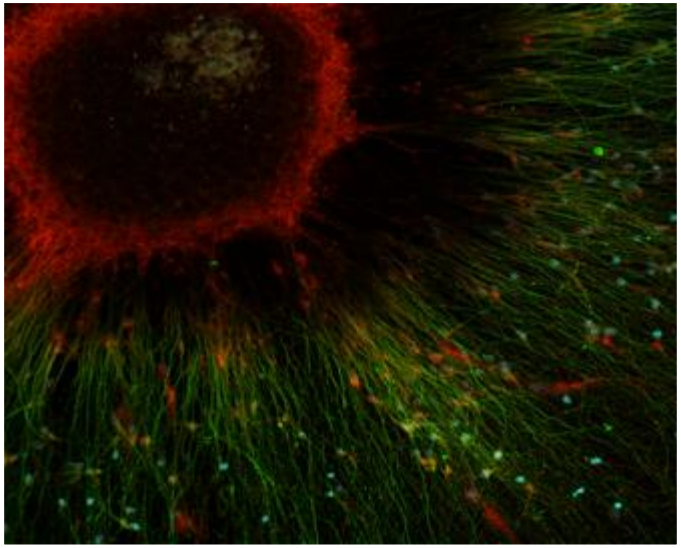


Sartore *et al*, PeerJ (2017)

Cellular models to study brain development *in vitro*







Nº	Linhagem	Origem	Condição
1	CF-2	Fibroblasto	Controle
2	CF-1	Fibroblasto	Controle
3	CF-3	Fibroblasto	Controle
4	C8	Urotélio	Controle
5	C-12	Urotélio	Controle
6	C-13	Urotélio	Controle
7	C-15	Urotélio	Controle
8	C-16	Urotélio	Controle
9	DRVT-1	Urotélio	Síndrome de Dravet
10	DRVT-2	Urotélio	Síndrome de Dravet
11	DRVT-3	Urotélio	Síndrome de Dravet
12	ADHD-2	Urotélio	Controle
13	ADHD-5	Urotélio	TDAH
14	ADHD-24	Urotélio	TDAH
15	C-1	Urotélio	Controle
16	C-2	Urotélio	Controle
17	ADHD-4	Urotélio	TDAH
18	ADHD-10	Urotélio	TDAH
19	DCC4	Urotélio	Controle
20	EZQ-3	Fibroblasto	Esquizofrenia
21	EZQ-4	Fibroblasto	Esquizofrenia
22	EZQ-9	Fibroblasto	Esquizofrenia
23	TOC4	Urotélio	TOC
24	CF-4	Fibroblasto	Controle
25	CF-5	Fibroblasto	Controle
26	CF-7	Fibroblasto	Controle
27	ALZHp-1	Fibroblasto	Alzheimer
28	DCC-1	Urotélio	Controle
29	DCC-2	Urotélio	Disgenesia do Corpo Caloso
30	C3	Urotélio	Controle
31	C5	Urotélio	Controle
32	C-18	Urotélio	Controle

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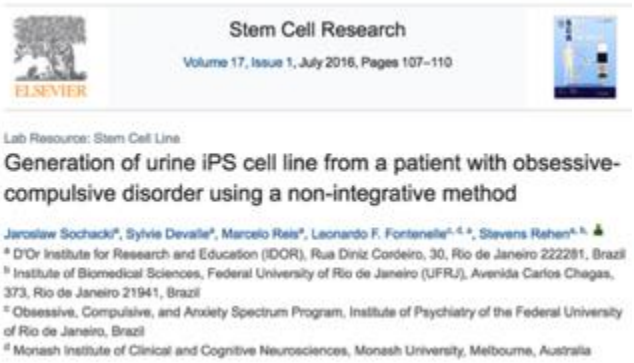
Sendai based reprogramming of urine-derived epithelial cells and fibroblasts to study mental and neurological disorders

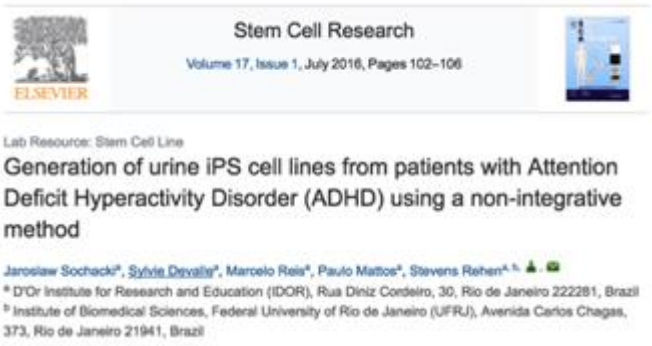


Stem Cell Research

Volume 17, Issue 1, July 2016, Pages 107–110

Lab Resource: Stem Cell Line

Generation of urine iPS cell line from a patient with obsessive-compulsive disorder using a non-integrative method

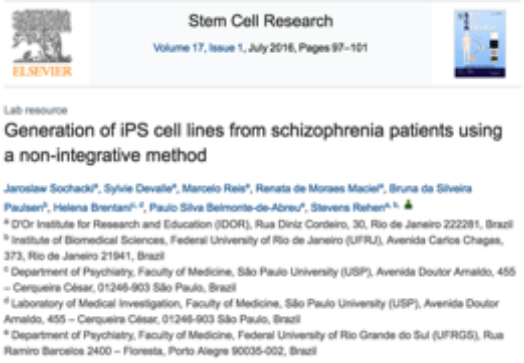


Stem Cell Research

Volume 17, Issue 1, July 2016, Pages 102–106

Lab Resource: Stem Cell Line

Generation of urine iPS cell lines from patients with Attention Deficit Hyperactivity Disorder (ADHD) using a non-integrative method



Stem Cell Research

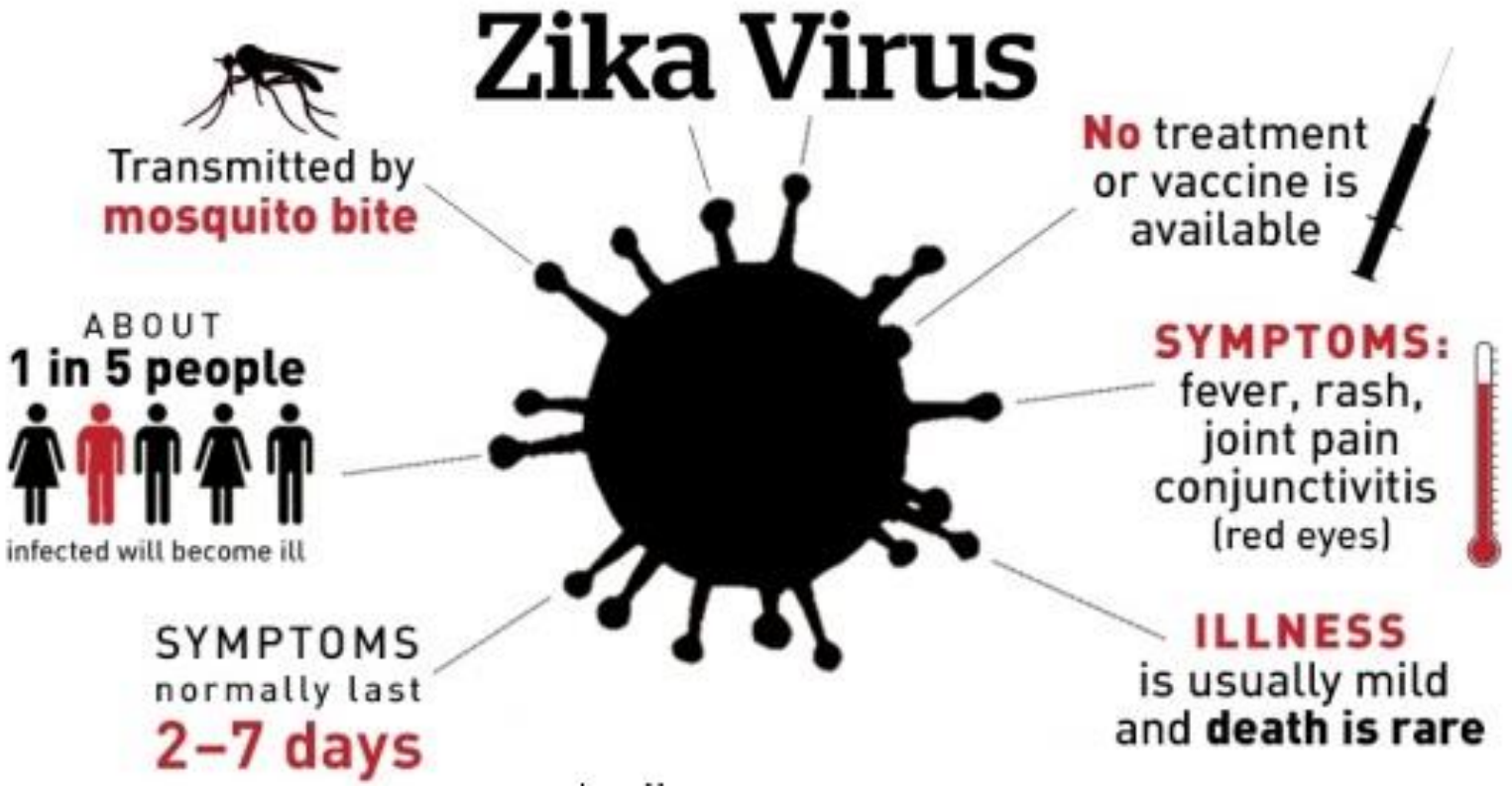
Volume 17, Issue 1, July 2016, Pages 97–101

Lab resource

Generation of iPS cell lines from schizophrenia patients using a non-integrative method

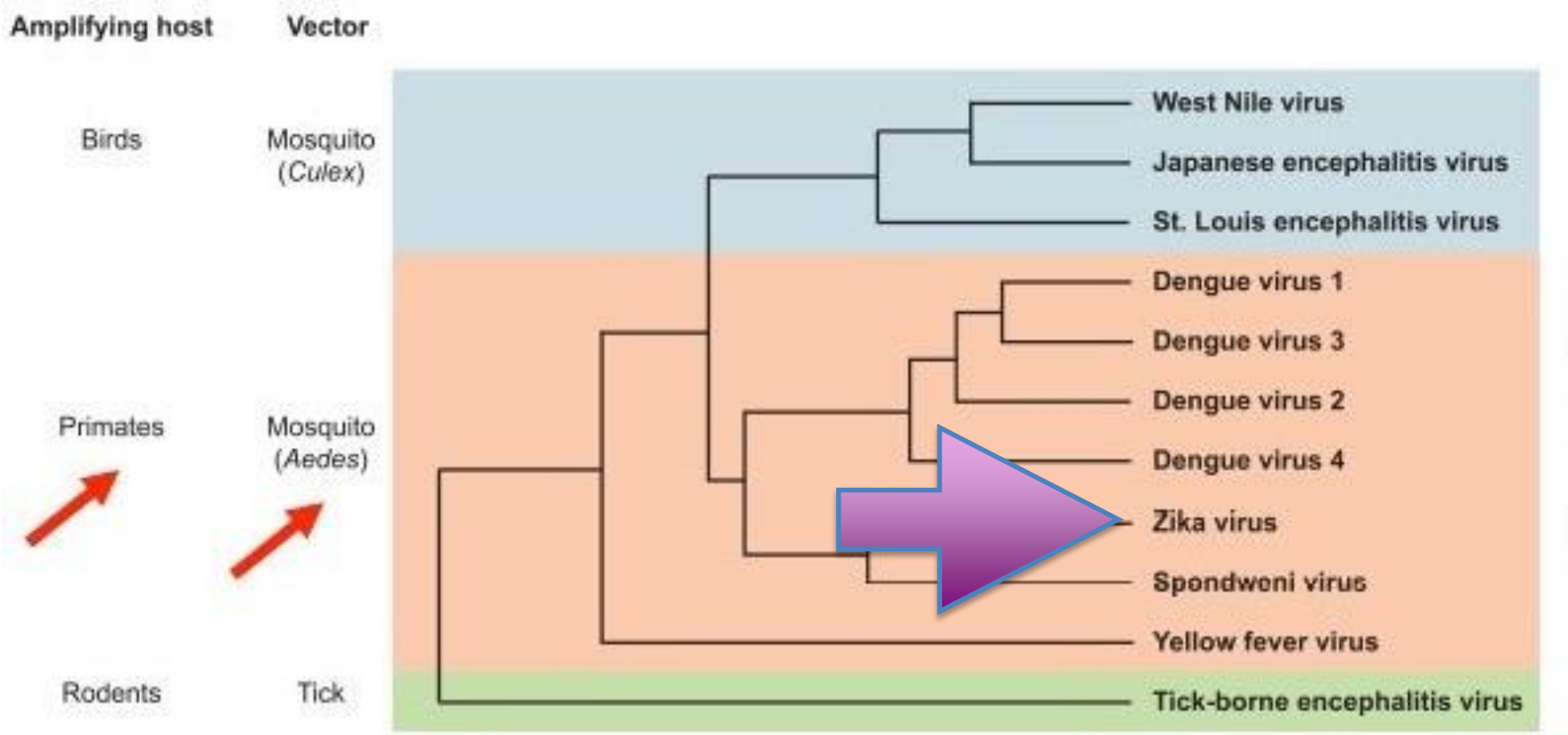

Uganda


ZIIKA FOREST.



http://drrajivdesaimd.com/2016/05/12/zika/

Flaviviruses



http://drrajivdesaimd.com/2016/05/12/zika/

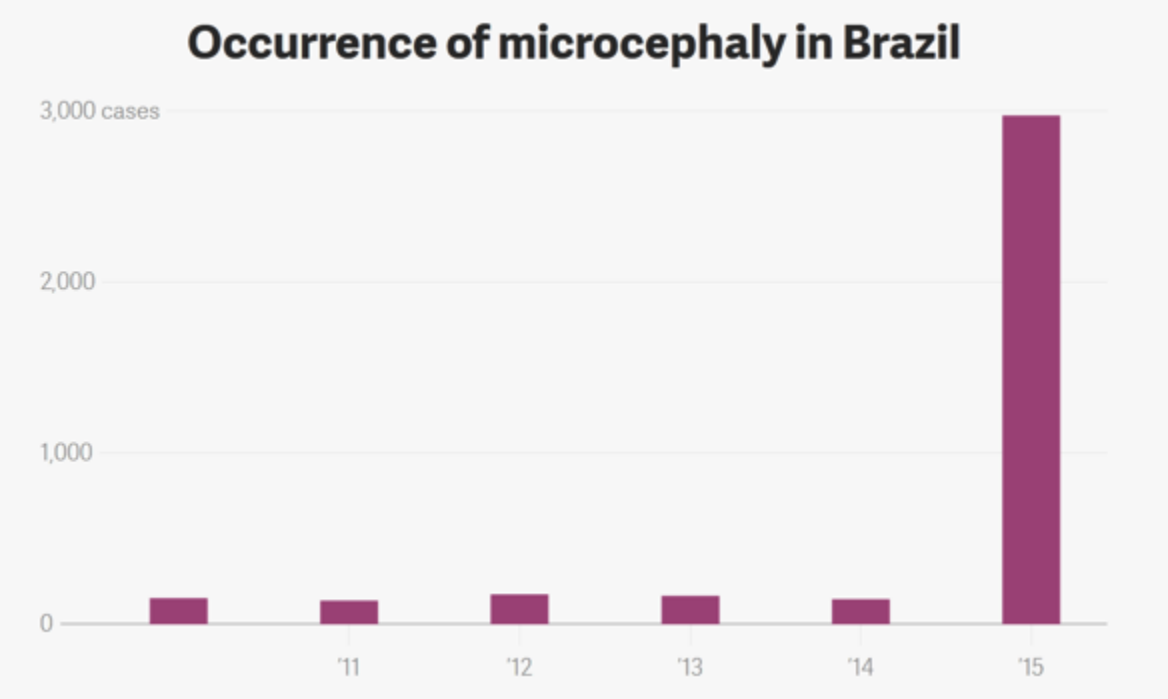
Phylogeographic analyses illustrating the lineage of the Zika virus currently circulating in Brazil

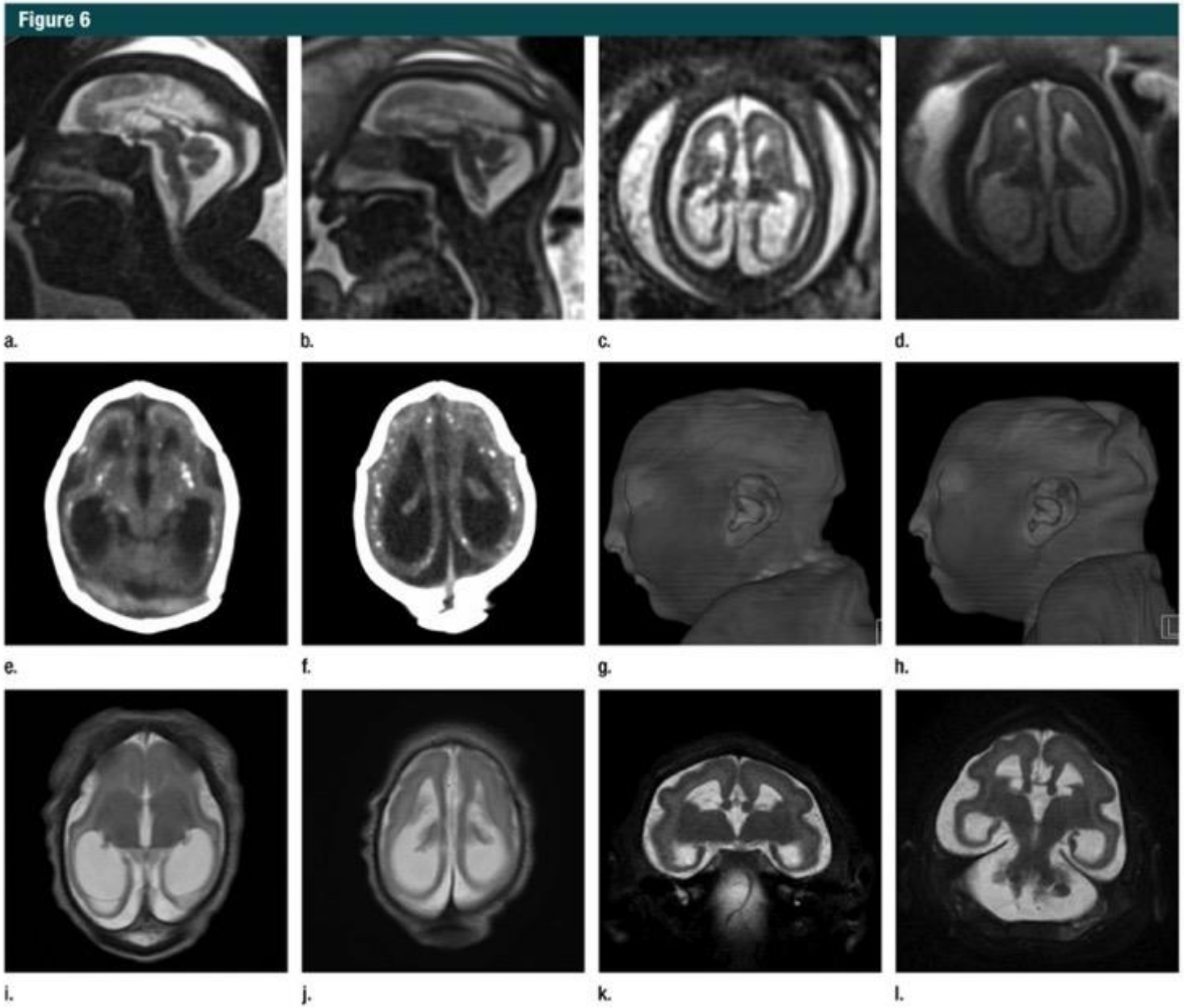
Introduction of Zika virus in Brazil: May, 2013

Malone RW, PLoS Negl Trop Dis 2016

PLOS | NEGLECTED TROPICAL DISEASES

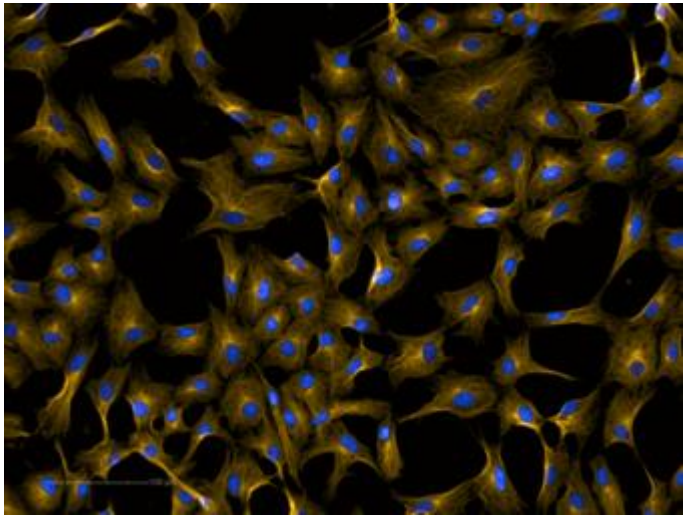
174,000 cases of zika in Brazil
11,059 in pregnant women

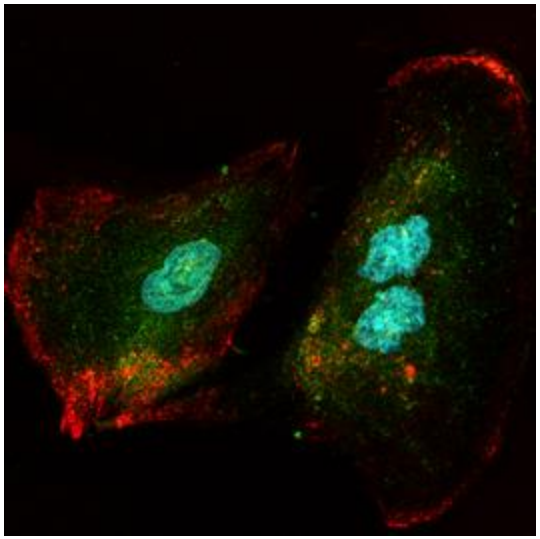


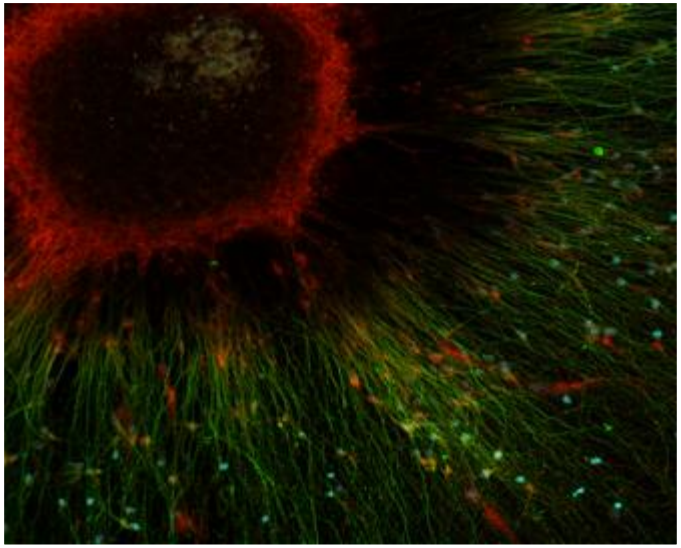


Oliveira-Szejnfeld et al, Radiology (2016)

Cellular models to study brain development *in vitro*







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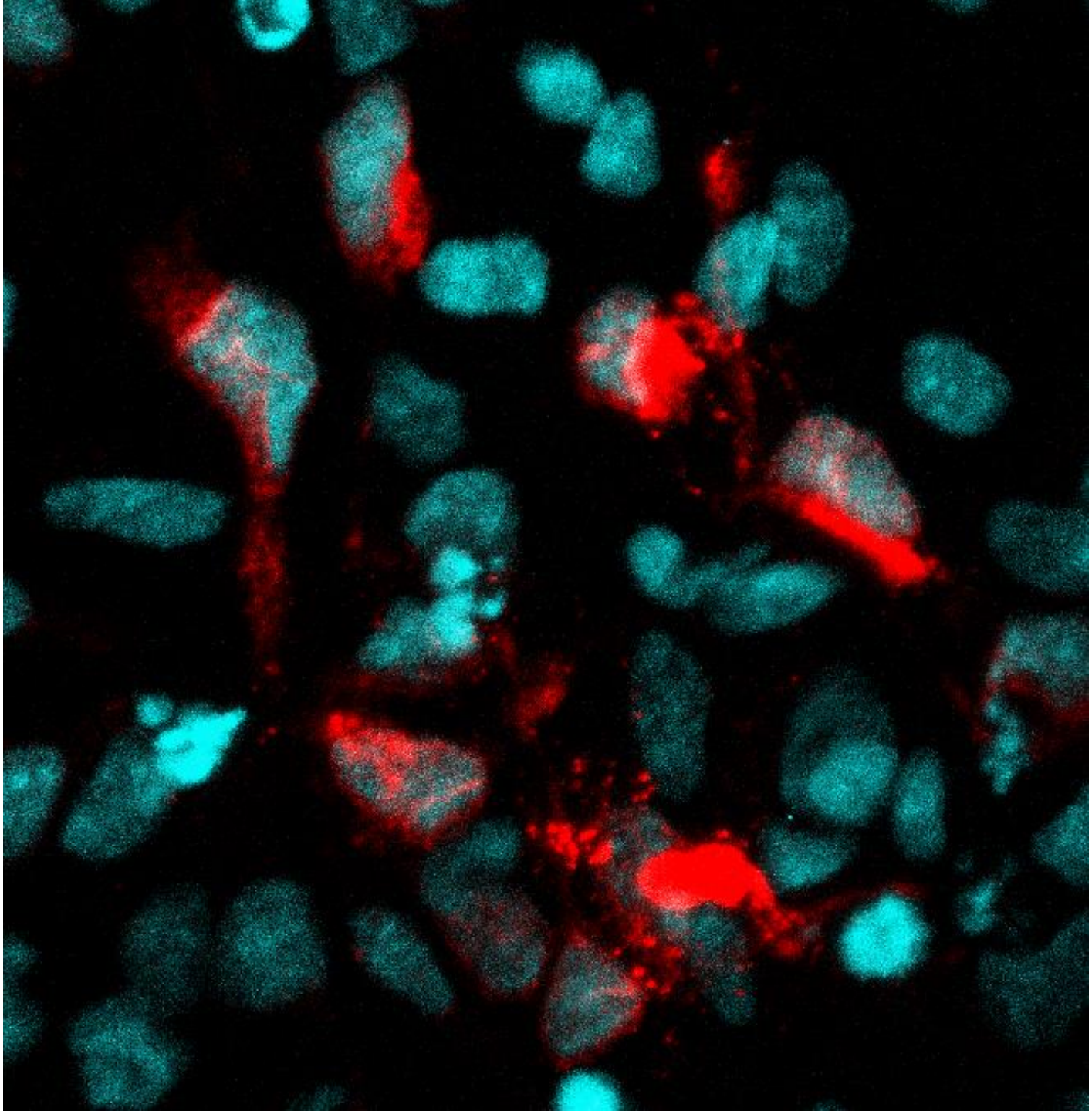
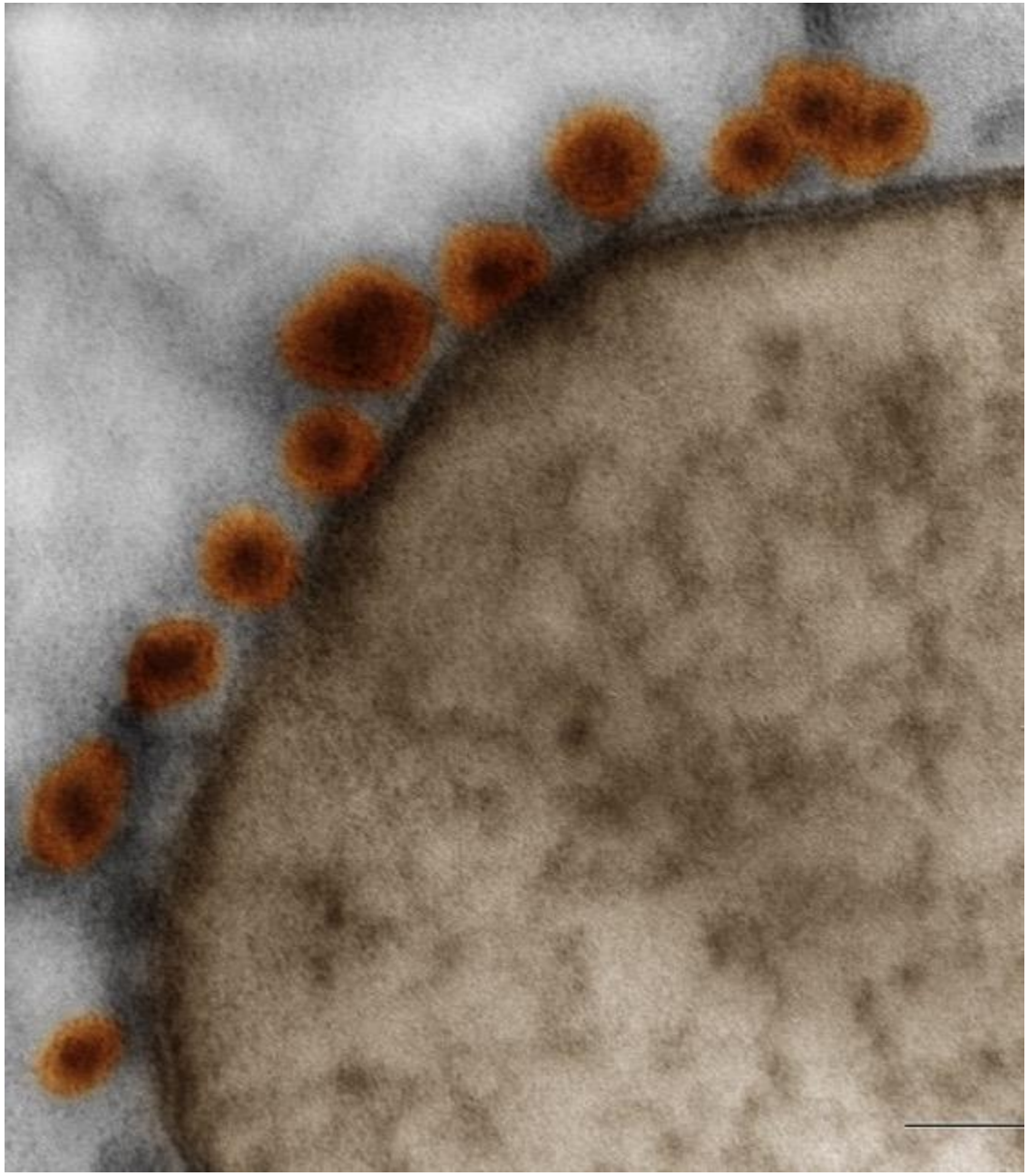
1) The consequences of ZIKV infection during neurogenesis and growth of human brain organoids

1) Insights about the molecular mechanisms of ZIKV infection

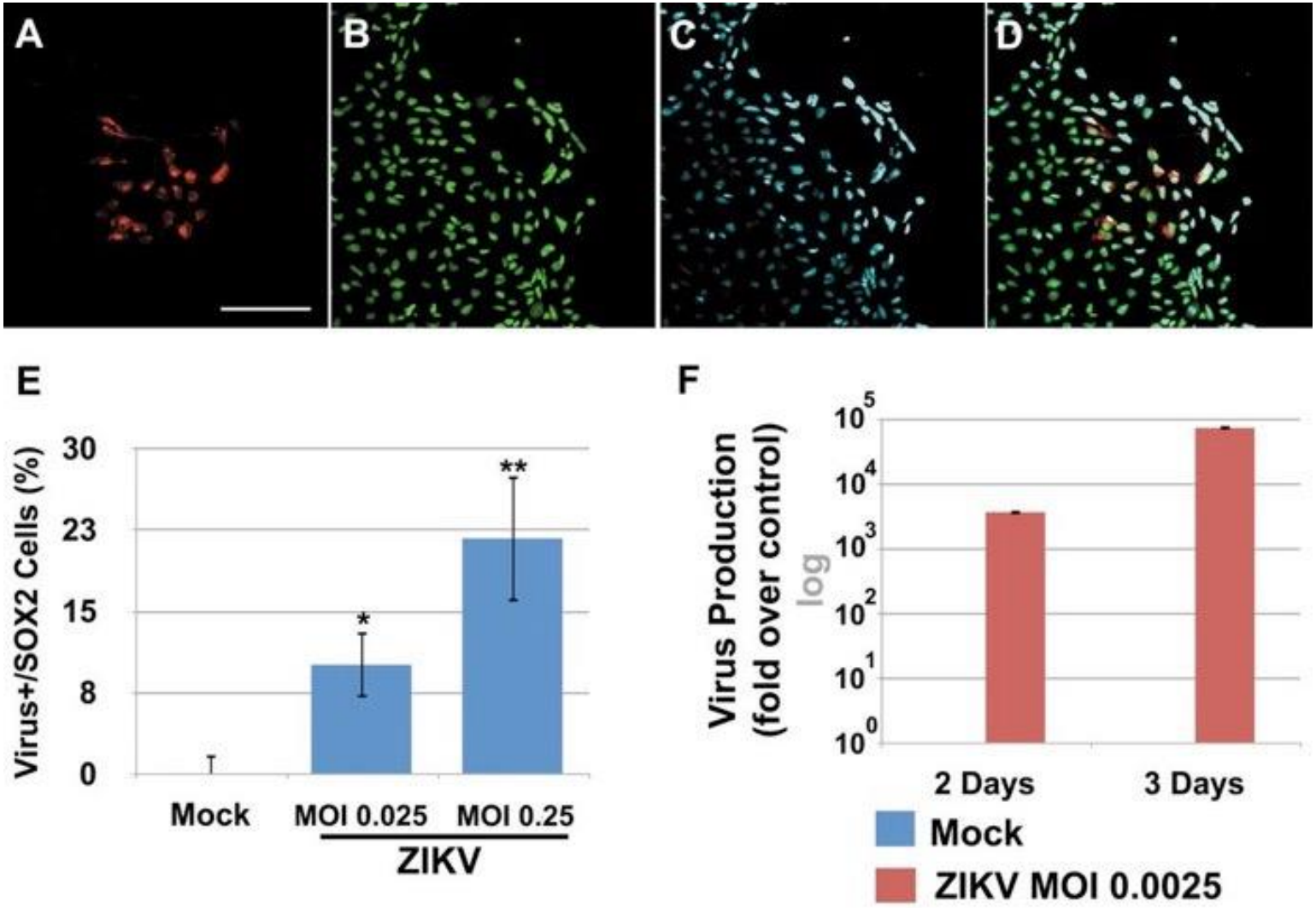
1) A platform based on iPS cell models to anticipate the consequences and to drug screen for TORCHES and other viruses



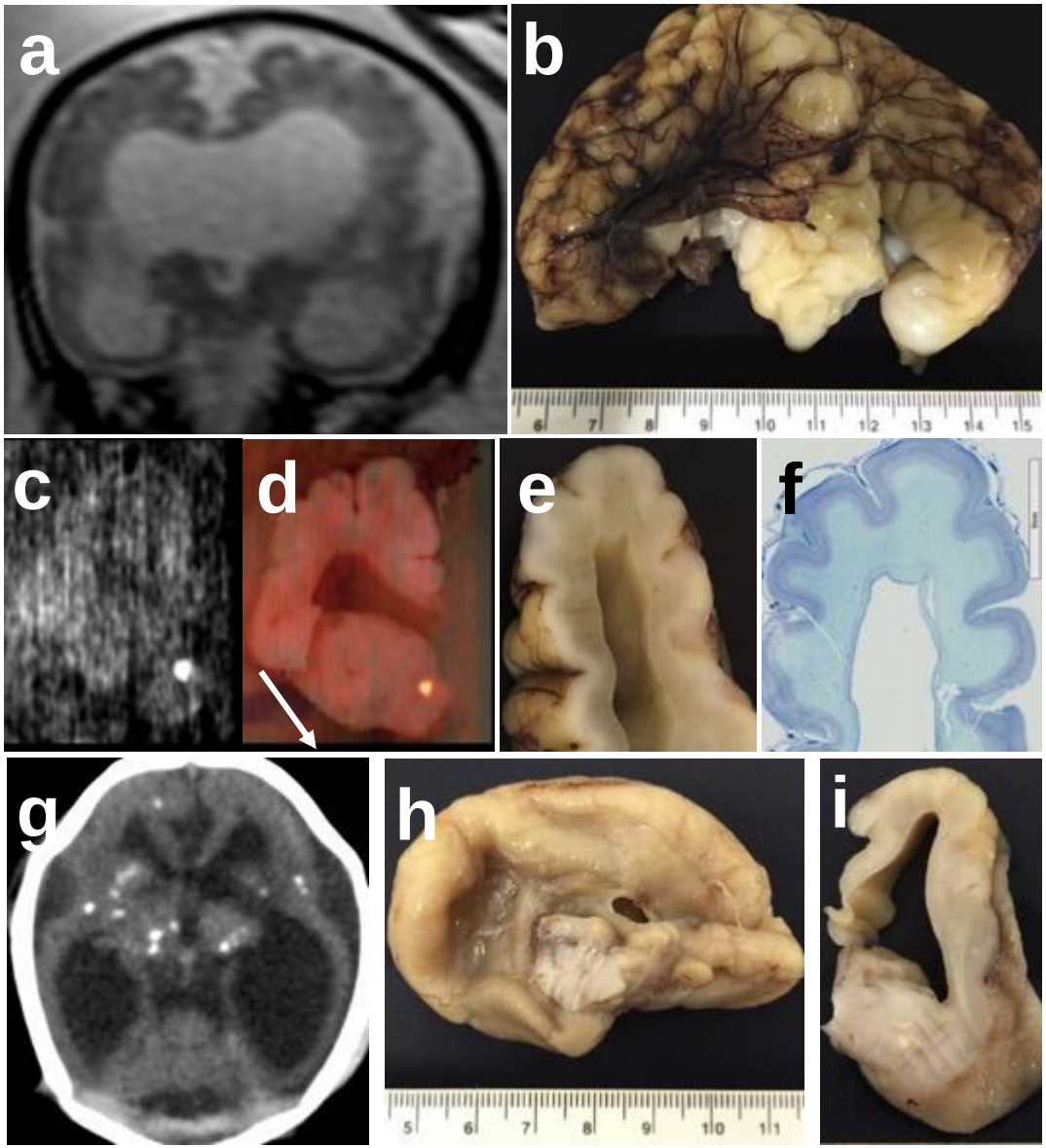


Garcez et al, Science (2016)

ZIKV infects human neural stem cells



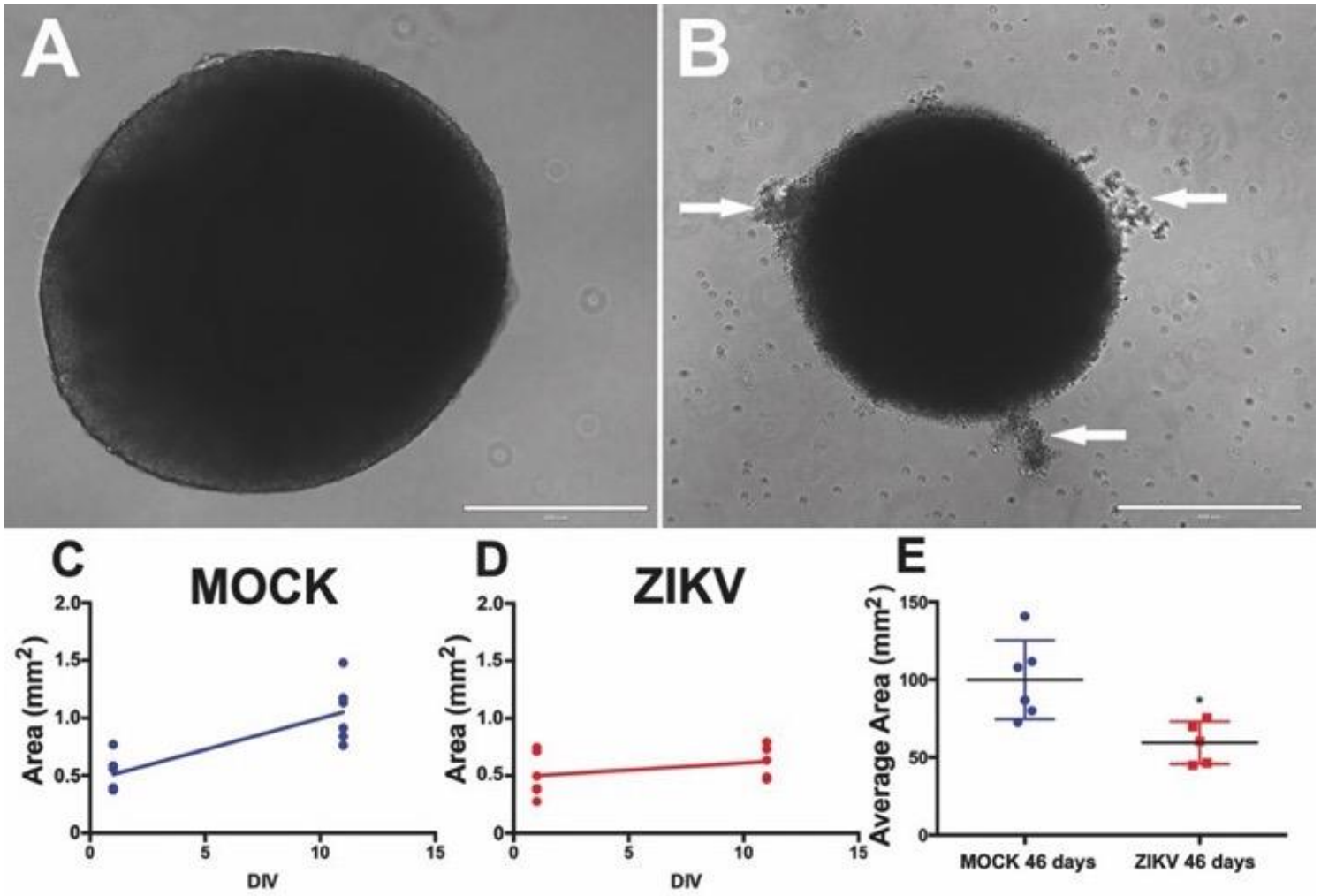
Garcez *et al*, Science (2016)



Chimelli *et al*, Acta Neuropathologica (2017)

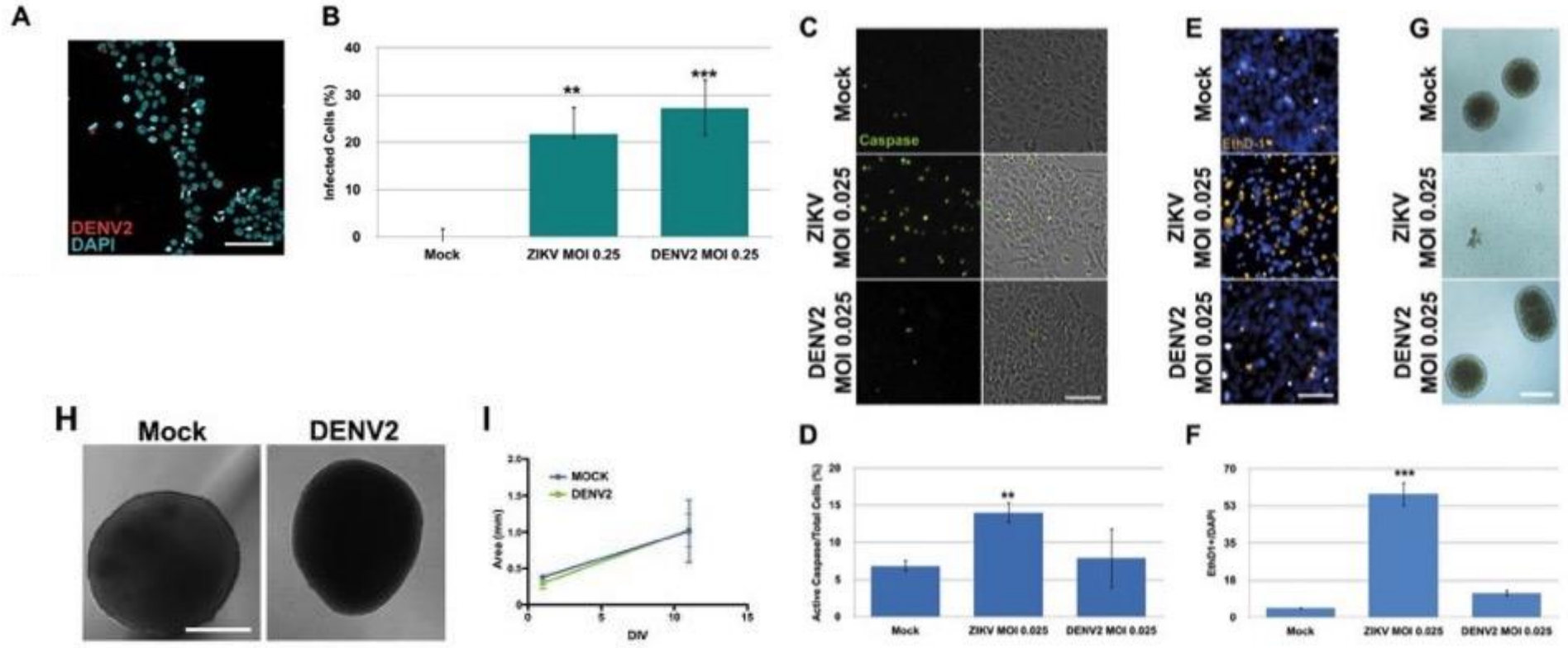
Sartore *et al*, PeerJ (2017)

ZIKV reduces the growth rate of human brain organoids



Garcez *et al*, Science (2016)

DENV2 infects human neural stem cells but does not impair growth in neurospheres and brain organoids



Garcez *et al*, Science (2016)

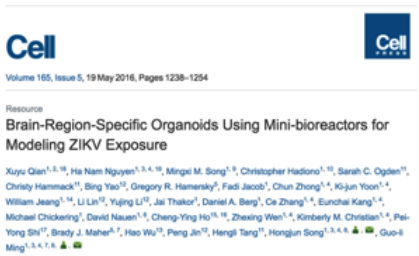
Science

REPORTS

Cite as: Garcez *et al.*, *Science*
10.1126/science.aaf6116 (2016).

Zika virus impairs growth in human neurospheres and brain organoids

Patricia P. Garcez,[1,2*] Erick Correia Loiola,[2†] Rodrigo Madeiro da Costa,[2†] Luiza M. Higa,[3†] Pablo Trindade,[2†] Rodrigo Delvecchio,[3] Juliana Minardi Nascimento,[3,4] Rodrigo Brindeiro,[3] Amilcar Tanuri,[3] Stevens K. Rehen[2,1*]



Cell

Volume 165, Issue 5, 19 May 2016, Pages 1238–1254

Resource

Brain-Region-Specific Organoids Using Mini-bioreactors for Modeling ZIKV Exposure

Xuyu Qian[1, 2, 10], Ha Nam Nguyen[1, 3, 4, 10], Mingxi M. Song[1, 9], Christopher Hadiono[1, 10], Sarah C. Ogden[11], Christy Hammack[11], Bing Yao[12], Gregory R. Hamersky[5], Fadi Jacob[1], Chun Zhong[1, 4], Ki-jun Yoon[1, 4], William Jeang[1, 14], Li Lin[12], Yujing Li[12], Jai Thakor[1], Daniel A. Berg[1], Ce Zhang[1, 4], Eunchai Kang[1, 4], Michael Chickering[1], David Nauen[1, 8], Cheng-Ying Ho[13, 15], Zhexing Wen[1, 4], Kimberly M. Christian[1, 4], Pei-Yong Shi[17], Brady J. Maher[6, 7], Hao Wu[12], Peng Jin[12], Hengli Tang[11], Hongjun Song[1, 3, 4, 6], Guo-li Ming[1, 3, 4, 7, 8]

nature

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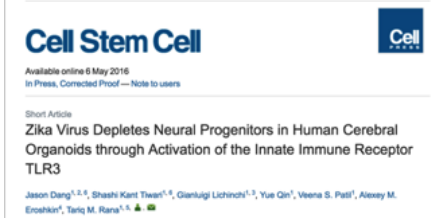
Advance Online Publication | Letters | Article

NATURE | LETTER near-final version

The Brazilian Zika virus strain causes birth defects in experimental models

Fernanda R. Cugola, Isabella R. Fernandes, Fabiele B. Russo, Beatriz C. Freitas, João L. M. Dias, Katia P. Guimarães, Cecilia Benazzato, Nathalia Almeida, Graciela C. Pignatari, Sarah Romero, Carolina M. Polonio, Isabela Cunha, Carla L. Freitas, Wesley N. Brandão, Cristiano Rossato, David G. Andrade, Daniele de P. Faria, Alexandre T. Garcez, Carlos A. Buchpigel, Carla T. Braconi, Erica Mendes, Amadou A. Sall, Paolo M. de A. Zanotto, Jean Pierre S. Peron, Alysson R. Muotri + *et al.*



Cell Stem Cell

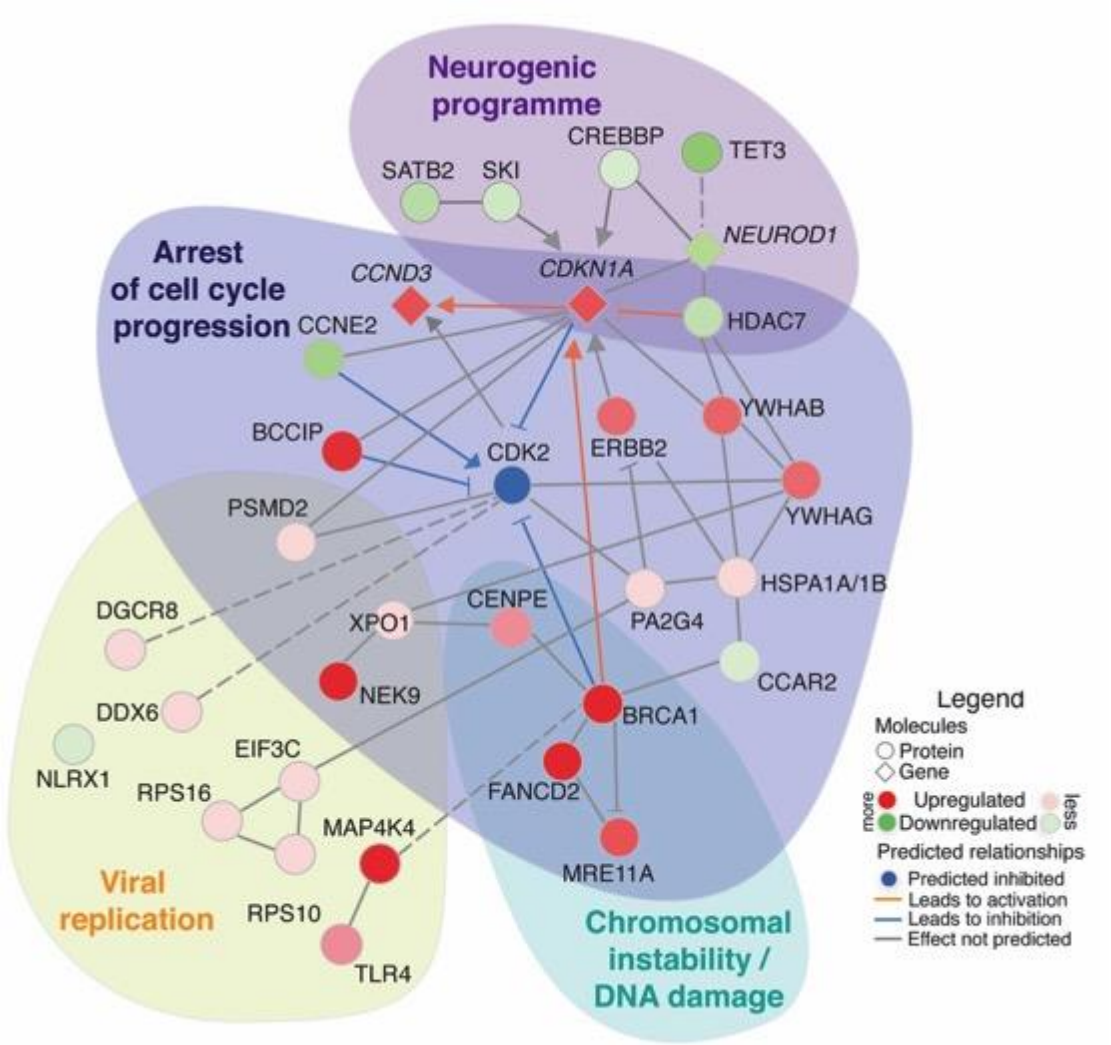
Available online 6 May 2016
In Press, Corrected Proof — Note to users

Short Article

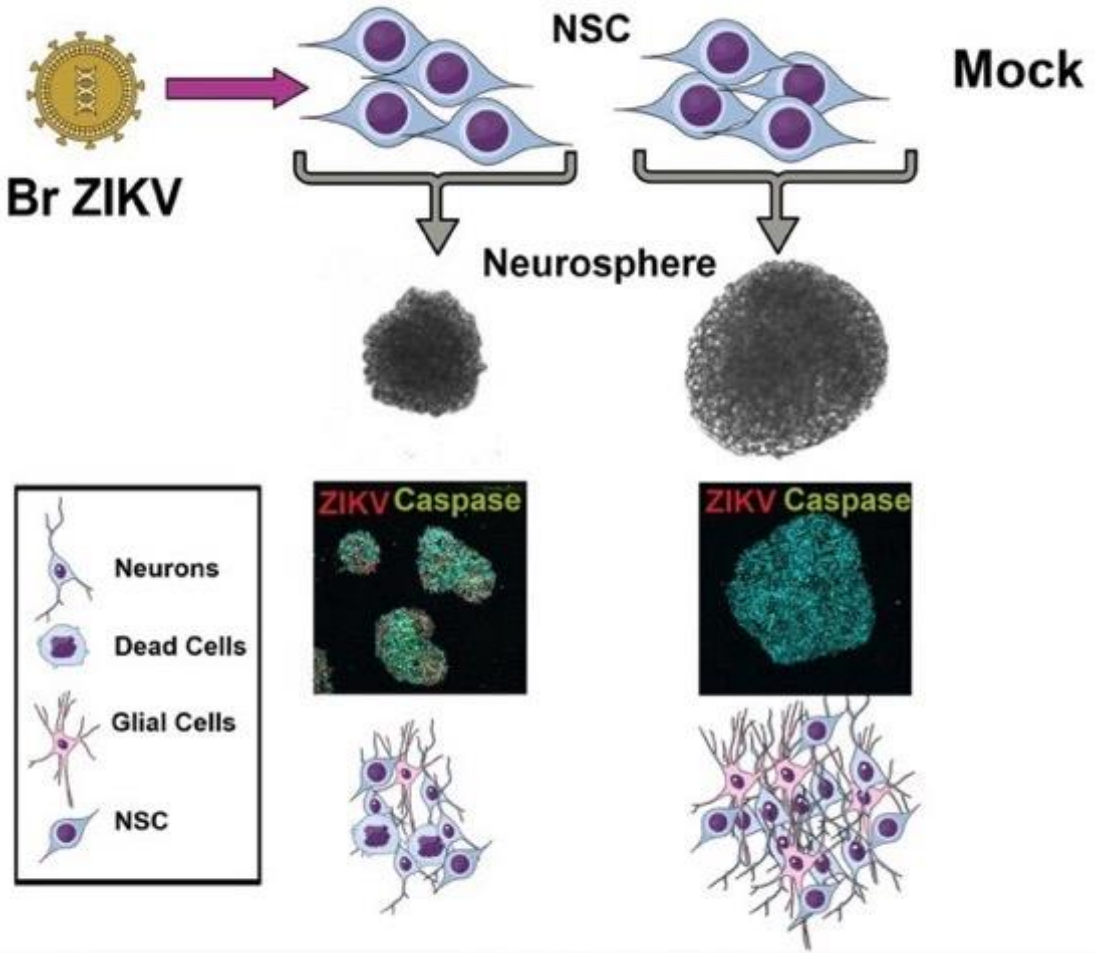
Zika Virus Depletes Neural Progenitors in Human Cerebral Organoids through Activation of the Innate Immune Receptor TLR3

Jason Dang[1, 2, 6], Shashi Kant Tiwari[1, 6], Gianluigi Lichinchi[1, 3], Yue Qin[1], Veena S. Patil[1], Alexey M. Eroshkin[4], Tariq M. Rana[1, 5]

Network interactive representation of molecular relationship among regulated molecules in ZIKV-infected neurospheres



Garcez *et al*, Scientific Reports (2017)



Garcez *et al*, Scientific Reports (2017)

SCIENTIFIC REPORTS

Article | OPEN

Zika virus disrupts molecular fingerprinting of human neurospheres

Patricia P. Garcez ✉, Juliana Minardi Nascimento, Janaina Mota de Vasconcelos, Rodrigo Madeiro da Costa, Rodrigo Delvecchio, Pablo Trindade, Erick Correia Loiola, Luiza M. Higa, Juliana S. Cassoli, Gabriela Vitória, Patricia C. Sequeira, Jaroslaw Sochacki, Renato S. Aguiar, Hellen Thais Fuzii, Ana M. Bispo de Filippis, João Lídio da Silva Gonçalves Vianez Júnior, Amilcar Tanuri, Daniel Martins-de-Souza ✉ & Stevens K. Rehen ✉

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EDITORS' CHOICE | EMERGING INFECTIONS

Kill or be killed: The epic battle between Zika virus and cells revealed

Kwanghun Chung

+ See all authors and affiliations

Science Translational Medicine 08 Mar 2017:
Vol. 9, Issue 380, eaam9859
DOI: 10.1126/scitranslmed.aam9859

"This suggests that cell death in both radial glia-like cells, which are capable of generating neurons and nonneuronal cells, as well as neural stem cells might be associated with damaged DNA."

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Drug screen to identify leads for Zika virus

BNDES

FAPERJ
Fundação Carlos Chagas Filho de Amparo à Pesquisa do Estado do Rio de Janeiro

FINEP

viruses

MDPI

Article

Chloroquine, an Endocytosis Blocking Agent, Inhibits Zika Virus Infection in Different Cell Models

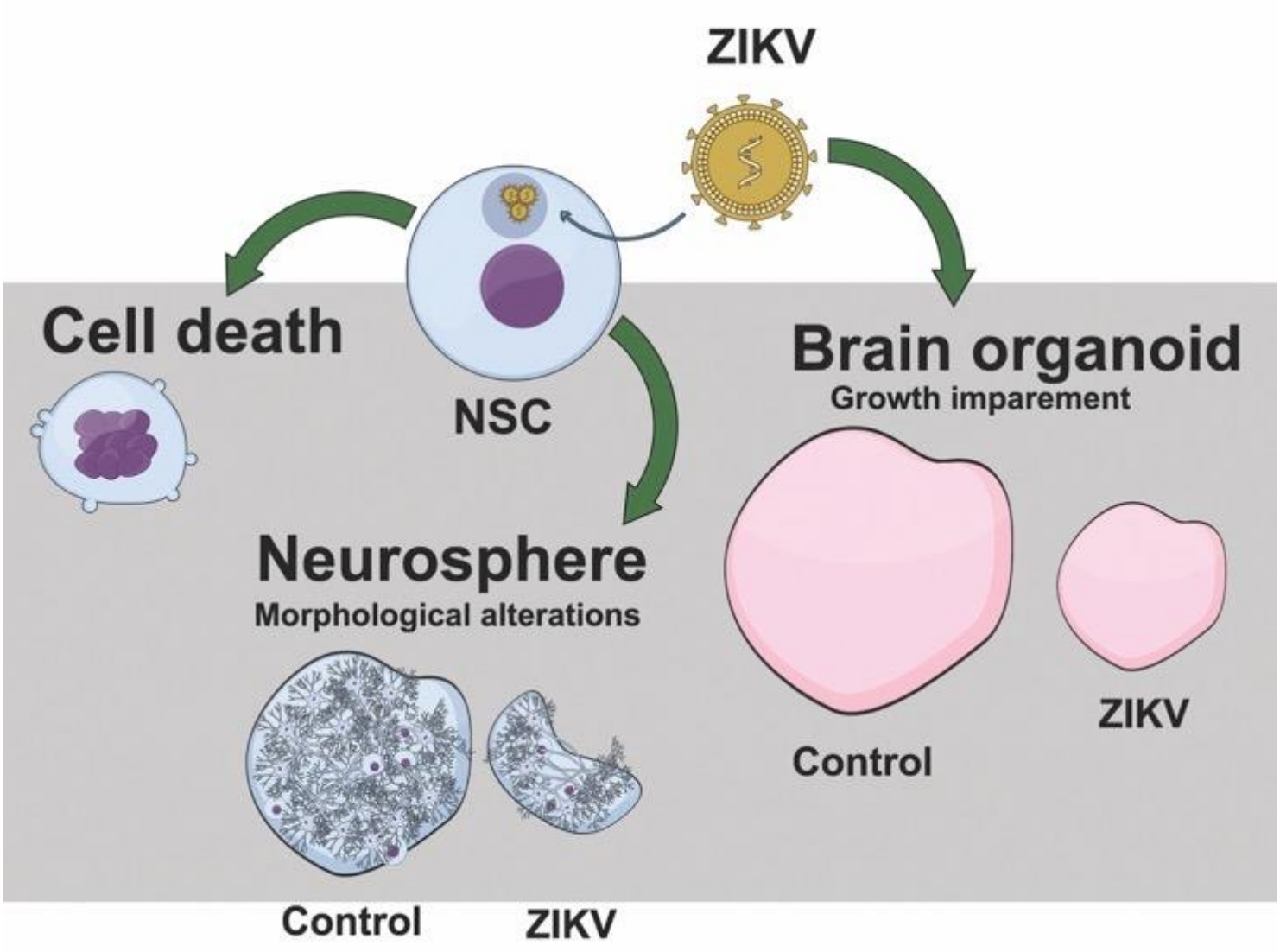
Rodrigo Delvecchio [1,†], Luiza M. Higa [1,†], Paula Pezzuto [1,†], Ana Luiza Valadão [1,†], Patrícia P. Garcez [2,3], Fábio L. Monteiro [1], Erick C. Loiola [3], André A. Dias [4], Fábio J. M. Silva [2], Matthew T. Aliota [5], Elizabeth A. Caine [5], Jorge E. Osorio [5], Maria Bellio [4], David H. O'Connor [6], Stevens Rehen [2,3], Renato Santana de Aguiar [1], Andrea Savarino [7], Loraine Campanati [2,*] and Amilcar Tanuri [1,*]

SCIENTIFIC REPORTS

Article | OPEN

The clinically approved antiviral drug sofosbuvir inhibits Zika virus replication

Carolina Q. Sacramento, Gabrielle R. de Melo […] Thiago Moreno L. Souza



Garcez et al, Science (2016)

Acta Neuropathol
DOI 10.1007/s00401-017-1699-5

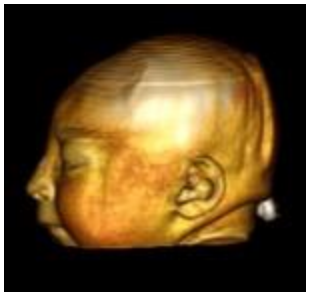
CrossMark

ORIGINAL PAPER

The spectrum of neuropathological changes associated with congenital Zika virus infection

Leila Chimelli[1] · Adriana S. O. Melo[2,3] · Elyzabeth Avvad-Portari[4] · Clayton A. Wiley[5] · Aline H. S. Camacho[1] · Vania S. Lopes[6] · Heloisa N. Machado[4] · Cecilia V. Andrade[4] · Dione C. A. Dock[4] · Maria Elisabeth Moreira[4] · Fernanda Tovar-Moll[7] · Patricia S. Oliveira-Szejnfeld[8] · Angela C. G. Carvalho[6] · Odile N. Ugarte[6] · Alba G. M. Batista[3] · Melania M. R. Amorim[2] · Fabiana O. Melo[2] · Thales A. Ferreira[2] · Jacqueline R. L. Marinho[3] · Girlene S. Azevedo[2] · Jeime I. B. F. Leal[3] · Rodrigo F. Madeiro da Costa[7] · Stevens Rehen[7] · Monica B. Arruda[9] · Rodrigo M. Brindeiro[9] · Rodrigo Delvechio[9] · Renato S. Aguiar[9] · Amilcar Tanuri[9]

Received: 3 December 2016 / Revised: 15 March 2017 / Accepted: 15 March 2017



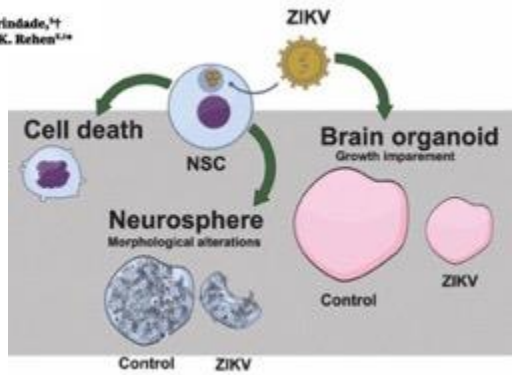
Science

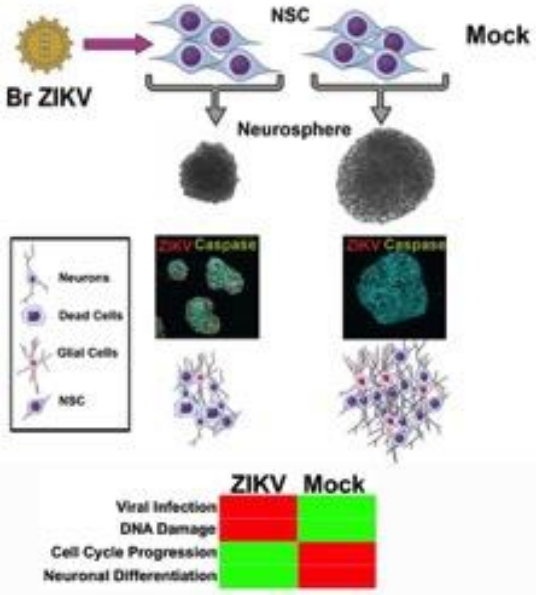
REPORTS

Cite as: Garcez et al., Science
10.1126/science.aaf6116 (2016).

Zika virus impairs growth in human neurospheres and brain organoids

Patricia P. Garcez,[1,2]* Erick Correia Loiola,[2]† Rodrigo Madeiro da Costa,[2]† Luiza M. Higa,[2]† Pablo Trindade,[2]† Rodrigo Delvecchio,[2] Juliana Minardi Nascimento,[3,4] Rodrigo Brindeiro,[5] Amilcar Tanuri,[5] Stevens K. Rehen[2,4]*





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Zika virus disrupts molecular fingerprinting of human neurospheres

Patricia P. Garcez, Juliana Minardi Nascimento, Janaina Mota de Vasconcelos, Rodrigo Madeiro da Costa, Rodrigo Delvecchio, Pablo Trindade, Erick Correia Loiola, Luiza M. Higa, Juliana S. Cassoli, Gabriela Vitória, Patricia C. Sequeira, Jaroslaw Sochacki, Renato S. Aguiar, Helien Thais Fuzii, Ana M. Bispo de Filippis, João Lídio da Silva Gonçalves Vianez Júnior, Amilcar Tanuri, Daniel Martins-de-Souza & Stevens K. Rehen

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The clinically approved antiviral drug sofosbuvir inhibits Zika virus replication

Carolina Q. Sacramento, Gabrielle R. de Melo [...] Thiago Moreno L. Souza

viruses

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Article

Chloroquine, an Endocytosis Blocking Agent, Inhibits Zika Virus Infection in Different Cell Models

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It is not only about zika...

Plataform based on iPS cell models to anticipate the consequences and to drug screen for TORCHES and other viruses

TORCHES Syndrome infection of a developing fetus or newborn (T)oxoplasmosis, (O)ther Agents, (R)ubella, (C)ytomegalovirus, and (H)erpes Simplex, Syphilis)

Aedes aegypti is known to transmit dengue virus, yellow fever virus, chikungunya virus, Zika virus, Venezuelan Equine Encephalitis virus, West Nile virus etc.

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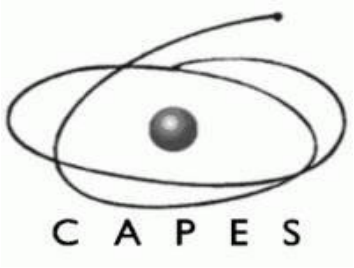
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