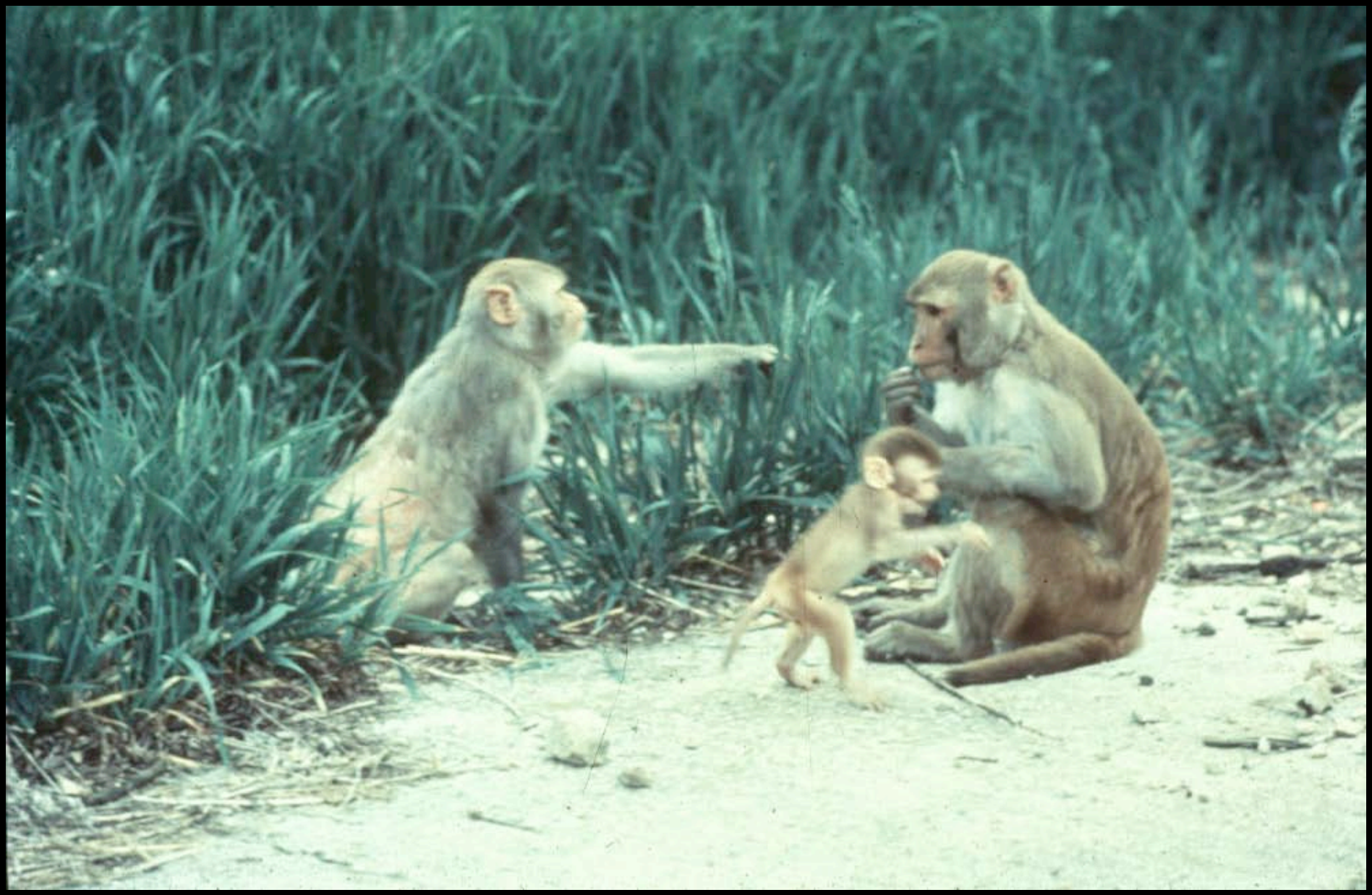
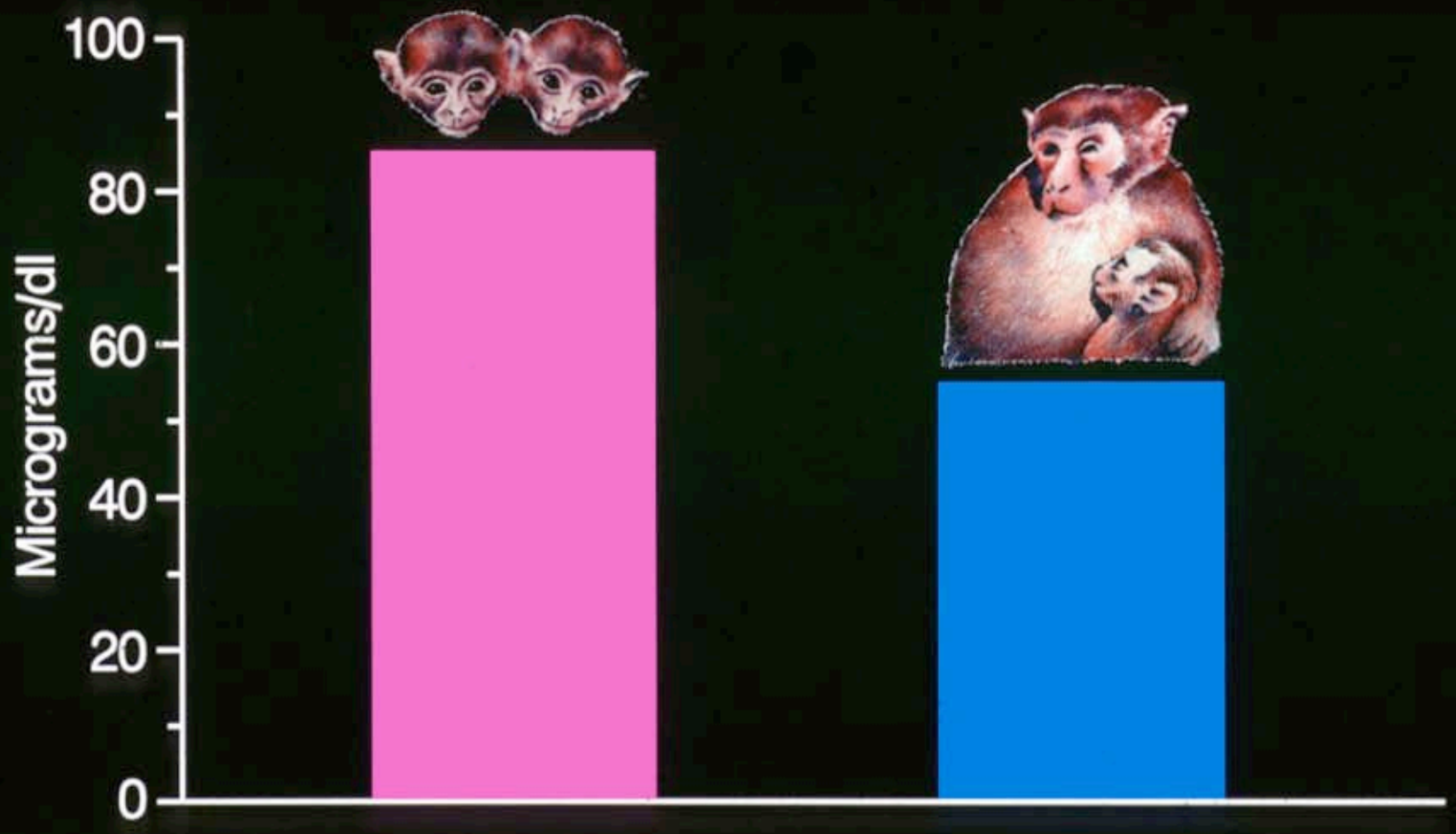
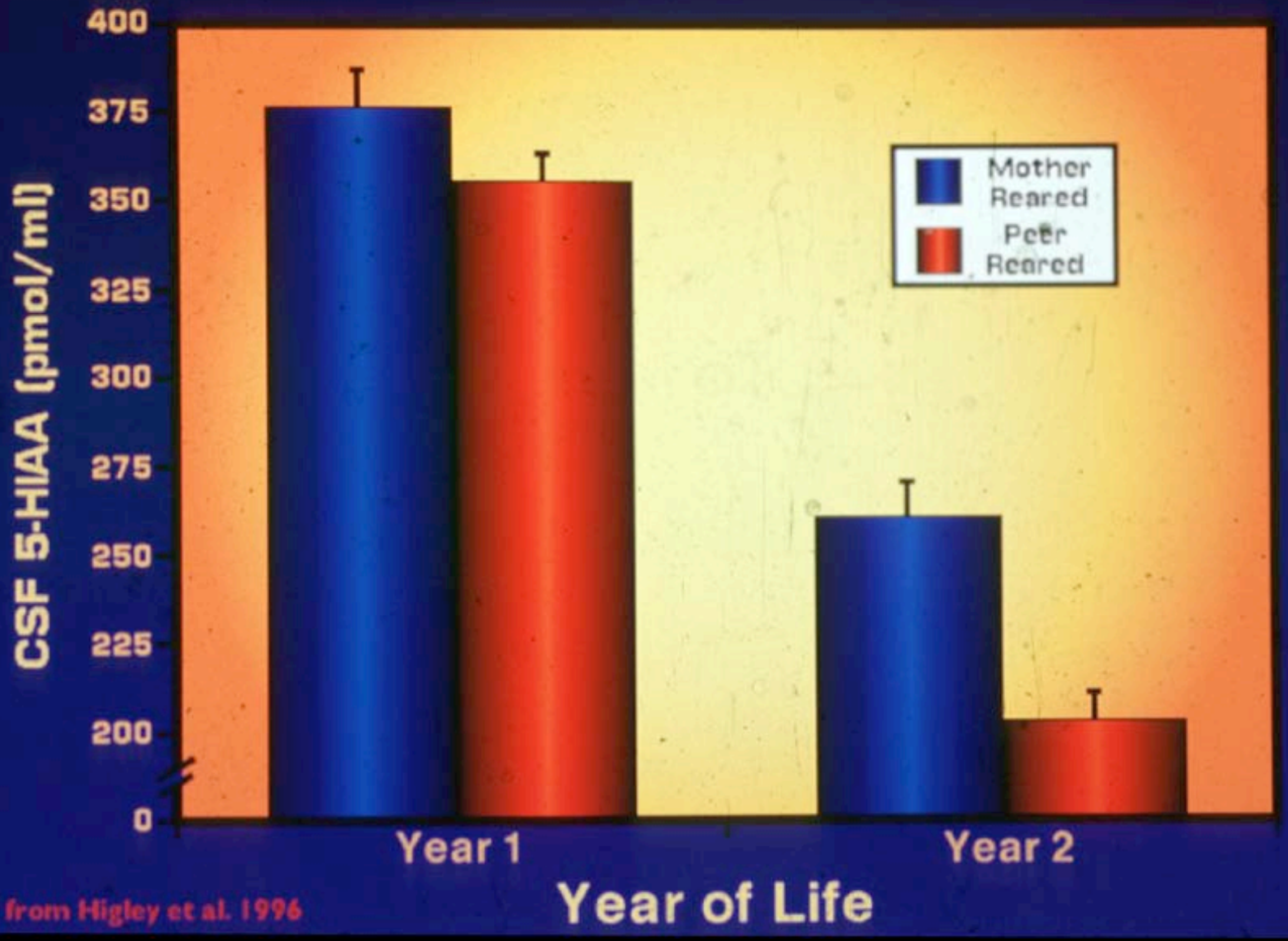


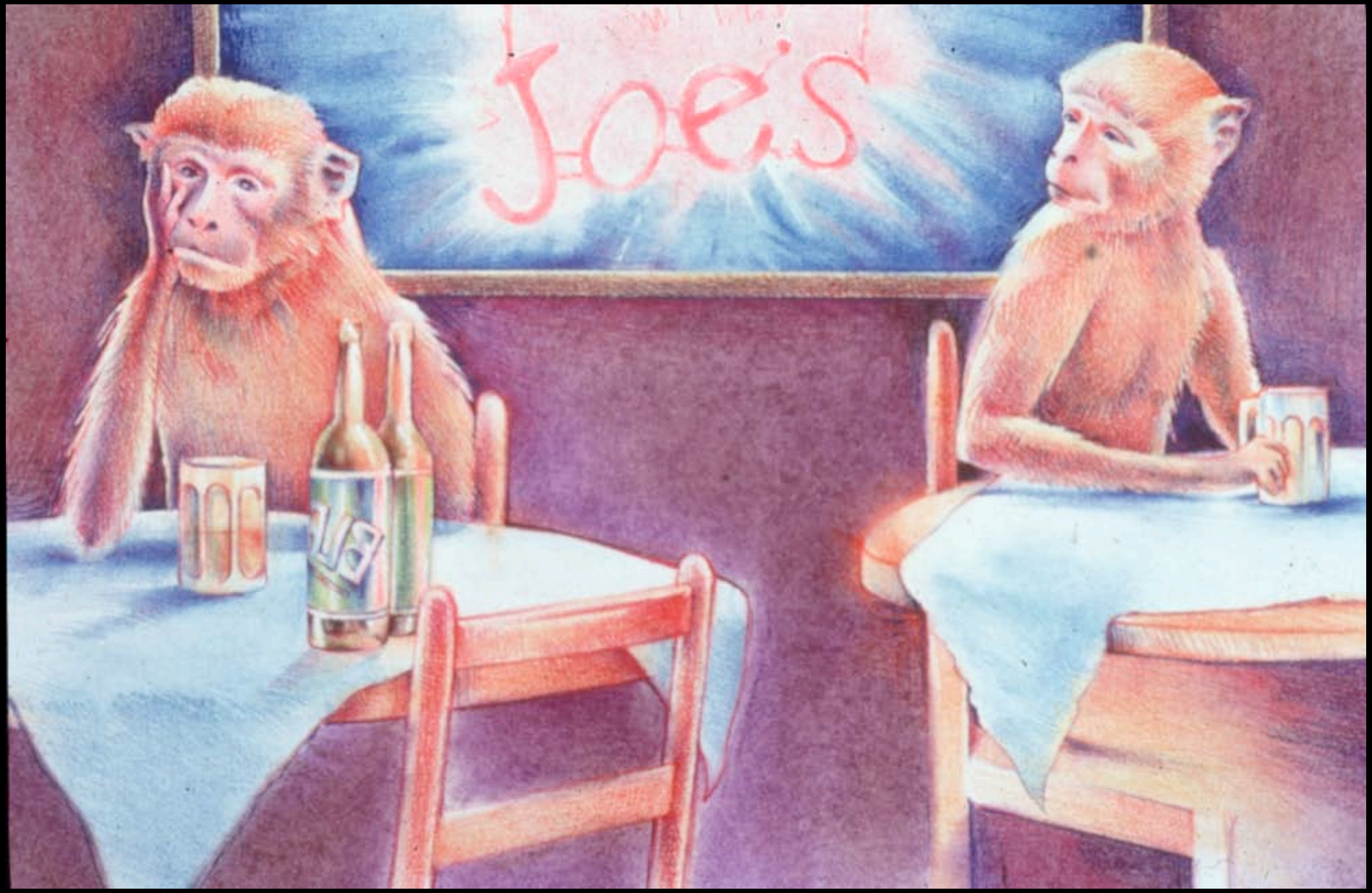
Cortisol



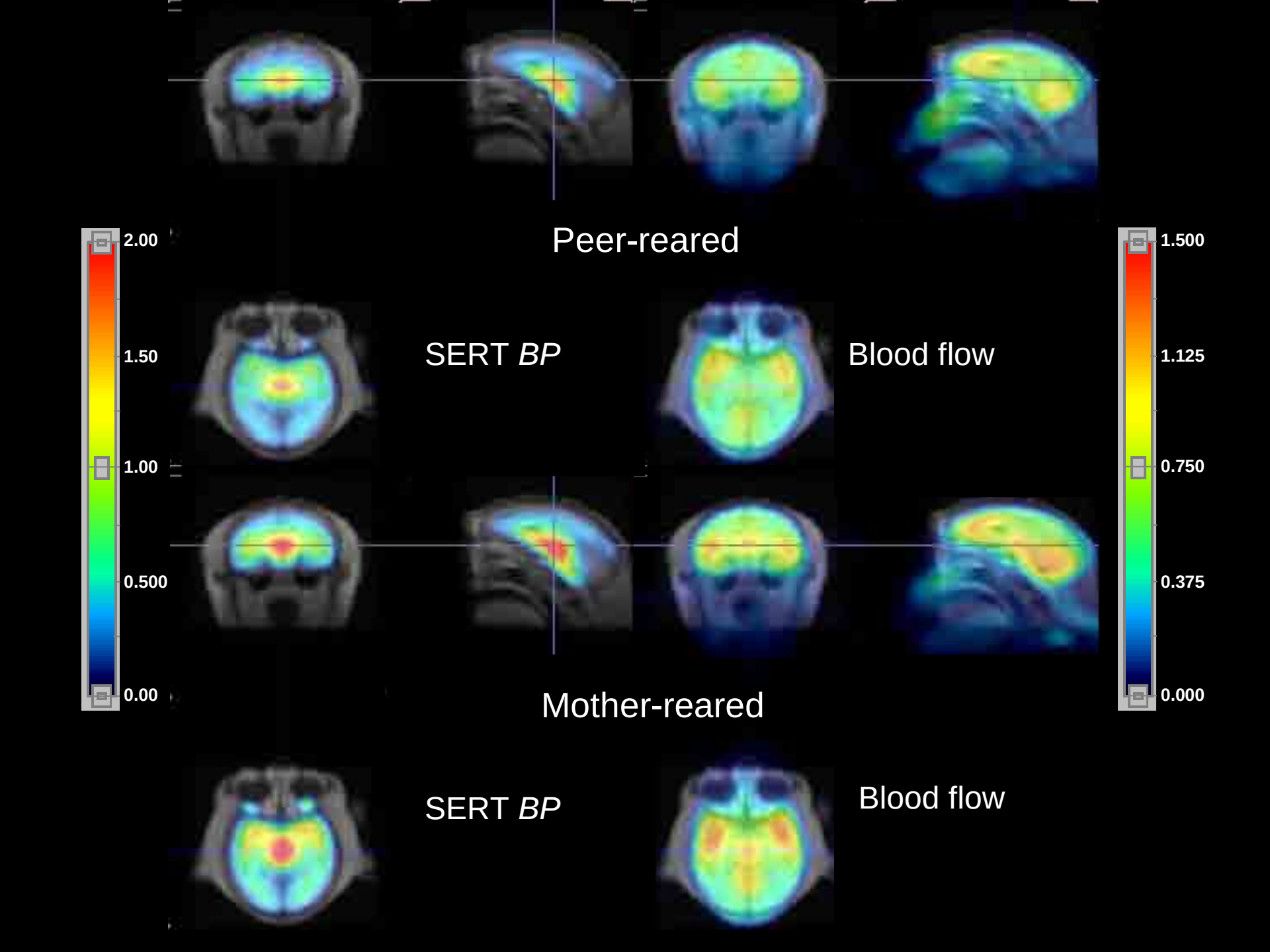
Rearing Effects on CSF 5-HIAA Levels



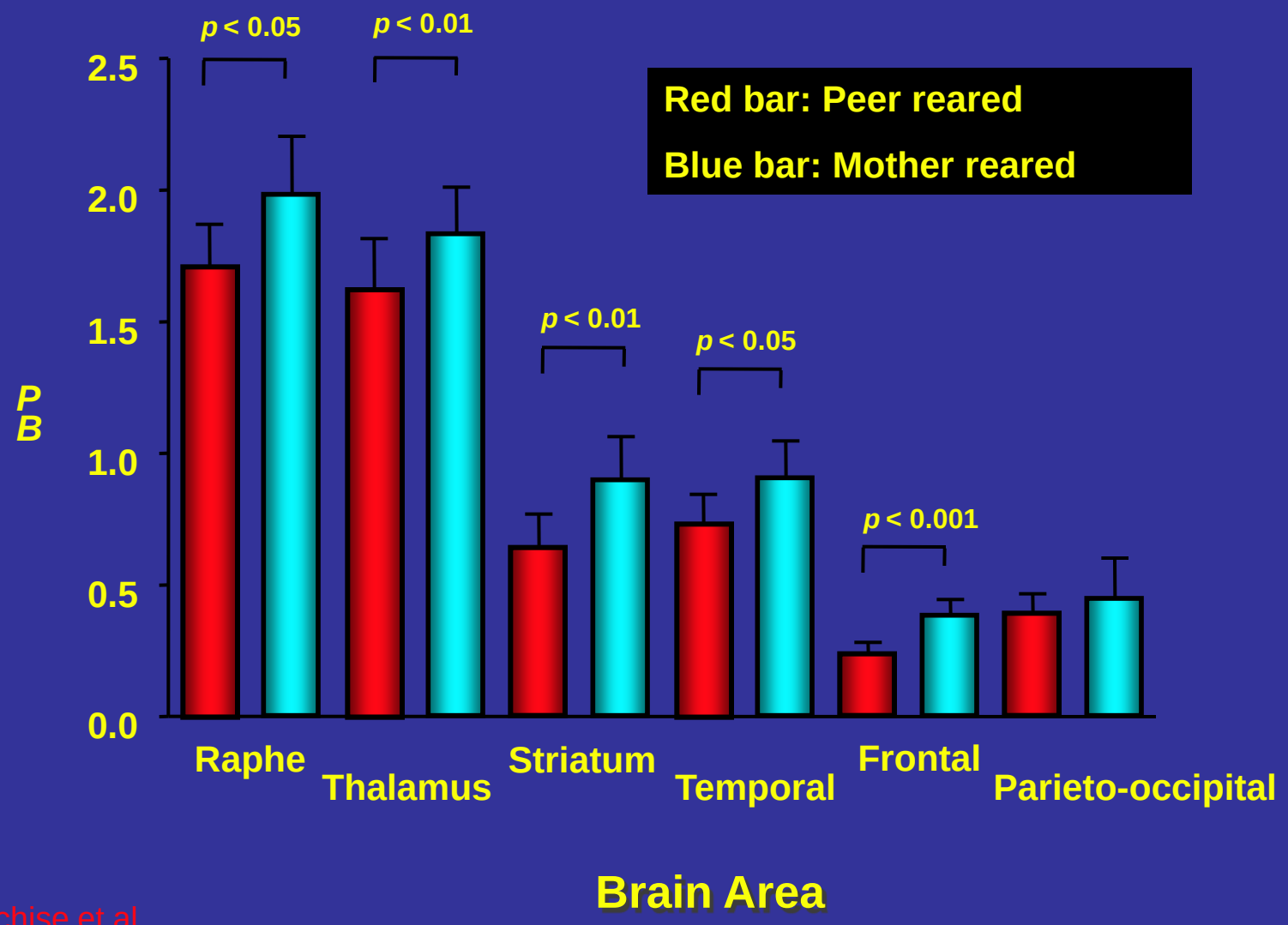
from Higley et al. 1996


Joe's

Alcohol Consumption

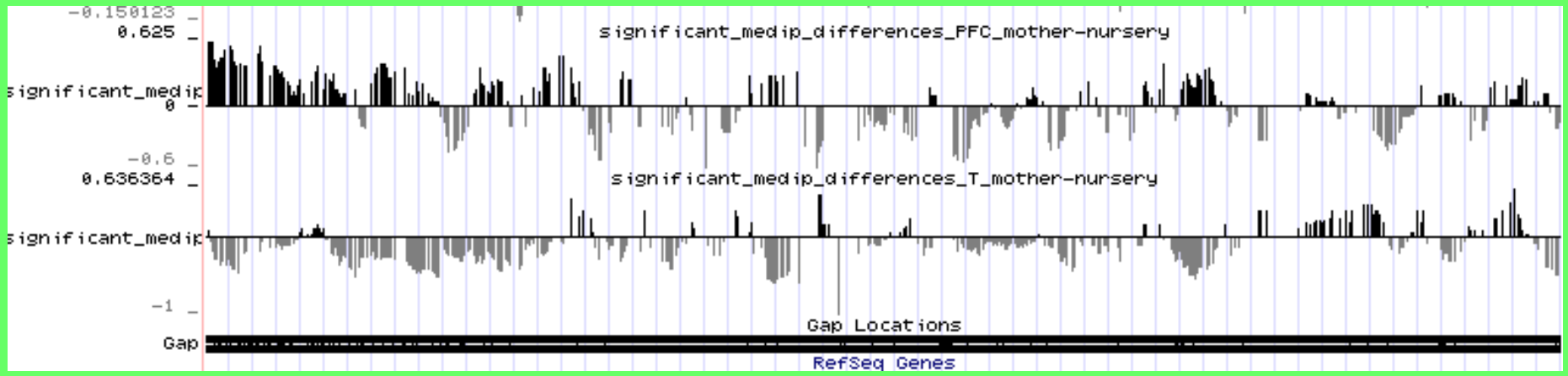

Peer-reared
SERT *BP*
Blood flow
Mother-reared
SERT *BP*
Blood flow
2.00
1.50
1.00
0.500
0.00
1.500
1.125
0.750
0.375
0.000

Rearing and Sert Binding Potential

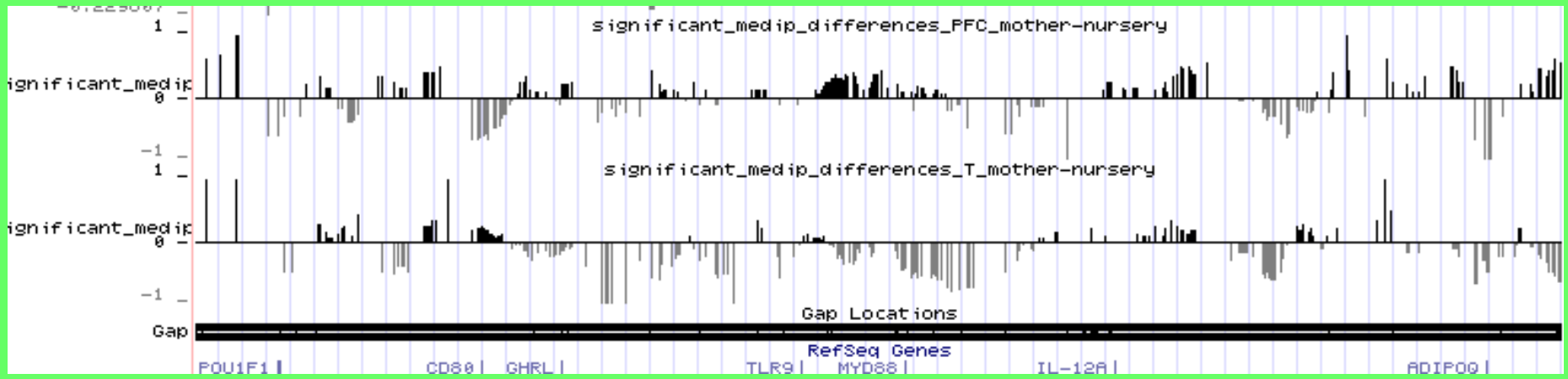


After Ichise et al

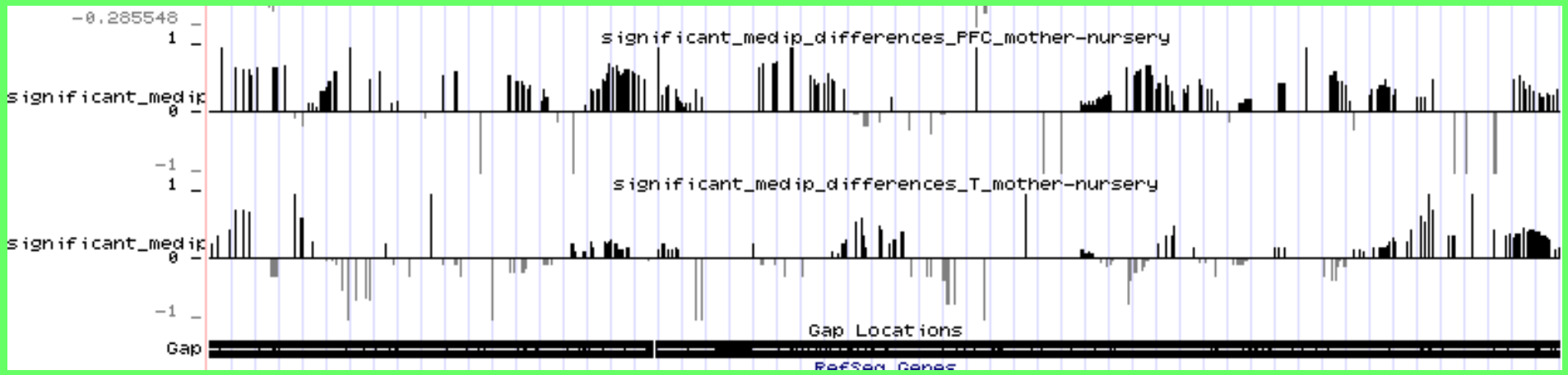
Chromosome 1



Chromosome 2



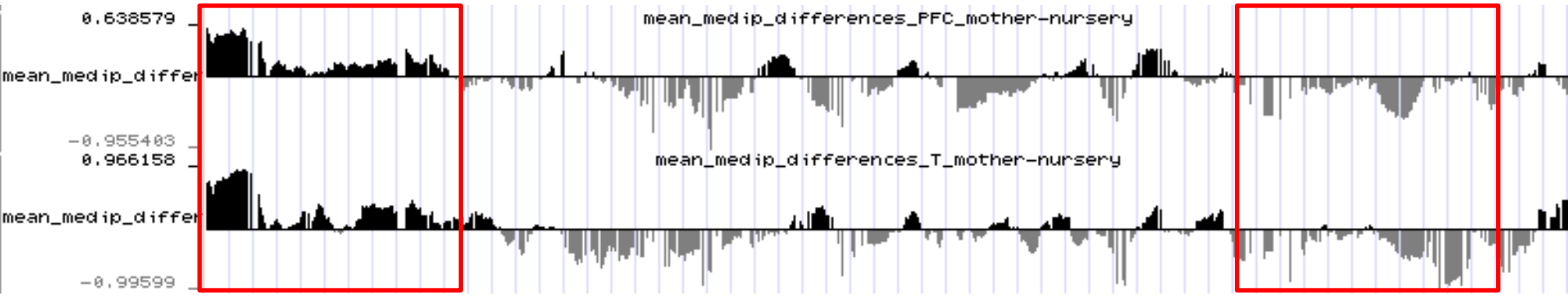
Chromosome X



Epigenetic signature associated with maternal care in rhesus monkey; both in T cell and in PFC

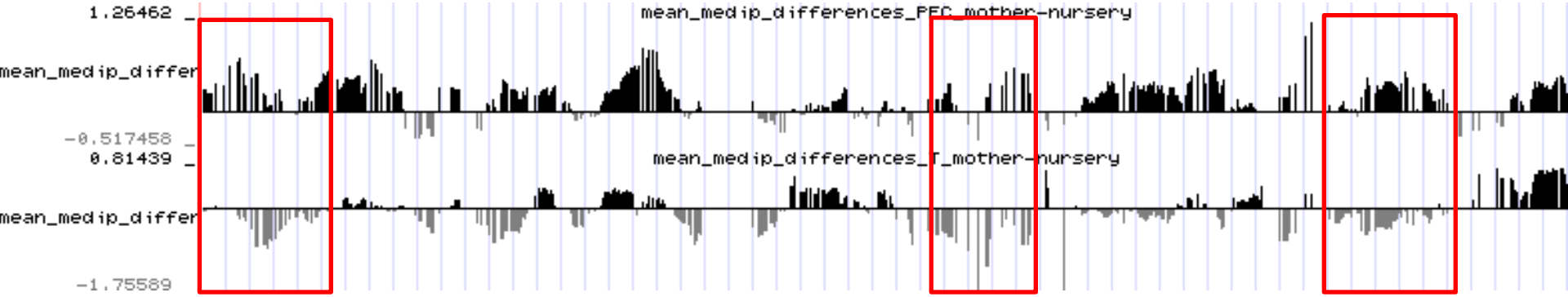
Hypermethylated in mother-reared
Hypermethylated in nursery-reared

Chromosome 1



Specific chromosomal region show the same response in both tissu in term of methylation associated with the rearing conditions

Chromosome X



Specific chromosomal region show opposite tissu response in term of methylation associated with the rearing conditions

Genes involved in the serotonin pathways that are significantly differentially methylated between mother and nursery reared rhesus monkey

Hypermethylated in mother-reared

Hypermethylated in nursery-reared

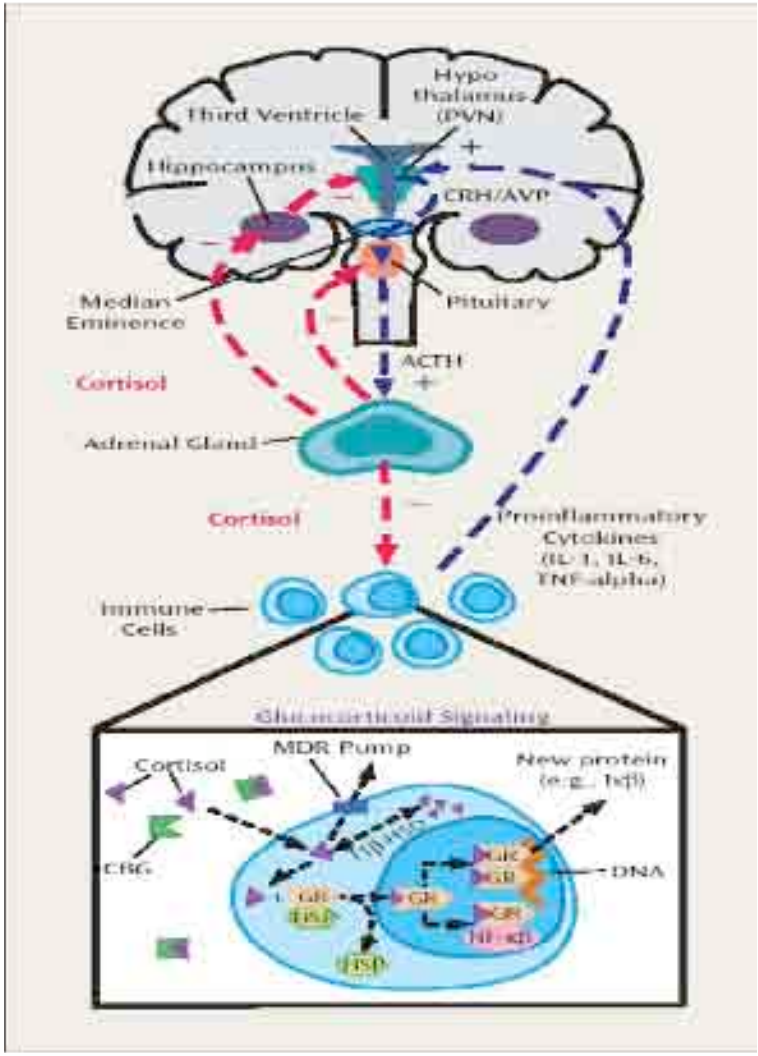
Genes	T cells	PFC
SLC6A4_MACMU		
5HT2A_MACMU		
MAOB		
MAOA		
TPH1		

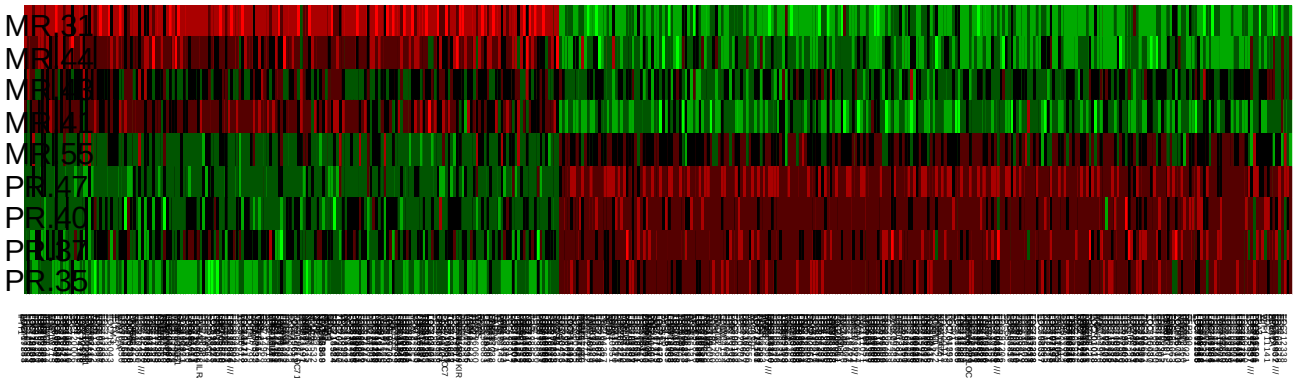
Genes involved in the HPA axis that are significantly differentially methylated between mother and nursery reared rhesus monkey

Hypermethylated in mother-reared

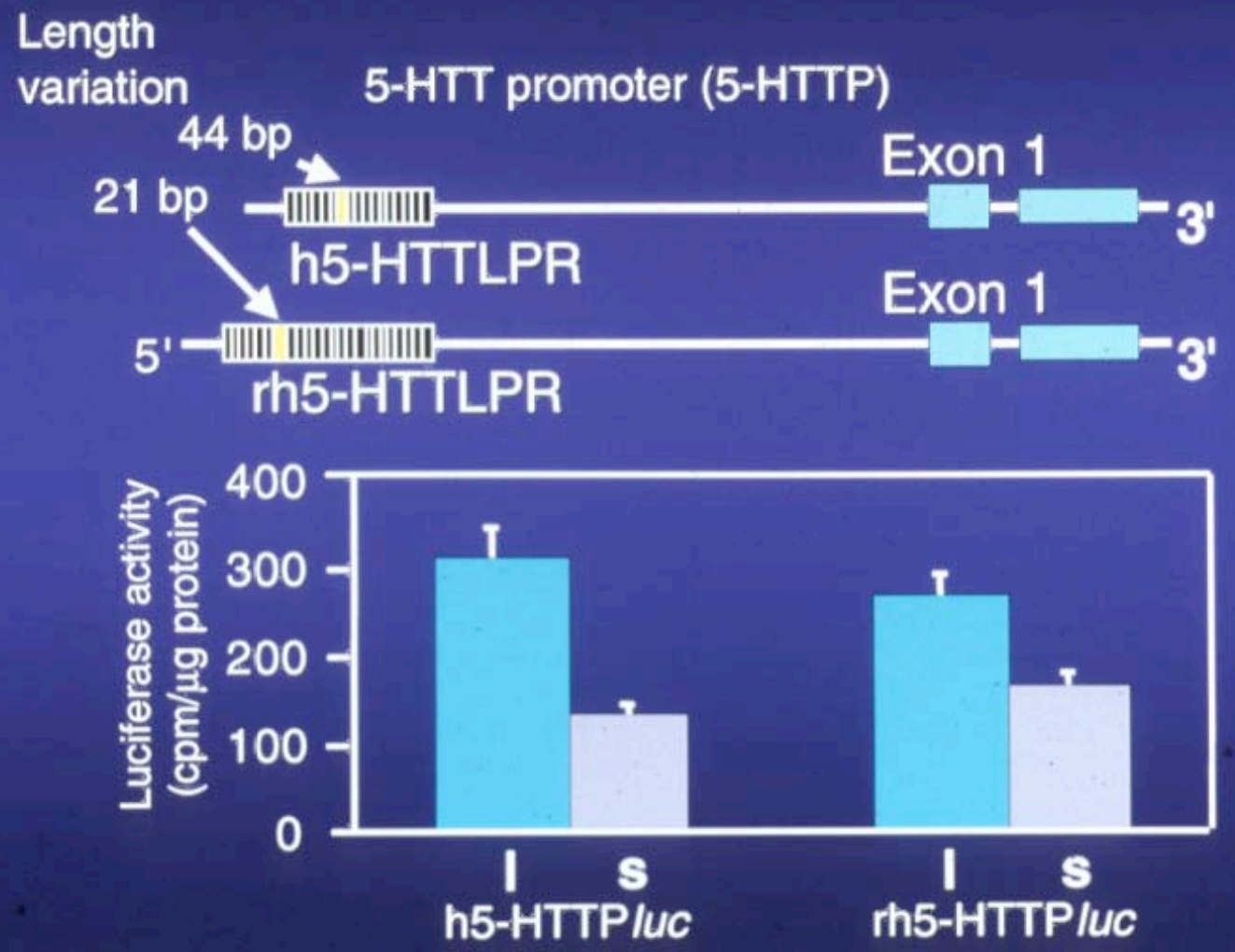
Hypermethylated in nursery-reared

Genes	T cells	PFC
NR3C1		
NR3C2		
AVPI1		
AVPR1A		
AVPR2		
AVPR1B		
CRH		
CRF1_MACMU		
CRHR2		
IL1A_MACMU		
IL1B_MACMU		
IL1R1		
IL1RL1		
IL2_MACMU		
IL6_MACMU		
TNFA_MACMU		
TNFC_MACMU		
INFG_MACMU		
INFA14		

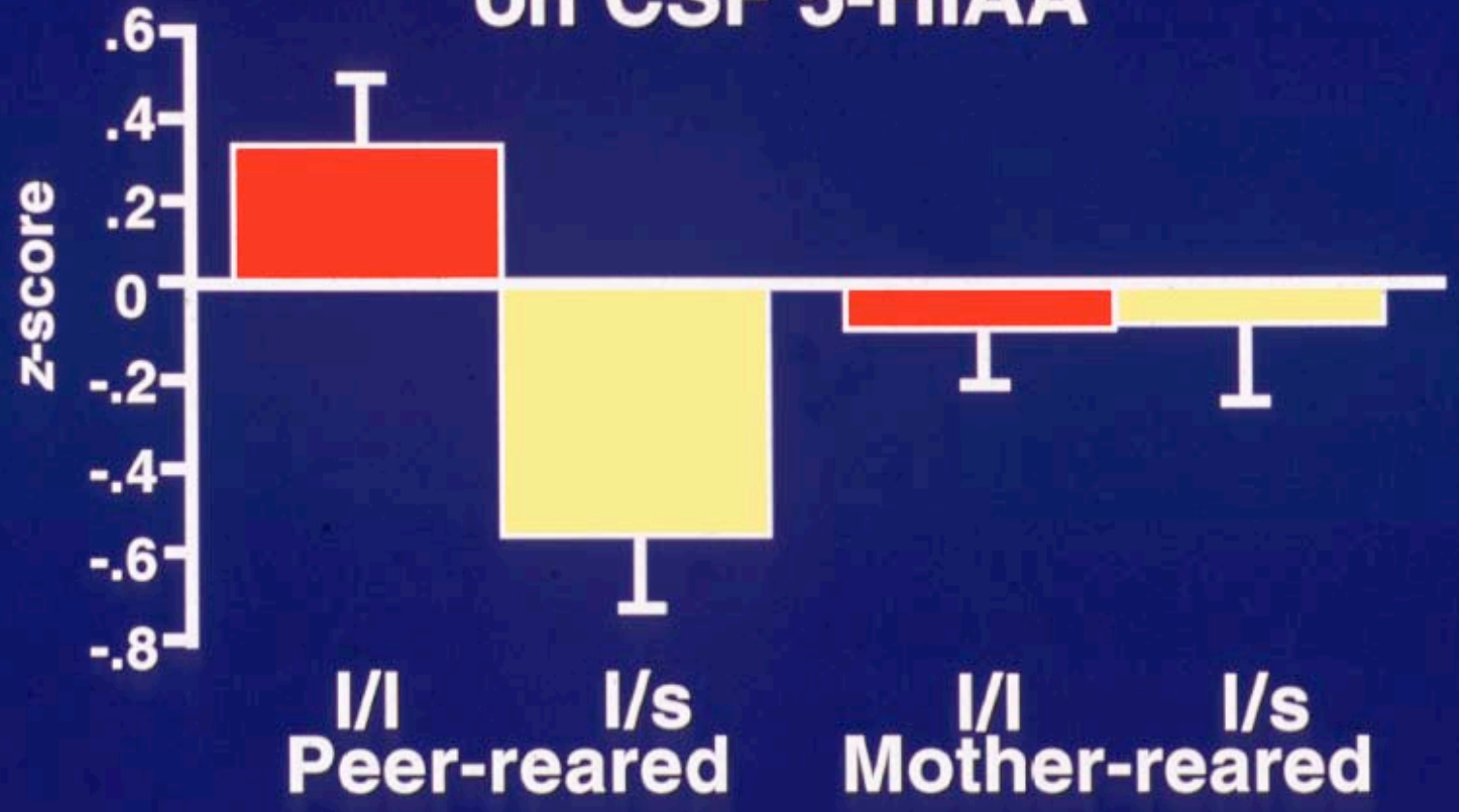



MR.31
MR.44
MR.41
MR.55
PR.47
PR.40
PR.35

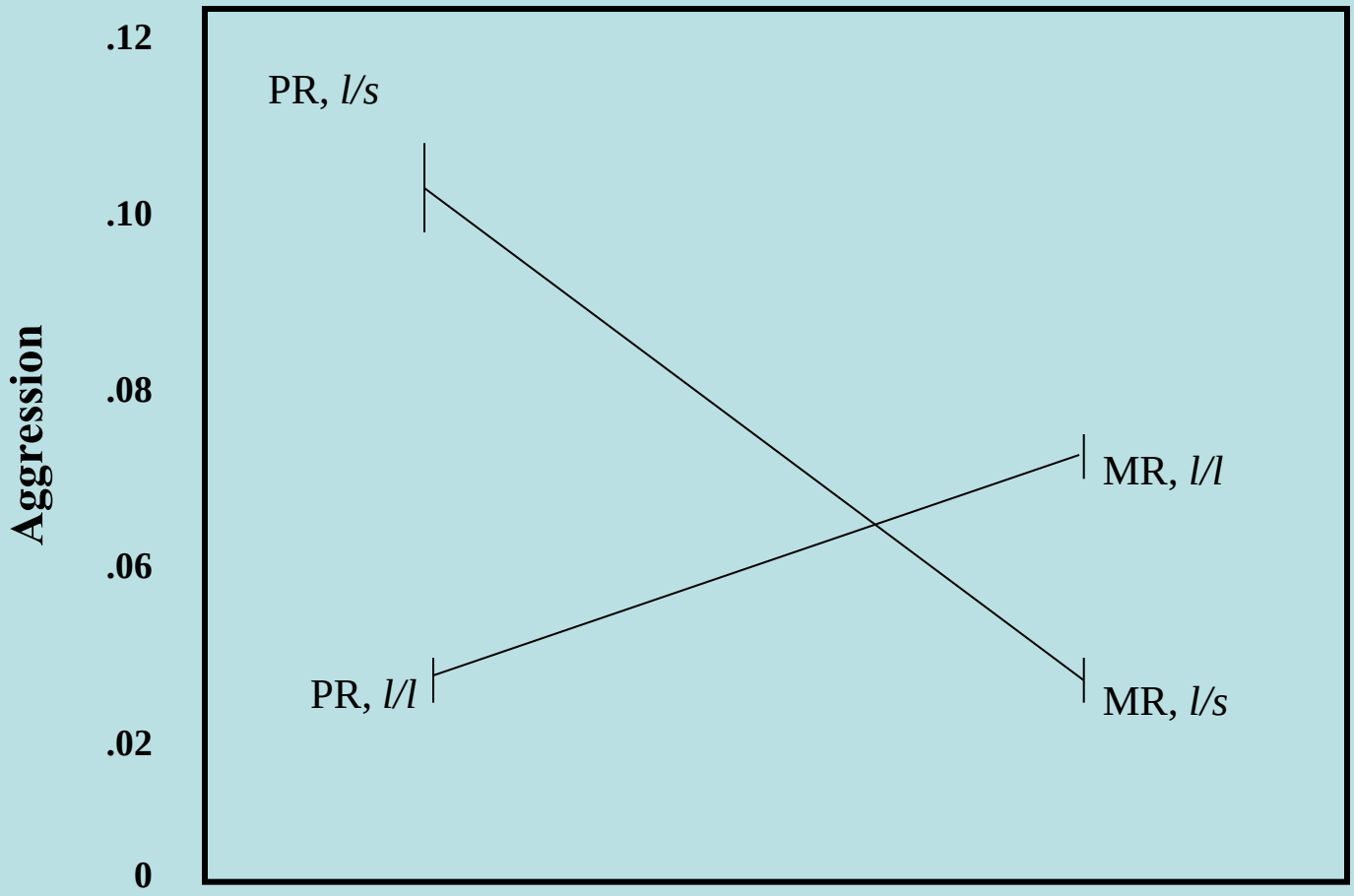
Transcriptional Activity of Human and Rhesus 5-HTTLPR Alleles



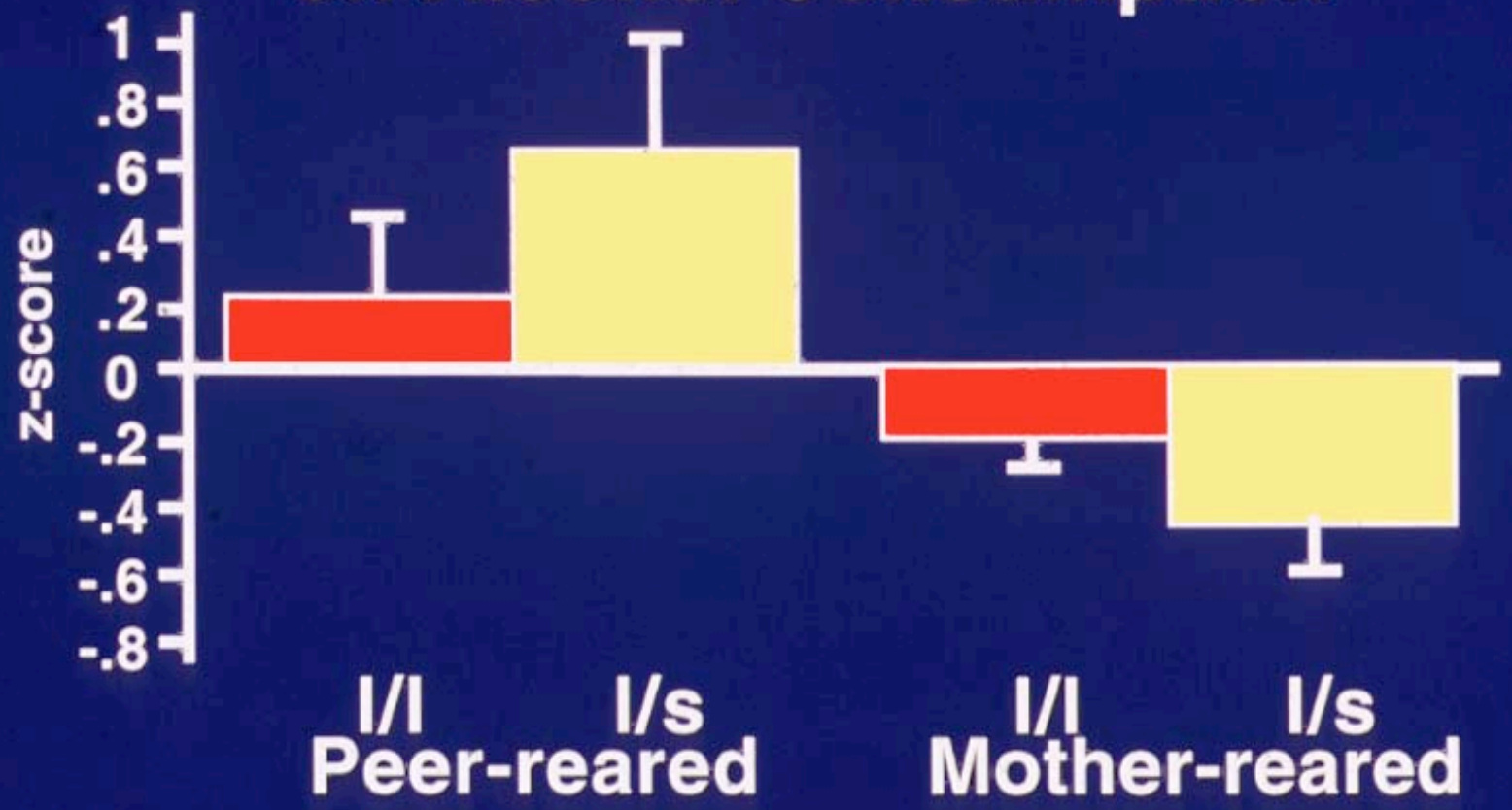
Effect of Rh5-HTTLPR Gene and Early Rearing Environment on CSF 5-HIAA



Bennett, Lesch, Heils, Long, Lorenz, Shoaf, Champoux, Suomi, Linnoila, & Higley

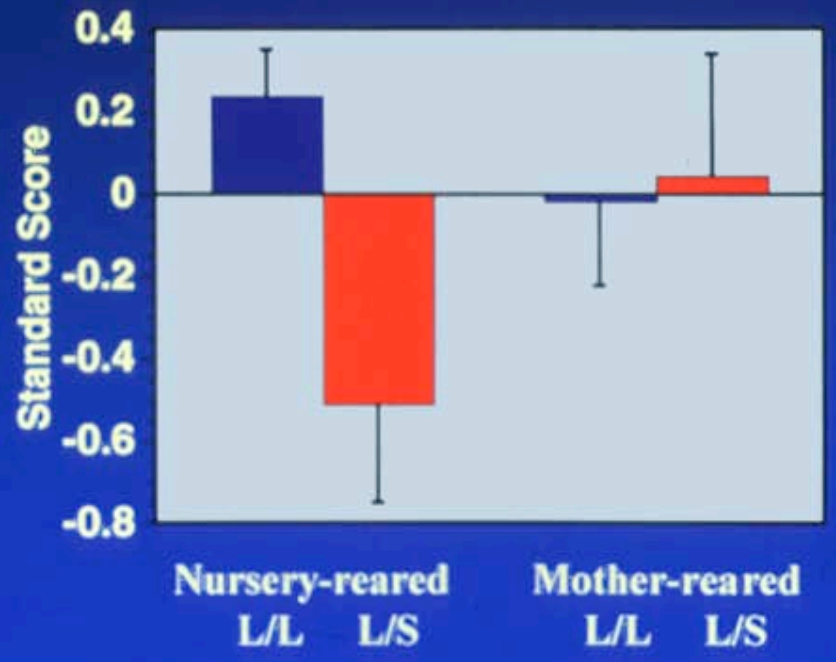

Aggression
.12
.10
.08
.06
.02
0
PR, *l/s*
MR, *l/l*
PR, *l/l*
MR, *l/s*

Effect of Rh5-HTTLPR Gene and Early Rearing Environment on Alcohol Consumption

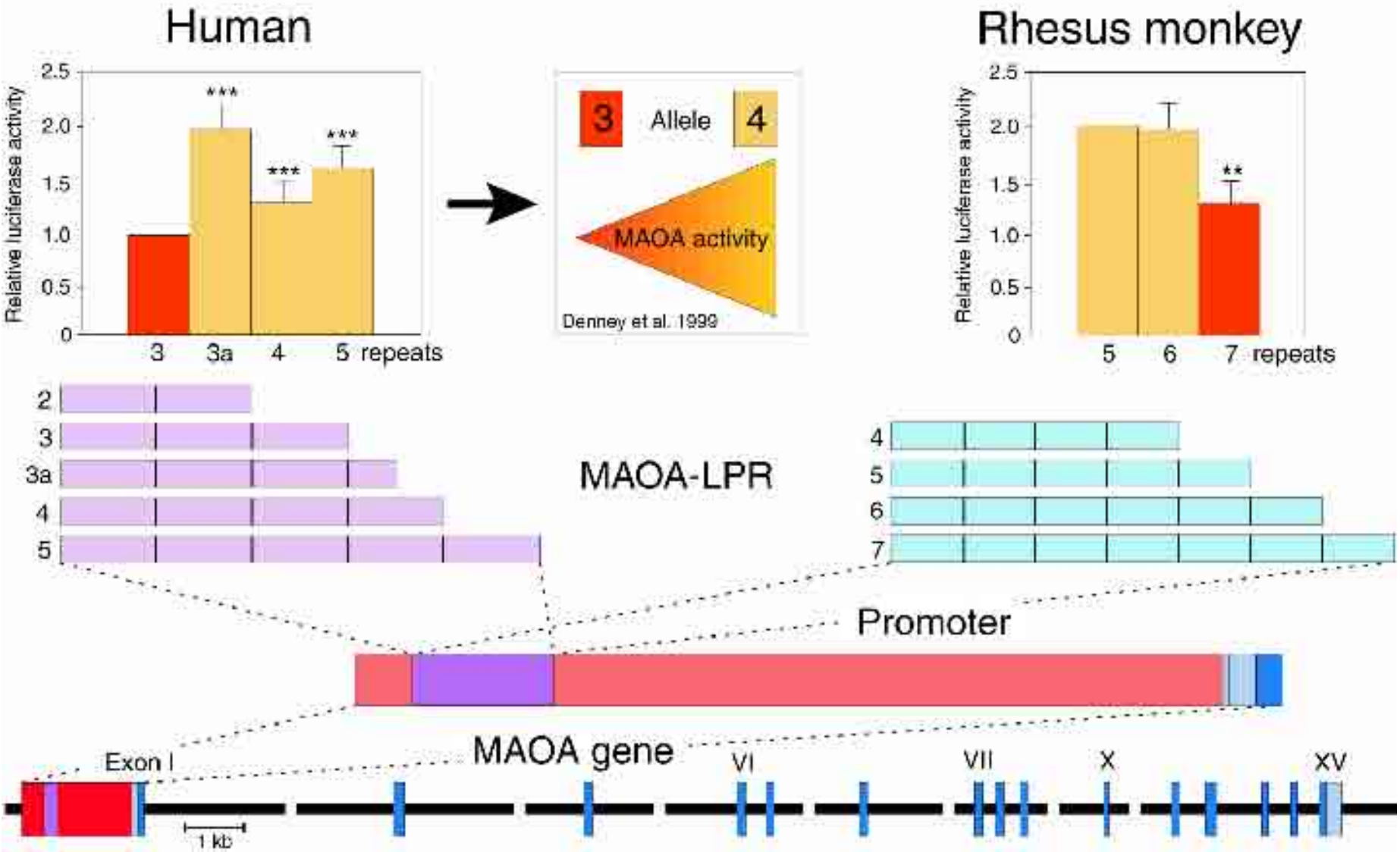


Bennett, Lesch, Heils, Long, Lorenz, Shoaf, Champoux, Suomi, Linnoila, & Higley

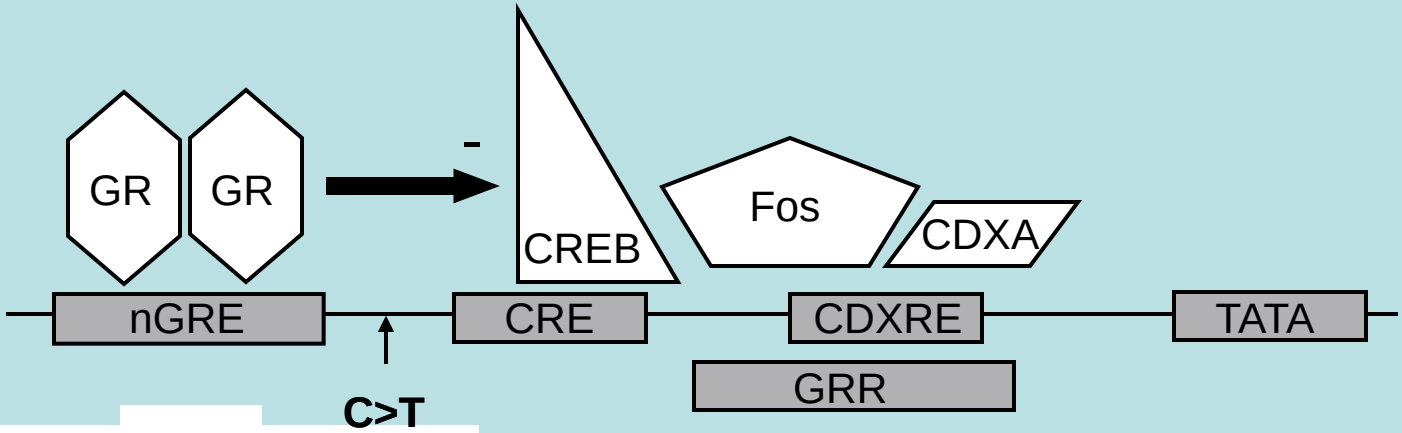
Orientation Cluster by rearing and genotype



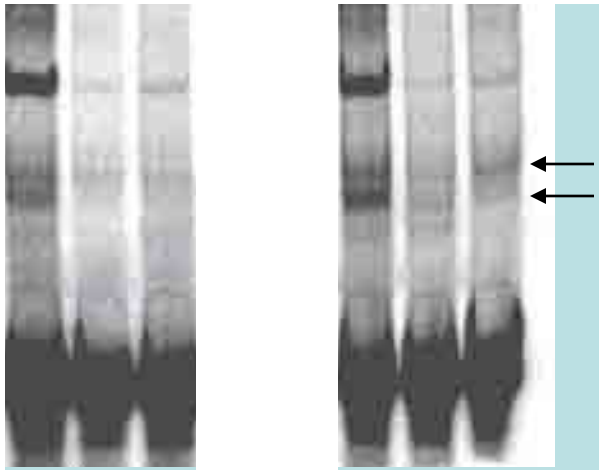
Variations of the MAOA gene promoter



A

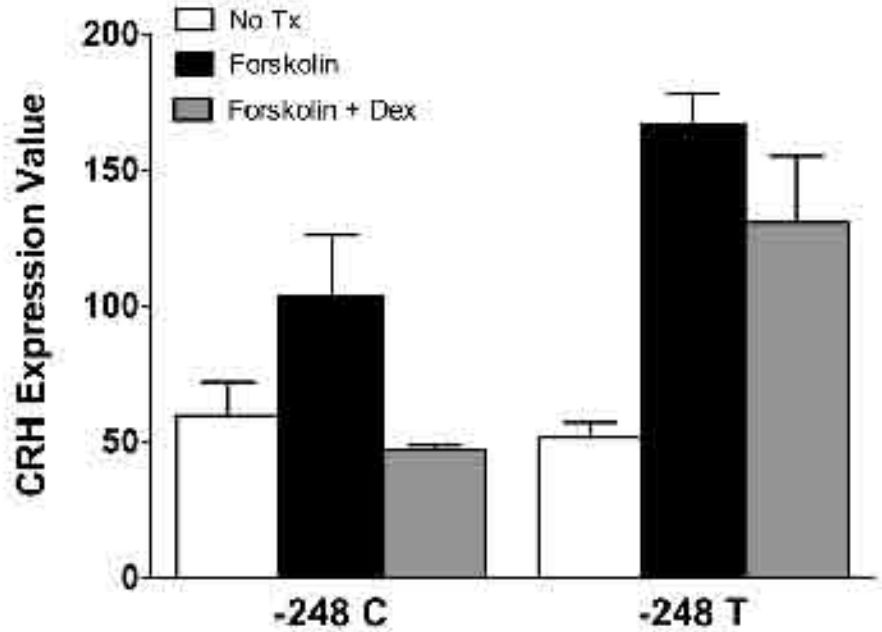


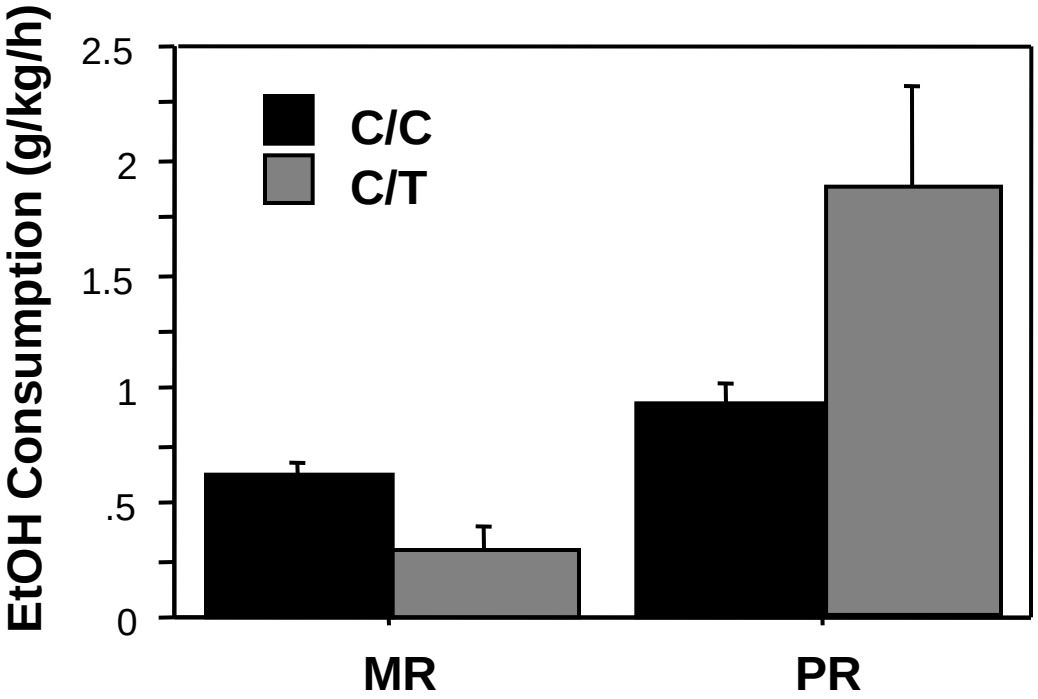
B



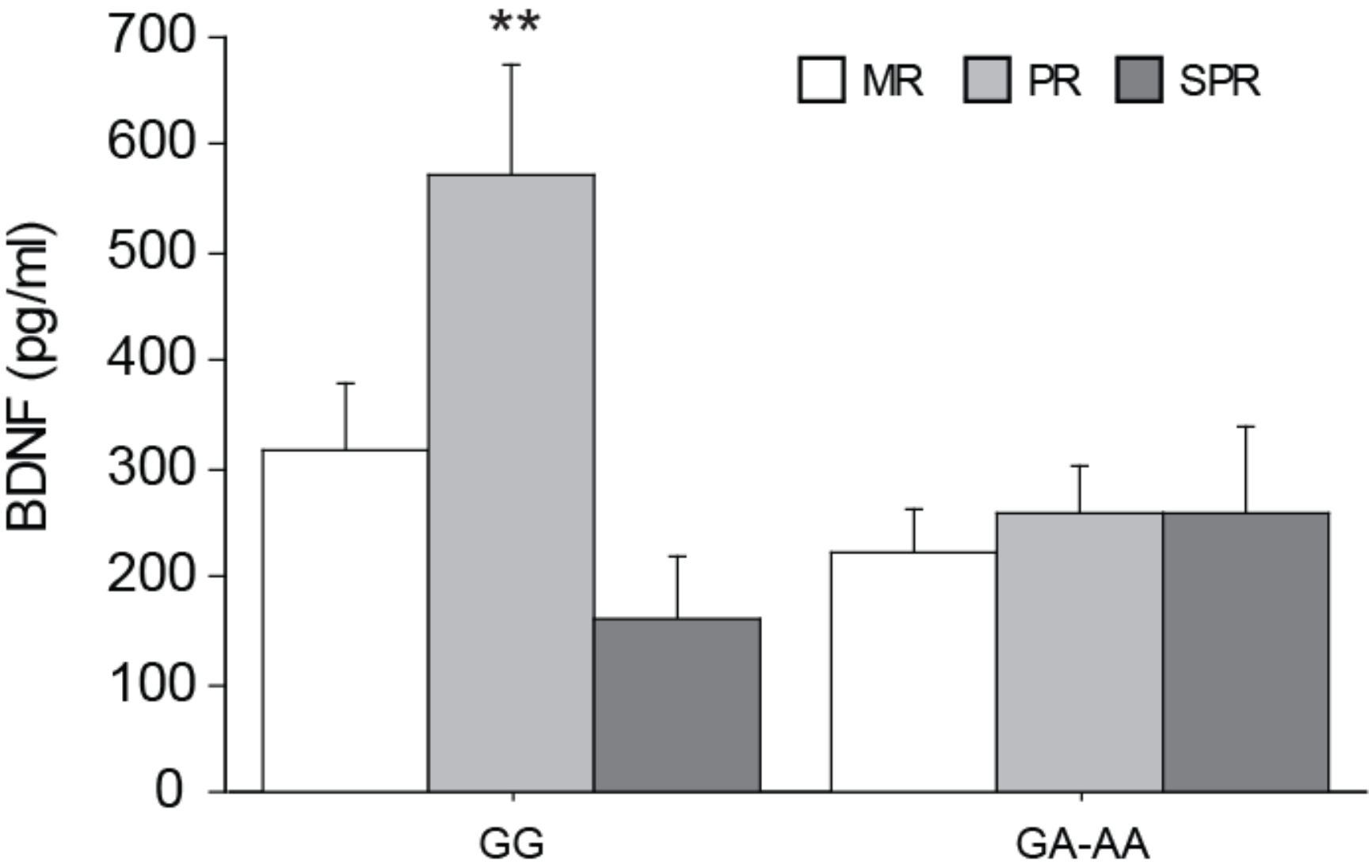
^{33}P Probe	C	C	C	T	T	T
Competitor	-	C	T	-	T	C

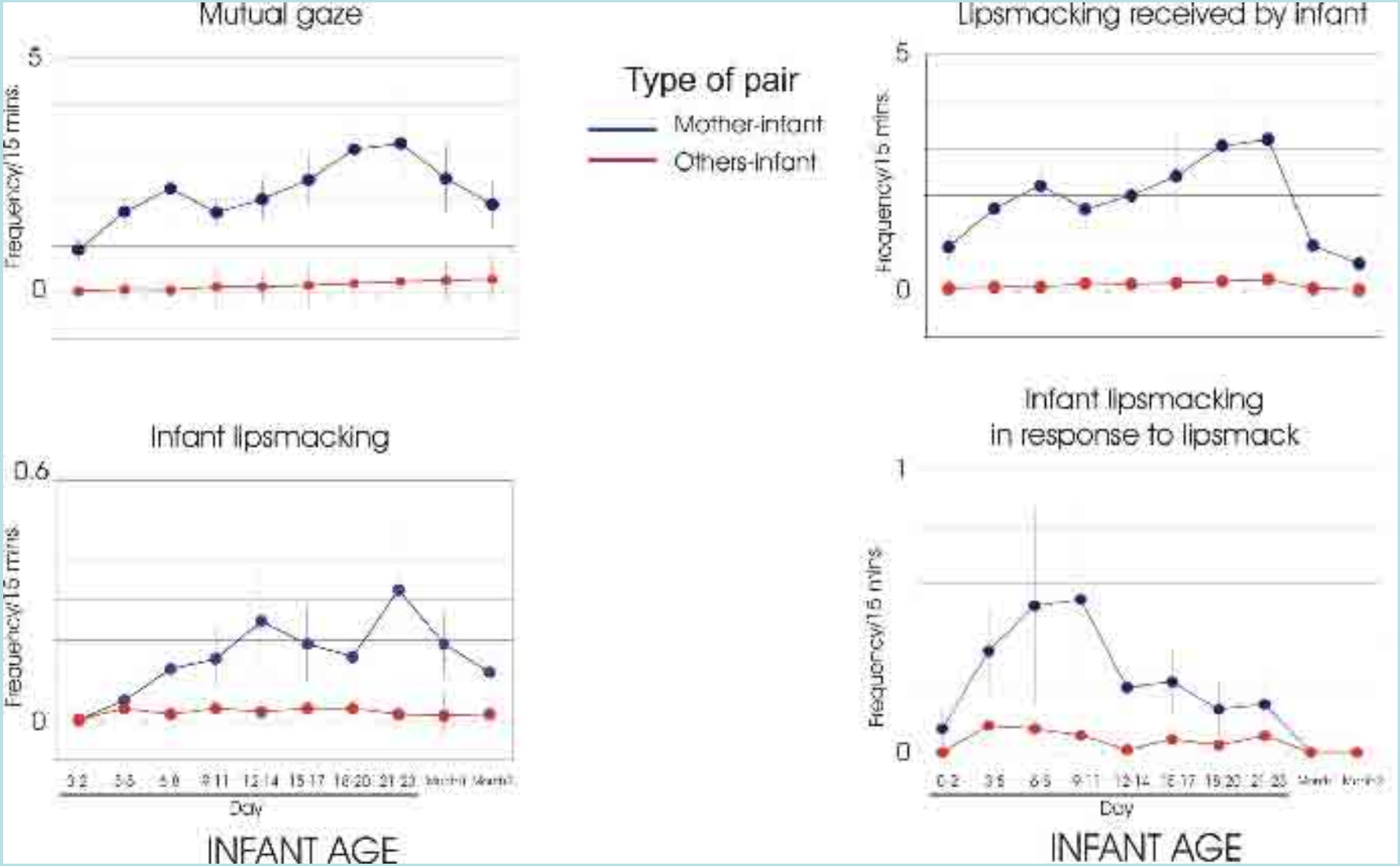
C

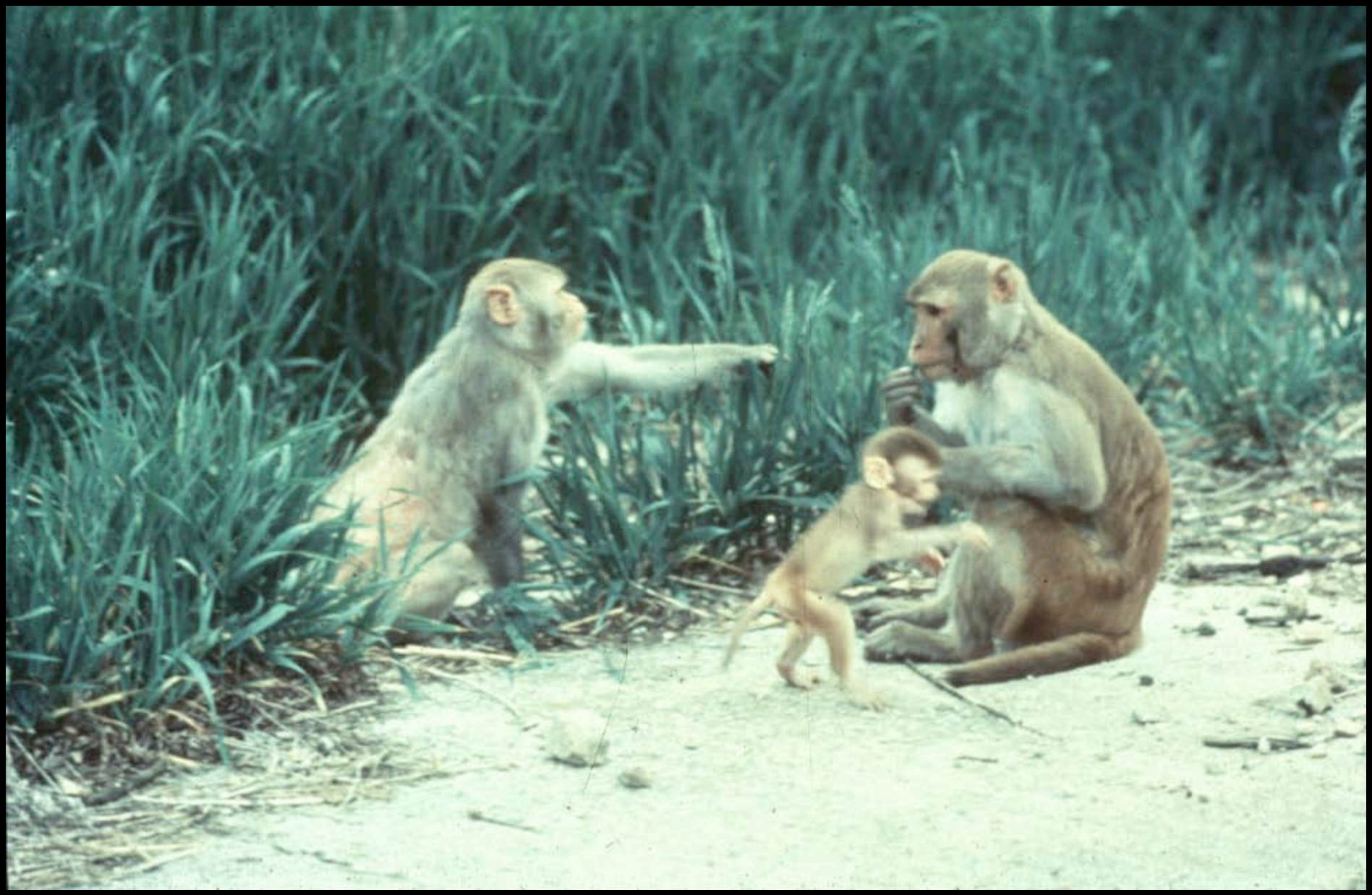


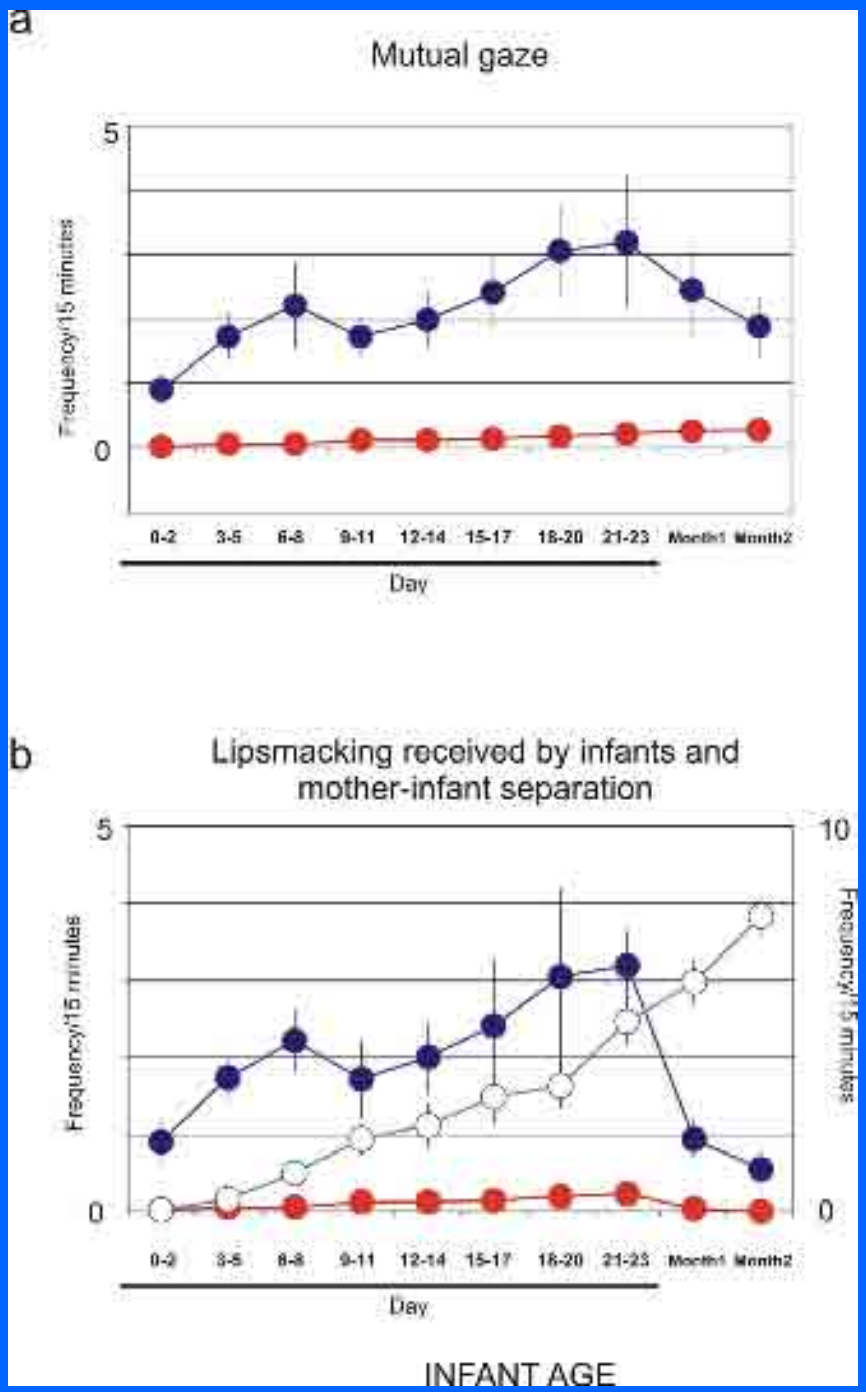


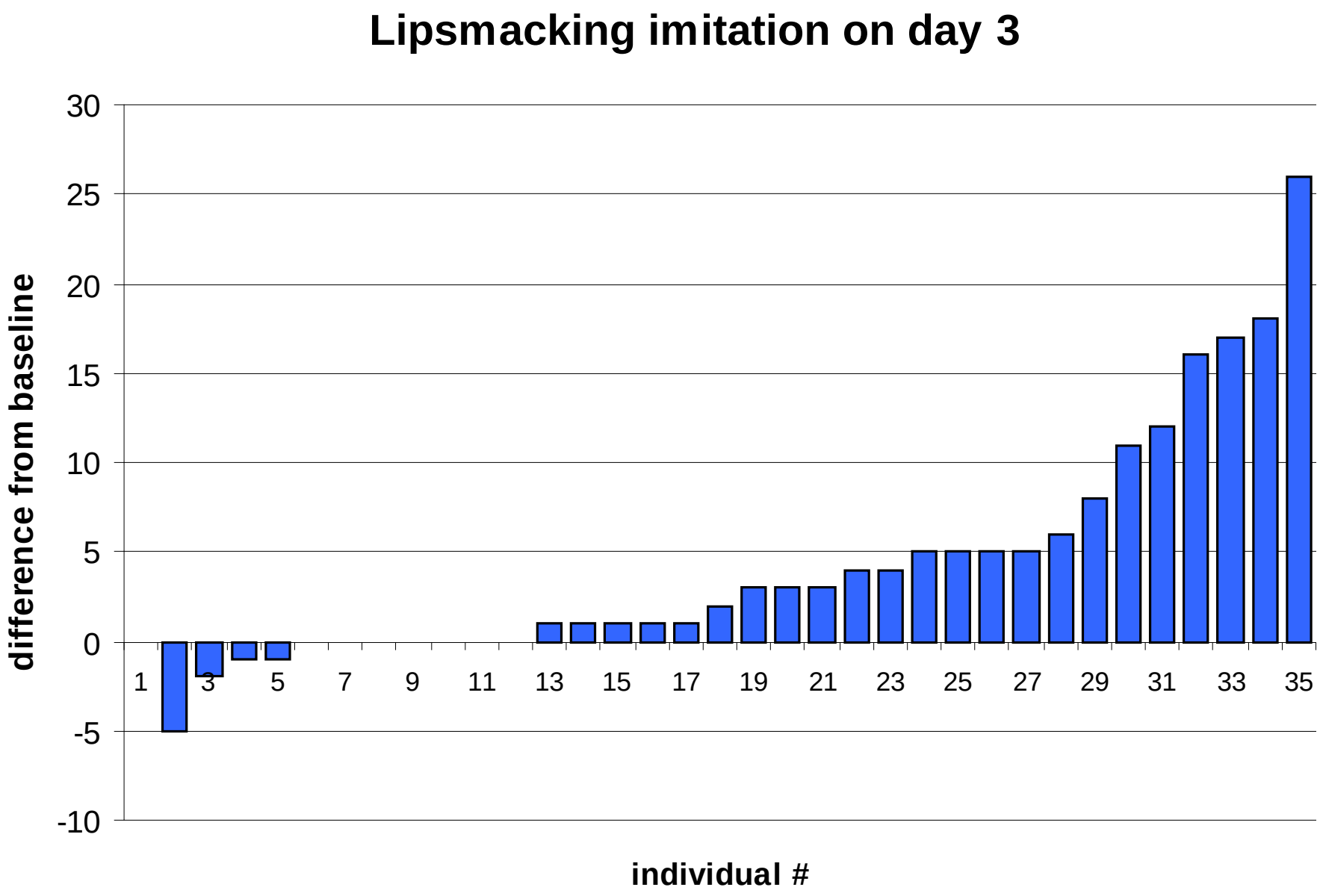
N =142


**
MR
PR
SPR
BDNF (pg/ml)
700
600
500
400
300
200
100
0
GG
GA-AA


Mutual gaze
Lipsmacking received by infant
Type of pair
Mother-infant
Others-infant
Infant lipsmacking
Infant lipsmacking
in response to lipsmack
Frequency/15 mins
Day
INFANT AGE

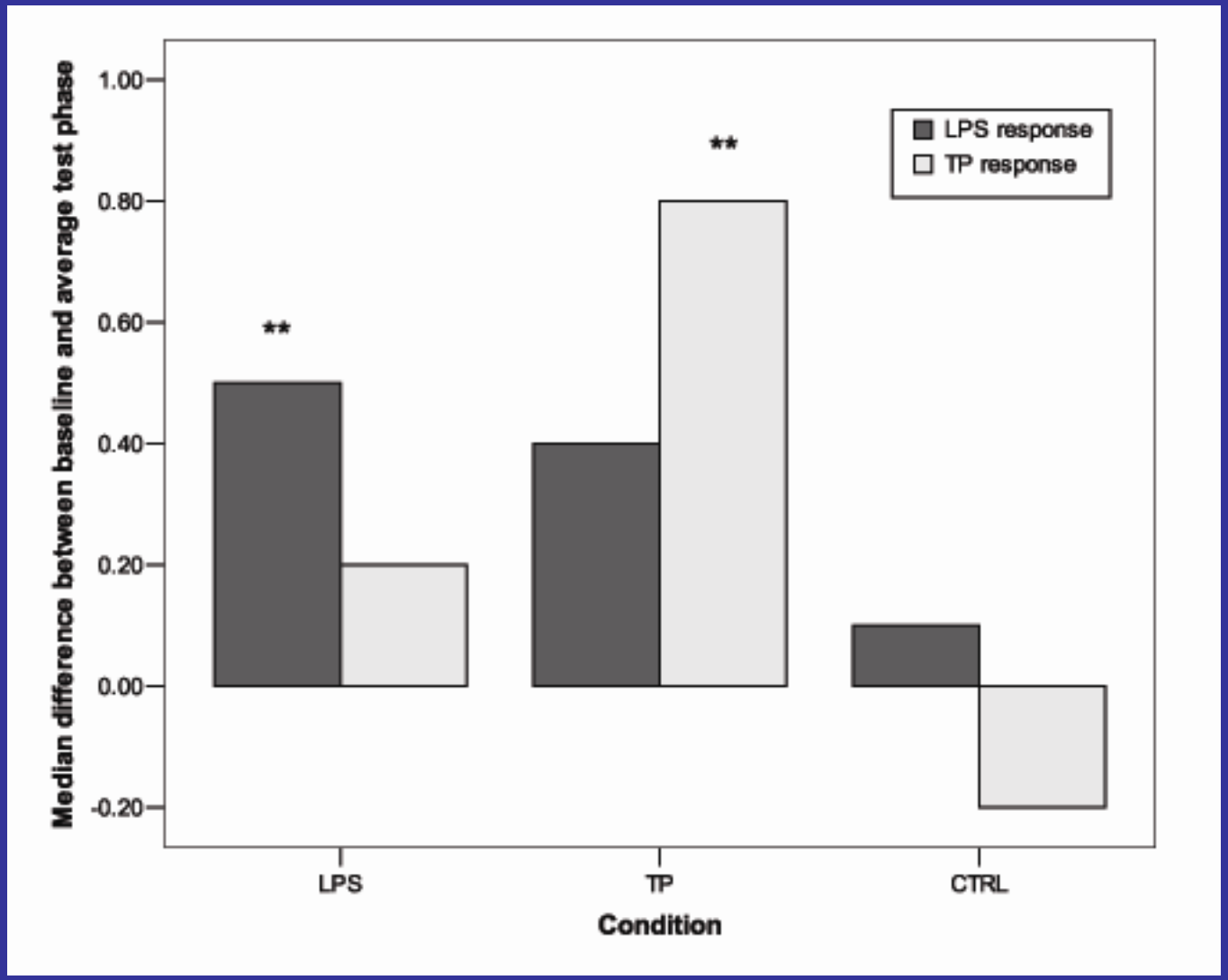



a
Mutual gaze
5
0
Frequency/15 minutes
0-2
3-5
6-8
9-11
12-14
15-17
18-20
21-23
Month1
Month2
Day
b
Lipsmacking received by infants and mother-infant separation
5
0
10
0
Frequency/15 minutes
Frequency/15 minutes
0-2
3-5
6-8
9-11
12-14
15-17
18-20
21-23
Month1
Month2
Day
INFANT AGE


Lipsmacking imitation on day 3
difference from baseline
30
25
20
15
10
5
0
-5
-10
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
individual #

LPS

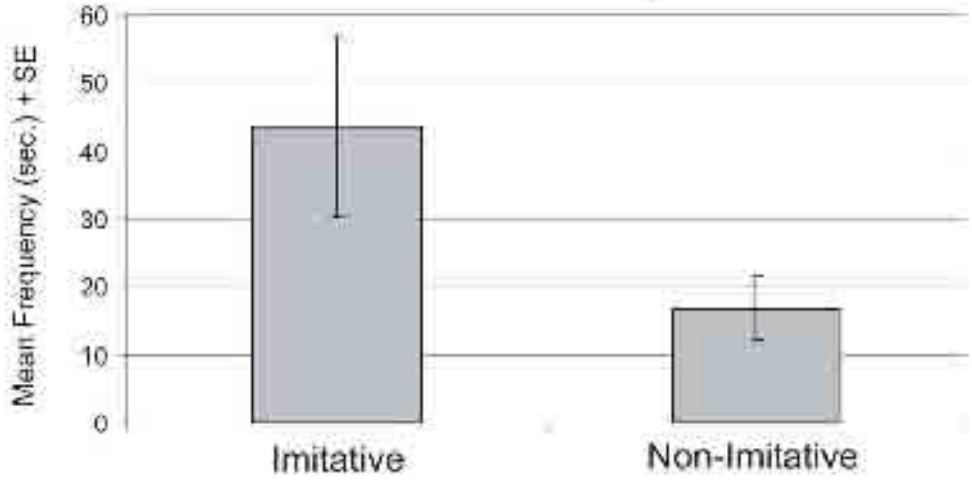
TP

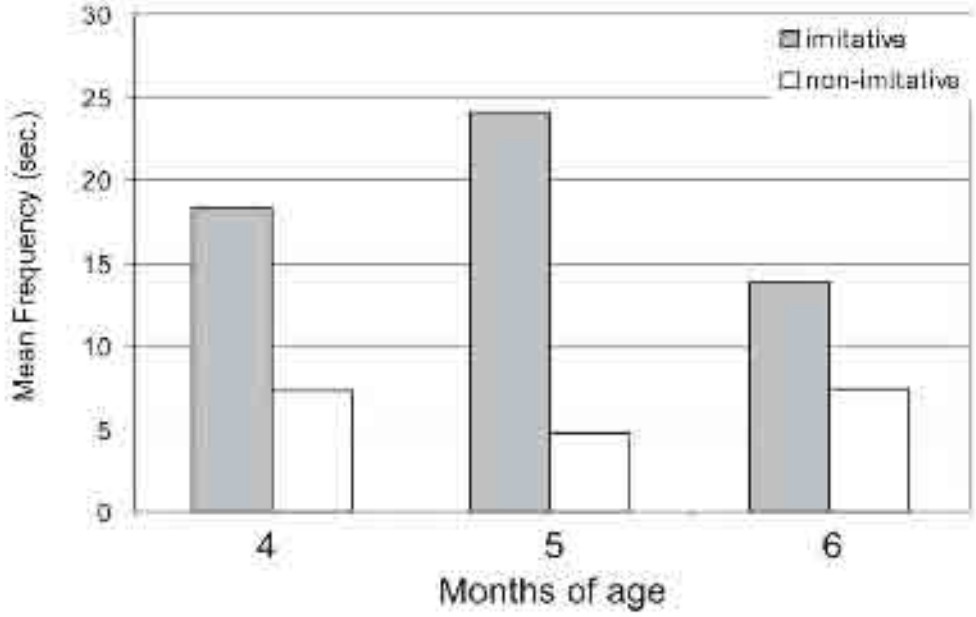

Median difference between baseline and average test phase
1.00
0.80
0.60
0.40
0.20
0.00
-0.20
**
**
LPS response
TP response
LPS
TP
CTRL
Condition

IMITATORS

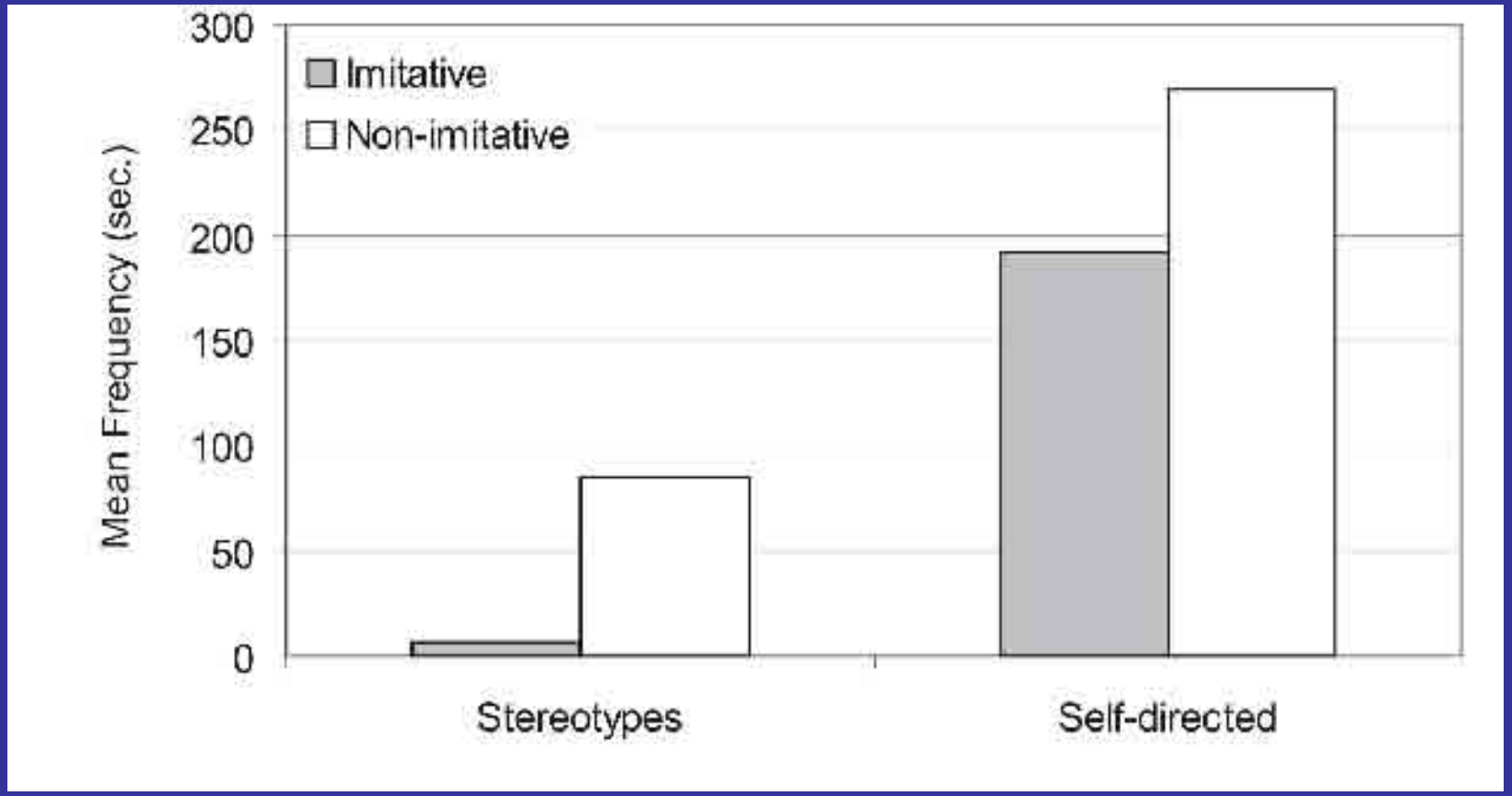
NON IMITATORS

Social play in 4-6 months old infant macaques

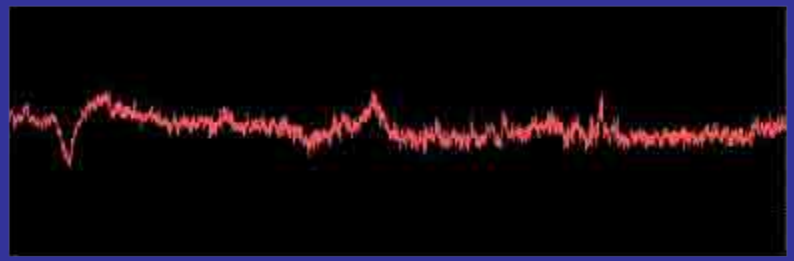


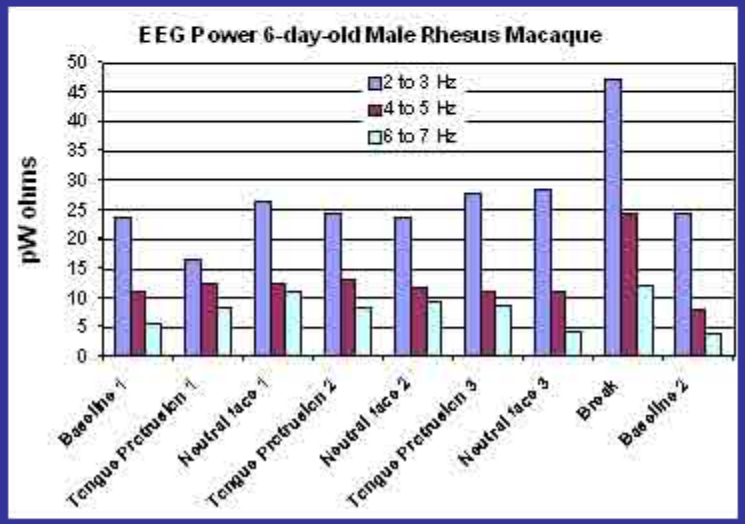


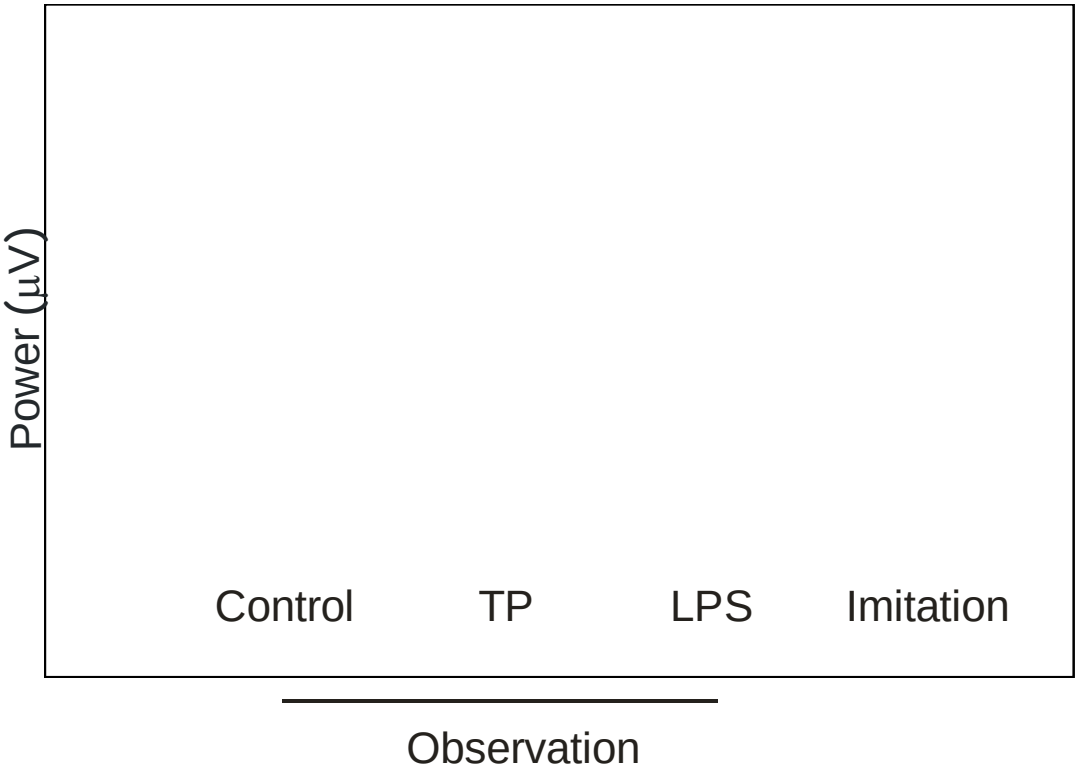
Stereotypic and self-directed behavior at 2 years of age



EEG signal in 6-day-old Male Rhesus Macaque






Power (μV)
Control
TP
LPS
Imitation
Observation

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Leonardo Fogassi, Ph.D.
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