Hippocampal microRNA-132 mediates stress-inducible cognitive deficits through its acetylcholinesterase target

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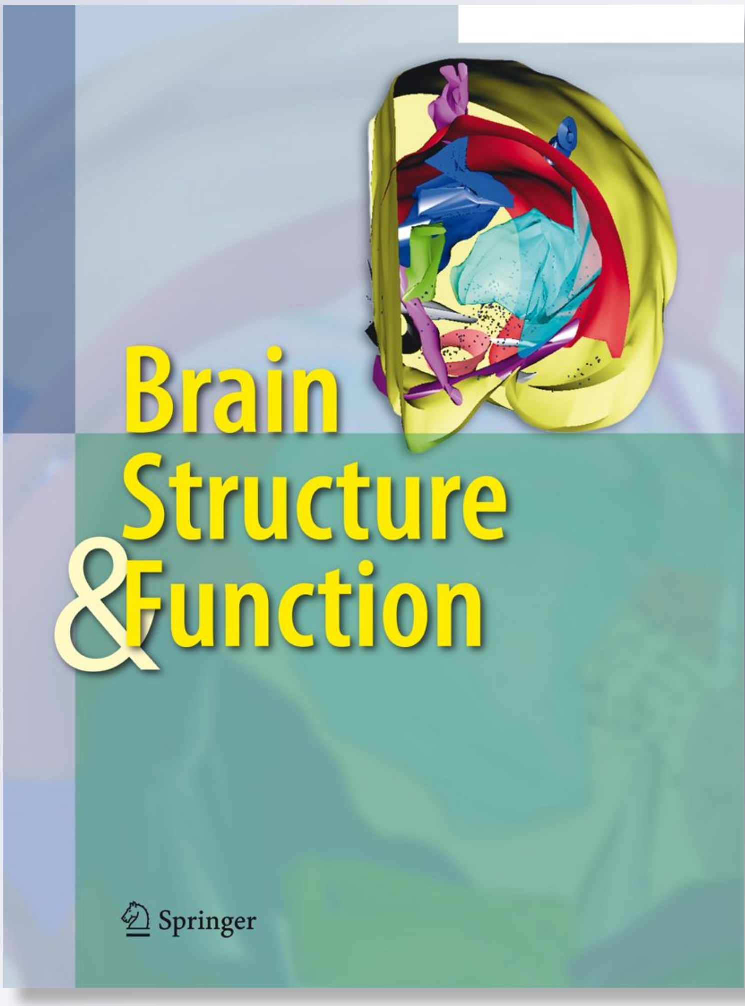

10.1007/ 00429-011-0376-

Hippocampal microRNA-132 mediates stress-inducible cognitive deficits through its acetylcholinesterase target

G. Shaltiel · M. Hanan · Y. Wolf · S. Barbash ·
E. Kovalev · S. Shoham · H. Soreq

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Abstract -132 (-132) ... 132, ... -132 ... -132 ... -132 ... -132 ... 132, ... 250 ... -132 ... -132 ... -132-

Keywords 250 · -132 ·

Introduction

(2011) ... (1999; 2004) ... (2002) ... 1998) ... ( )- ... (2010). ... (* 22),

Electronic supplementary material (10.1007/ 00429-011-0376-)

(&) ... 91904, ... 91351,

2009; 2010) 2008; 2007). 3′ (3′) 2004) 2011) ( ) -132 -132). -132 250 (2005). -132 (2008). ( ) -132 ( ) -132 ( ) 2009; 2006). 1998) 1998; 2002; 2006). -132 2009). 2006). -132- (1) -132 -132 (2) -132 (3 -132

-132 2008) -132 132 2009).

Methods

(22 ± 1) 12- (30) 10 16 -08-11485-4).

( ) 0.1 25 30

57 /6, (50) ( ) (0.5) ( ) ( ) -2.0, 1.8, -1.5. 0.5 10- ( ) 5

1.6

[illegible] (16 [illegible]), [illegible] 1 [illegible] 4 [illegible] 1- [illegible] 3 [illegible] 60 [illegible] 30 [illegible] 60 [illegible] 30 [illegible] 60 [illegible] 2000) [illegible] 1964/ [illegible] 1998). 40- [illegible] 5 [illegible] 2 [illegible] 5 [illegible] 3 [illegible] 0.5 [illegible] 0.1 [illegible]

[illegible]

3- [illegible] 6- [illegible] 3′ [illegible] 2010). [illegible] 1994). [illegible] 22 [illegible] 40 μ [illegible] 5% [illegible] 5 [illegible] 2007). [illegible] 80 [illegible] 90 [illegible] 200 [illegible] 4% [illegible] 4% [illegible] (7.4) [illegible] -70 [illegible]

[illegible]

[illegible] 57 /6 [illegible] 10 [illegible] 2 [illegible] 2006) [illegible] (0.3 [illegible] /2 [illegible]) [illegible] 120 [illegible]

[illegible]

[illegible] (30 9 5 [illegible] 5 9 5 [illegible] 40 [illegible]) [illegible] 30 9 5 [illegible] 50 [illegible] 5 [illegible] 10% [illegible]

[illegible]

[illegible] 24 [illegible] 48 [illegible] (70,000g, 2 [illegible], 15 [illegible]). [illegible] -293 [illegible] (* 1 9 10 [illegible]) [illegible] 799 [illegible] 800, [illegible] 12 [illegible] 799 [illegible] 1).

[illegible]

[illegible] 15 [illegible] 12- [illegible] 2% [illegible] 27 [illegible] 20% [illegible] 20% [illegible]). 72 [illegible] 250 [illegible]

[illegible]

Results

[illegible]

Table 1 [illegible]

[illegible]	[illegible] 5′ 3′	[illegible] 5′ 3′
[illegible]	[illegible]	[illegible]

, 250A , 250A p < 0.05, 2), -132 (2). , 250A

-132

-132

1), -132 * 220% p < 0.01 1), 25% (t p < 0.05 1) -132 r = - 0.55 p < 0.01 1), -132 (2). 2002 2002). -132- -132

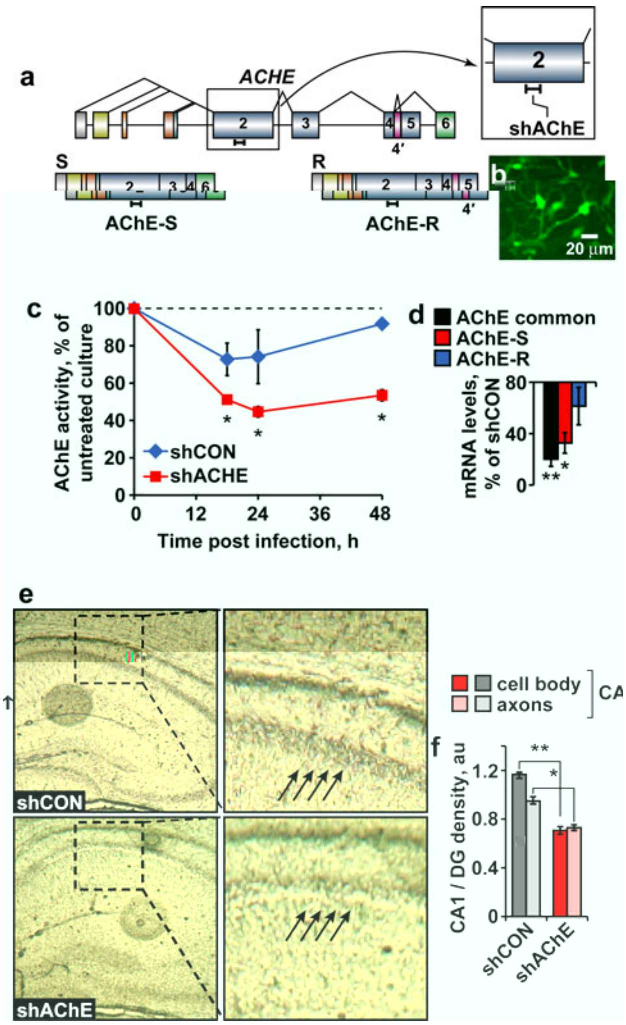
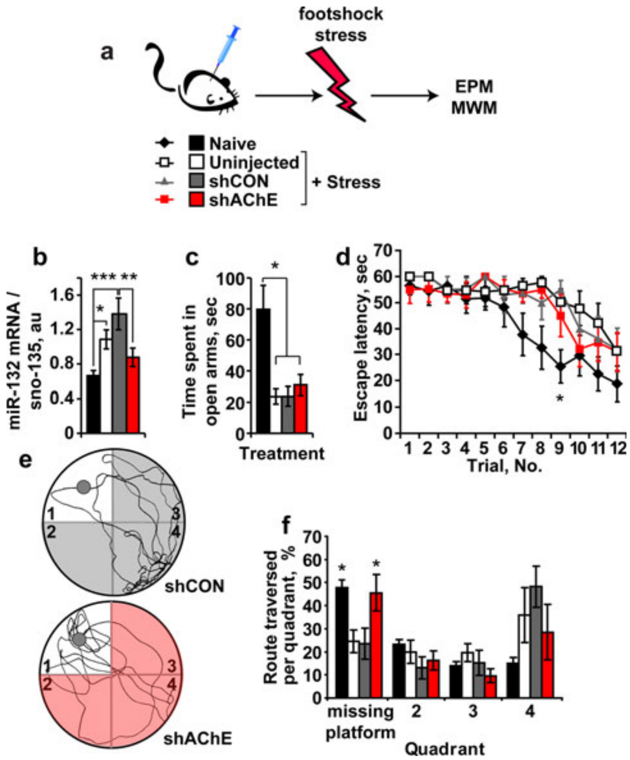
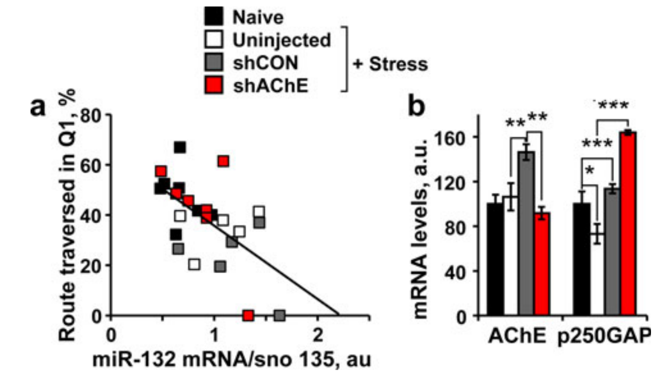

a
ACHE
2
3
4
5
6
4'
shAChE
S
R
AChE-S
AChE-R
b
20 µm
c
AChE activity, % of untreated culture
shCON
shACHE
Time post infection, h
0
12
24
36
48
d
AChE common
AChE-S
AChE-R
mRNA levels, % of shCON
e
shCON
shAChE
cell body
axons
CA
f
CA1 / DG density, au
shCON
shAChE

Fig. 3



a
footshock
stress
EPM
MWM
Naive
Uninjected
shCON
shAChE
+ Stress
b
miR-132 mRNA / sno-135, au
c
Time spent in open arms, sec
Treatment
d
Escape latency, sec
Trial, No.
e
shCON
shAChE
f
Route traversed per quadrant, %
missing platform
Quadrant

Fig. 4 [illegible]



Naive
Uninjected
shCON
shAChE
+ Stress
a
Route traversed in Q1, %
miR-132 mRNA/sno 135, au
b
mRNA levels, a.u.
AChE
p250GAP

Fig. 5 [illegible]

[illegible]

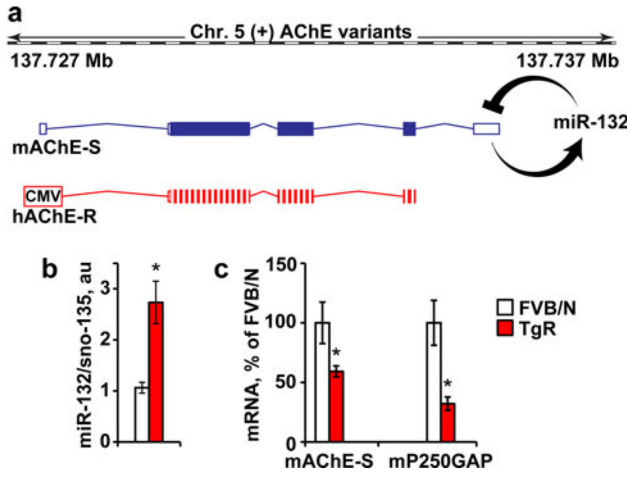


Fig. 6 miR-132 250A a 5 miR-132- 3′ miR-132 b miR-132 2.7- $t_{19} = 3.72$, *$p < 0.001$). c 250A *$p < 0.05$)

250A $p < 0.05$ 6). miR-132

miR-132 3′ (7). (2006). ( ) 1 ( ) ( ), (7). 25 / (1997) (7 ,).

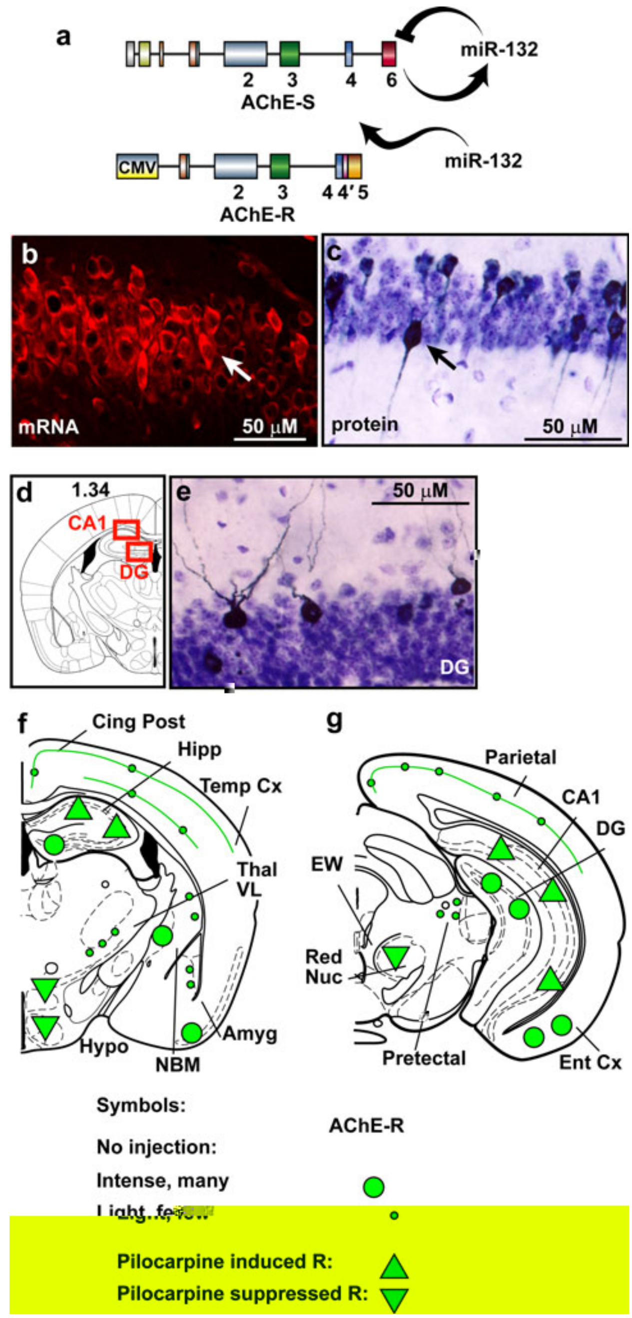


Fig. 7 miR-132- a 3′ miR-132. b 1 c d 1 ( ) f g (1), ( ), ( ), ( ). Large small green circles Green triangles (up) (down)

2004) r = 0.86, p < 0.05 r = 0.77, p < 0.05 (Fig. 8).

p < 0.05 (Fig. 8).

(Fig. 9) p < 0.001. 2002), 55% (t p < 0.01 Fig. 9).

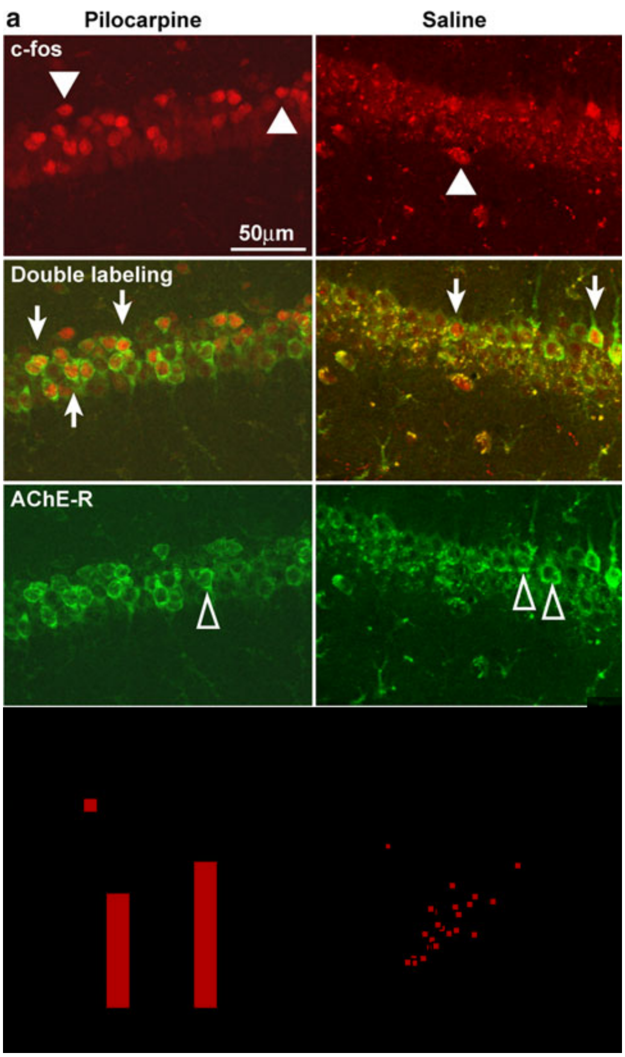


Fig. 8 a b $(F_{1,19} = 226, p < 0.0001)$ $(F_{2,19} = 5.88, p < 0.05)$. c $r = 0.86$, $p < 0.05$ $r = 0.77$, $p < 0.05$

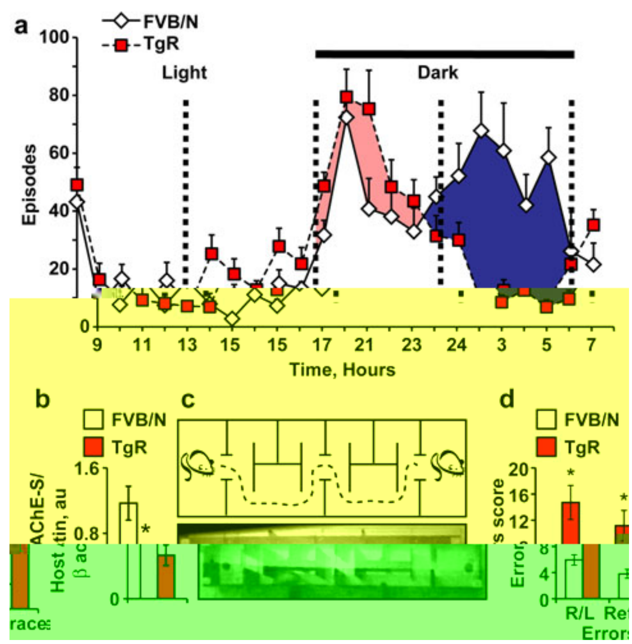


Fig. 9 a Light $F_{1,22} = 0.4$, Dark $F_{1,22} = 79.02$, $p < 0.001$. b $t_{13} = 2.71$, *$p < 0.01$). d $F_{1,33} = 9.97$ $F_{1,33} = 9.37$, *$p < 0.005$

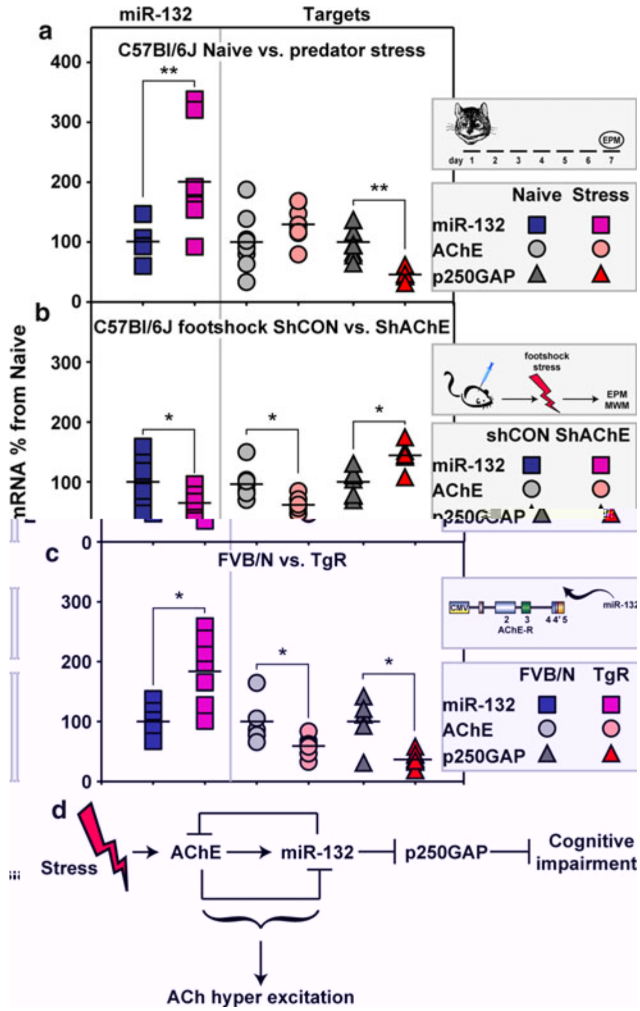


Fig. 10

Discussion

mir-132 ... mir-132- ... 4 ... 4), ...

... 2011; ... 2007).

... mir-132 ...

2007). ...

... (... 2001) ... mir-132 ... 4 ... mir-132/-212 ... 2 ... 2007). ...

2008), ...

2010) ... mir-132 ... 2 ... mir-132 ...

... mir-132 ... 250A ... mir-132- ... 2008). ...

mir-132 ...

... mir-132 ...

... (... 2010; ... 2010) ... 250A ...

Acknowledgments ... 378/11), ...

Conflict of interest ...

Open Access ...

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... (1998) ... 280(5364) 747 749

... (2004) ... 303(5654) 83 86

... (2007) ... 6(24) 3034 3035 ... 5106

... (2007) ... 54(5) 813 829

... (2008) ... 14(1) 27 41

... (2002) ... 7(8) 874 885

... (2006) ... 60(7) 767 776

... (1999) ... 9(5) 542 552

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