马兰教授

1982年获沈阳药学院药学学士，1984年获中国医科大学免疫学硕士，1990年获北卡罗来那大学生物化学博士。1995年起任上海医科大学/复旦大学上海医学院神经生物学、药理学教授至今。现为教育部长江学者奖励计划特聘教授、复旦大学药理研究中心主任、脑科学研究院副院长。研究方向为分子神经药理学。在《Cell》等SCI刊物发表论文60余篇，指导的研究生论文中有多篇被评为全国优秀博士学位论文或上海市优秀研究生论文。获国家自然科学二等奖、国家教学成果二等奖、何梁何利科技进步奖、教育部科技进步一等奖、中华医学科技一等奖、上海市科技进步一等奖、上海市自然科学一等奖、上海市级教学成果一等奖。现为“Journal of Biological Chemistry”、“Neuropharmacology”、“Molecular Pain”、“Neuroscience Bulletin”、《中国药物依赖性杂志》、《中国药物滥用防治杂志》、《复旦学报（医学版）》编委。

图表是论文的重要部分

- 结果是论文的核心和主要部分
- 结果一般以图表形式呈现

图表在论文手稿中的位置

1. 表格：排在正文中参考文献的后边，每个表格一页

2. 图注：图注排在表格后面，另起一页

3. 图：　在图注后面，每个图一页

图表的作用

- 直观、高效地表达复杂的数据和观点
- 启发思考数据的本质、分析数据揭示的规律
- 以较小的空间承载较多的信息
- 真实、准确地展示和反映数据

A picture is worth a thousand words.

Graphic Excellence is that which gives the viewer:

- the greatest number of ideas
- in the shortest time
- with the least ink
- in the smallest space

By Edward R. Tufte (Graphics Press):

1. The Visual Display of Quantitative Information
2. Visual Explanations

表 格

适于呈现较多的精确数值或无明显规律的复杂分类数据和平行、对比、相关关系的描述。

表格的基本结构

序号、标题

项目栏

表体

脚注

顶线、栏目线、底线（三线表）

（一般没有竖线）

TABLE 2
Brain Metabolite Ratios in Plane above Ventricle and Annual Decrease

Metabolite Ratio	1995–1996 Ratio*	1999–2000 Ratio*	Annual Decrease in Ratio†
Cho/Cr			
Women	1.00 ± 0.11	0.84 ± 0.17	0.038 (0.031, 0.046)
Adjusted	0.98 ± 0.10	0.89 ± 0.16	
Men	1.00 ± 0.13	0.89 ± 0.18‡	0.027 (0.018, 0.035)§
Adjusted	1.00 ± 0.12	0.91 ± 0.15	
NAA/Cr			
Women	1.57 ± 0.17	1.46 ± 0.29	0.027 (0.013, 0.041)
Adjusted	1.56 ± 0.16	1.50 ± 0.27	
Men	1.54 ± 0.20	1.42 ± 0.32	0.029 (0.014, 0.045)
Adjusted	1.52 ± 0.16	1.47 ± 0.23	
Cho/NAA			
Women	0.64 ± 0.09	0.59 ± 0.14	0.012 (0.006, 0.018)
Adjusted	0.64 ± 0.08	0.58 ± 0.13	
Men	0.65 ± 0.10	0.65 ± 0.18‡	0.000 (−0.009, 0.008)‡
Adjusted	0.66 ± 0.09	0.63 ± 0.10‖	

Note.—Data are for 105 women (first examination, 137 women) and 96 men (first examination, 134 men), adjusted as described in Results.

* Data are the mean ± SD.

† Data in parentheses are 95% CI.

‡ Men differ from women, $P < .02$.

§ Men differ from women, $P < .05$.

‖ Men differ from women, $P < .01$.

Cell, Vol. 112, 257–269, January 24, 2003

	Patients			Siblings			Controls		
Genotype Group (number of subjects)	Val/val (138)	Val/met (56)	Met/met (9)	Val/val (206)	Val/met (85)	Met/met (14)	Val/val (91)	Val/met (36)	Met/met (6)
Age	36.8 (9.2)	35.7 (8.6)	32.5 (10.2)	37.2 (8.8)	35.8 (8.9)	34.7 (8.8)	35.0 (9.7)	34.1 (8.9)	39.3 (8.4)
Gender (M/F)	109/29	45/11	7/2	91/115	31/54	7/7	43/48[a]	26/10[a]	4/2
Education years	13.8 (2.2)	13.9 (2.6)	13.9 (2.8)	15.8[a] (2.5)	15.1[a] (2.4)	15.3 (2.6)	16.2 (2.4)	16.7 (3.2)	17.7 (4.3)
Reading Comprehension	101.3 (12.3)	100.9 (12.7)	105.1 (10.0)	106.5 (11.2)	104.7 (11.8)	104.5 (11.2)	106.3 (10.2)	106.2 (10.2)	104.7 (12.6)
IQ	92.9 (12.6)	91.1 (13.1)	92.3 (13.5)	106.2 (13.1)	106.1 (13.1)	104.7 (13.1)	107.6 (10.7)	109.1 (10.2)	105.7 (12.6)
Semantic Memory	33.5 (11.8)	33.9 (11.5)	33.2 (14.1)	42.1 (11.1)	39.2 (11.3)	41.7 (10.5)	44.11 (9.2)	48.0 (9.8)	44.3 (10.5)
Working Memory	37.0 (12.0)	37.4 (12.8)	42.0 (14.9)	44.0 (9.5)	44.7 (10.6)	43.4 (7.3)	47.3 (9.5)	46.1 (10.3)	40.1 (8.1)

Not so good

图

- 照片、其它纪实图象等 记录性
- 线形图、条形图、散点图等 定量
- 示意图、流程图 解释性
- 地图

图的种类

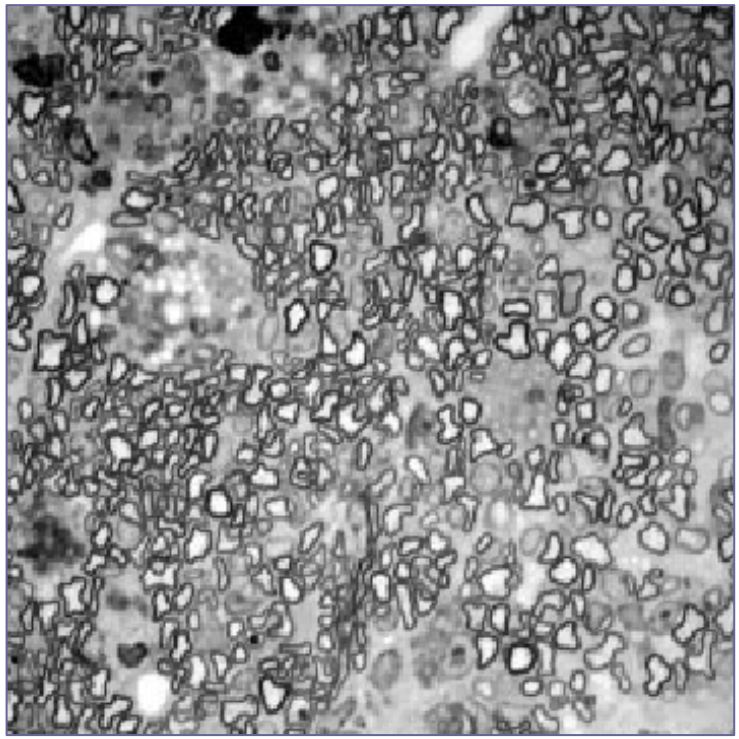
照　片：　真实、直观、信息量大。
要对比强烈、重点突出

线形图：　二个变量之间的定量关系（趋势、连续变化）

条形图：　自变量为分类数据

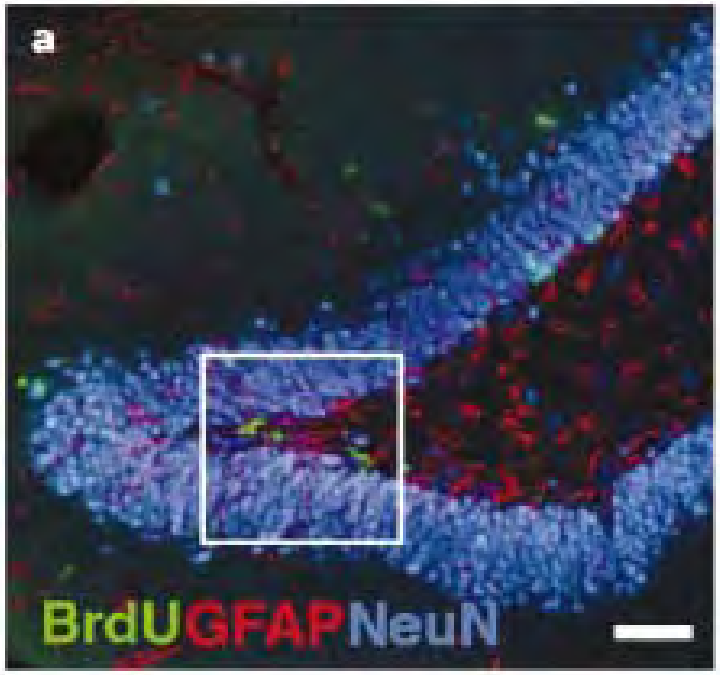
饼形图：　比例

照片：真实、直观、信息量大

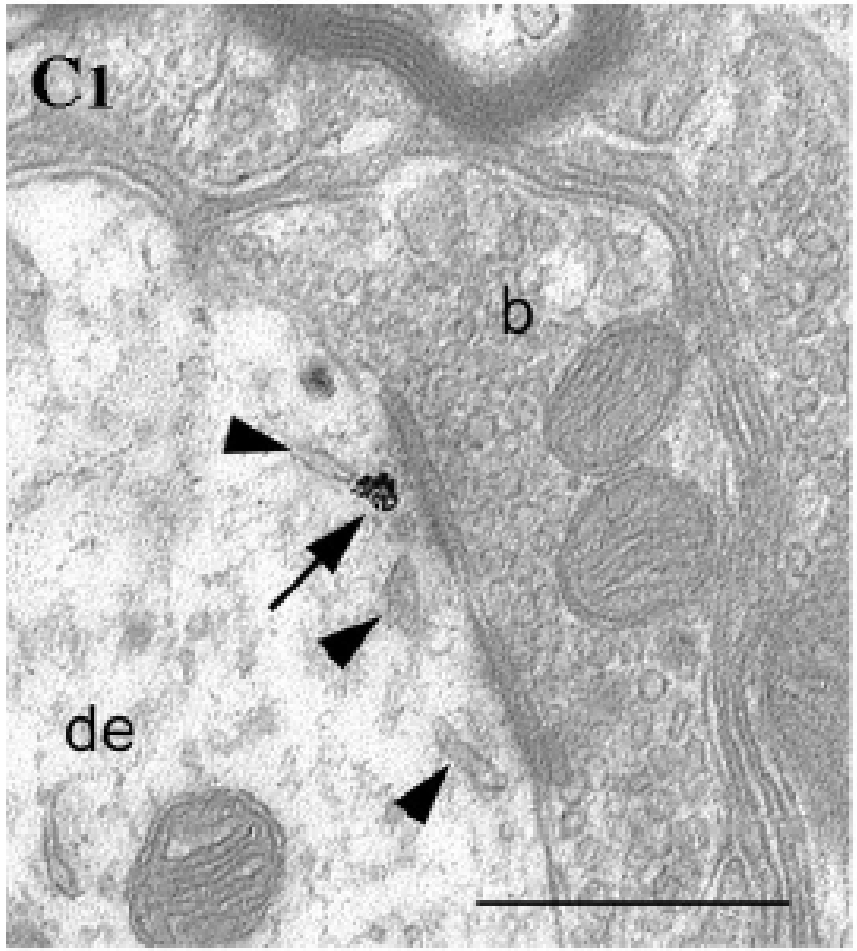


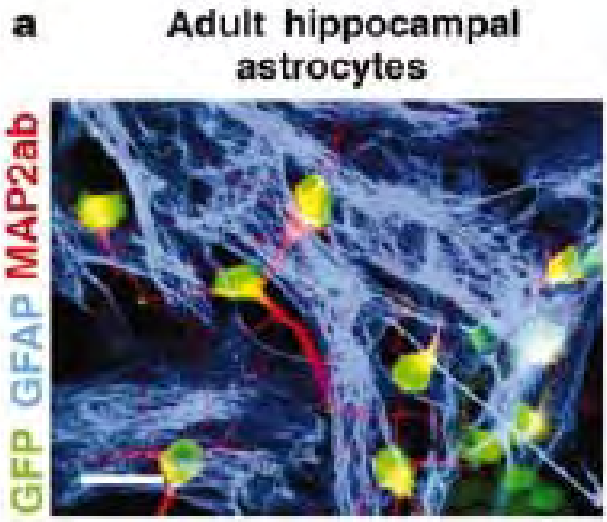
缺乏对比、重点不突出

标记帮助突出重点



NATURE | VOL 417 | 2 MAY 2002

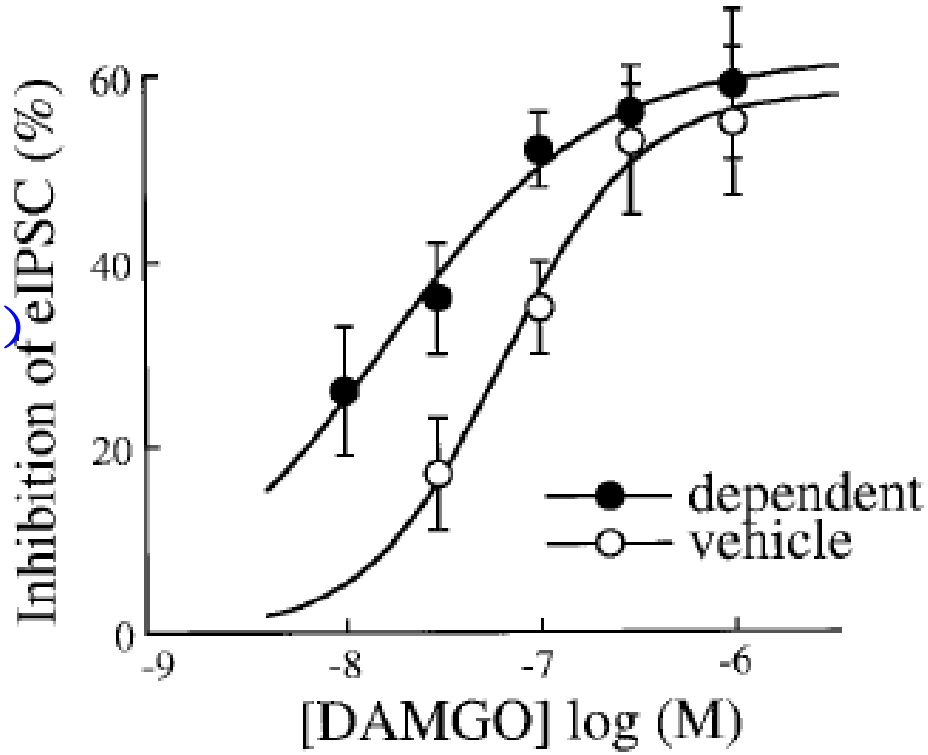




Molecular and Cellular Neuroscience **18,** 13–25 (2001)

线形图：二个变量之间的定量关系（趋势、连续变化）

因变量：
竖轴（标题、单位）



自变量：
横轴（标题、单位）

Figure 2. DAMGO is more efficacious in neurons from dependent animals. Concentration–response relationship for percentage inhibition of eIPSC amplitudes by the selective μ-opioid agonist DAMGO in neurons from morphine-dependent (*closed circles*, no morphine for >1 hr) and vehicle-treated (*open circles*) animals. Each point shows the mean (± SEM) of responses of three to eight neurons. A logistic function was fitted to the concentration–response curves to determine the EC_{50} (*dependent*, 16 nM; *vehicle*, 65 nM).

条形图：自变量为分类数据

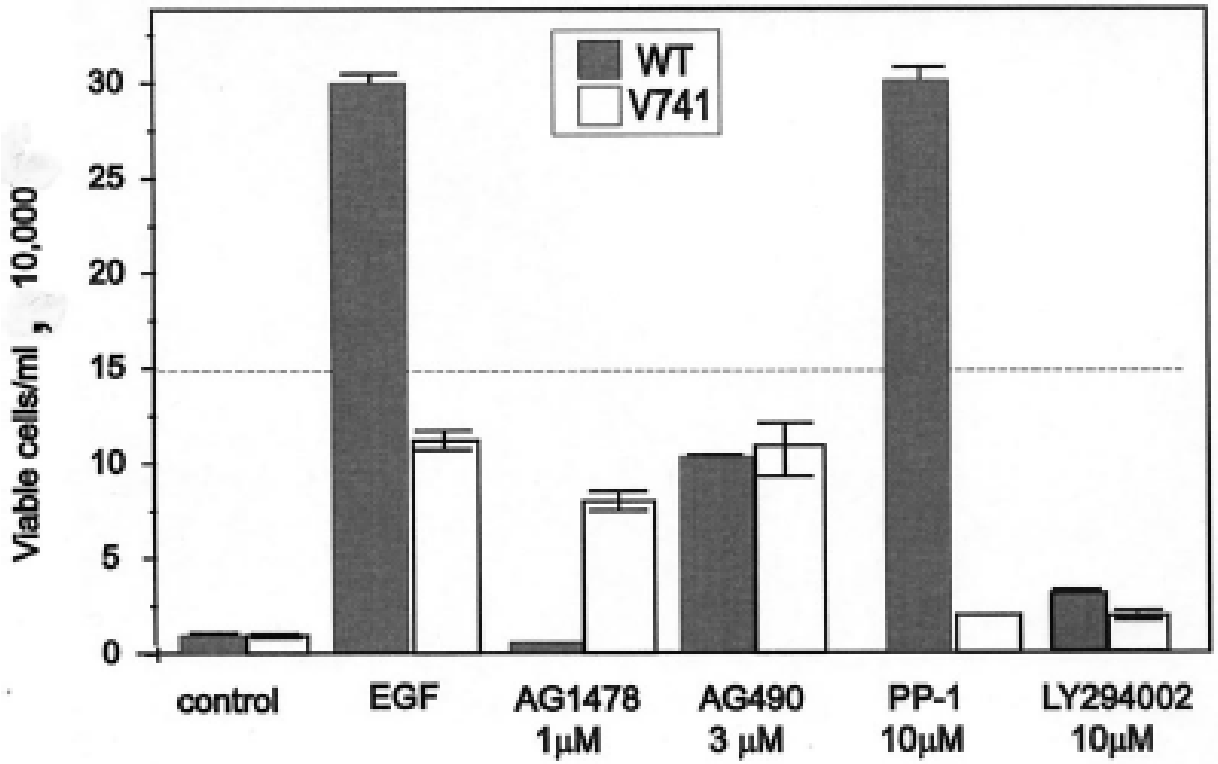


FIG. 10. Effect of kinase inhibitors on EGF-dependent survival and proliferation. Cells were seeded at 1.5×10^5/ml (dashed line) in control medium or in medium containing EGF (15 nM) or EGF plus the stated concentrations of inhibitors. Viable cell numbers were determined after 3 days. All inhibitors were dissolved in DMSO, and the concentration of DMSO was adjusted to 0.5% in all wells. Results are the averages and standard errors from three replicate wells and are representative of those from three separate experiments.

图 注

1. 图序和题目
2. 内容：用文字和符号表达图中未能表达的必要信息，使读者不必依赖正文而理解图所要说明的问题。

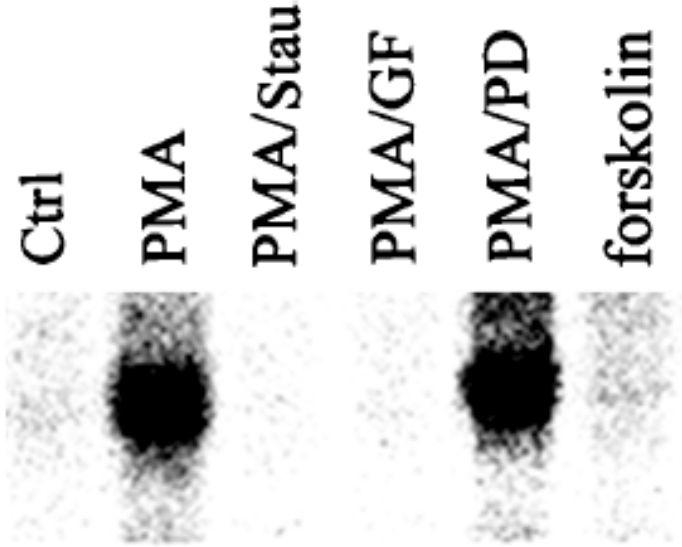


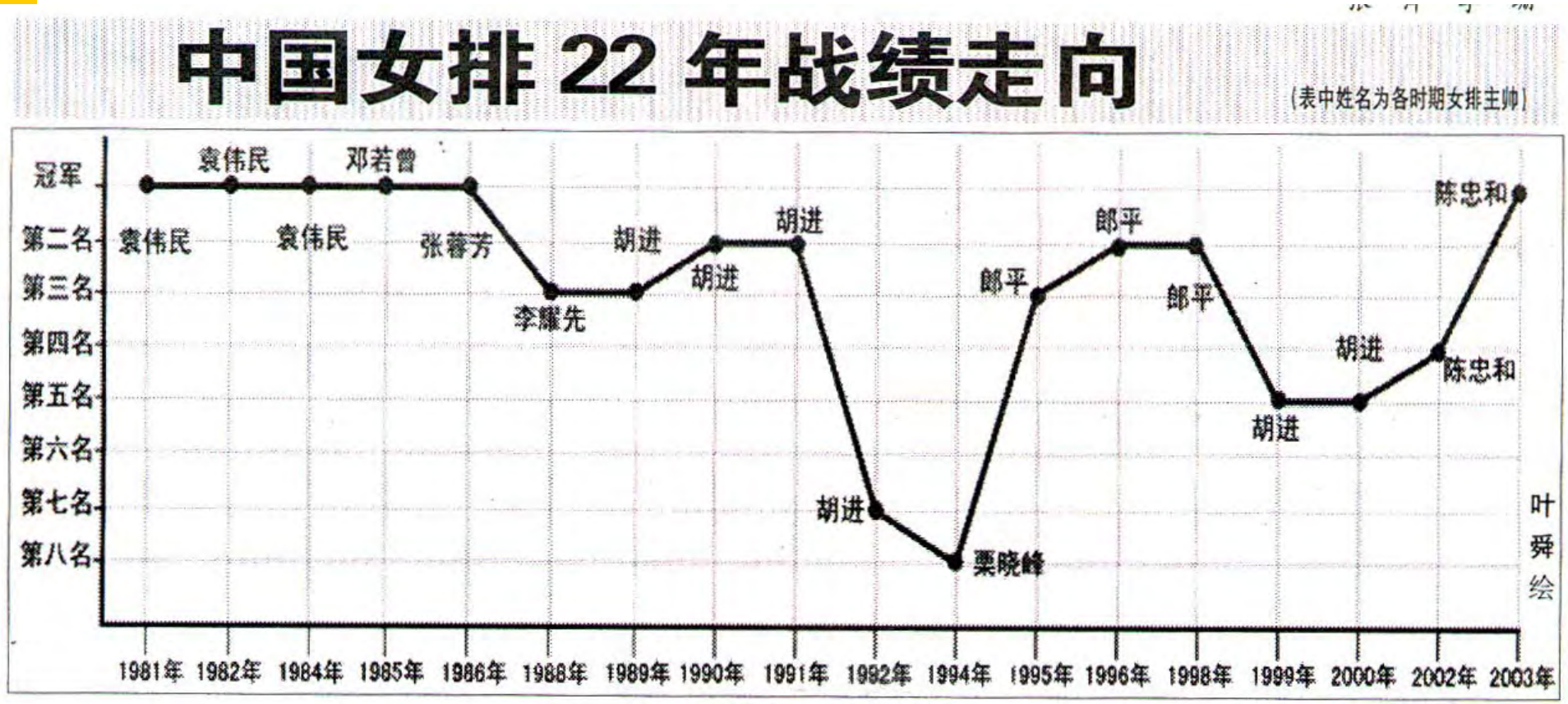
FIG. 2. **PMA-stimulated DOR phosphorylation was mediated by PKC.** HEK 293 cells transiently expressing DOR were labeled with $^{32}P_i$ and challenged with or without 0.2 μM staurosporine (*Stau*), 2 μM GF109203X (*GF*), or 20 μM PD98059 (*PD*) for 20 min prior to incubation with 1 μM PMA, 10 μM forskolin, or PBS (*Ctrl*) for 10 min. DORs were then immunoprecipitated and receptor phosphorylation was analyzed. The figure is representative of three independent experiments performed.

JBC （2001） 276: 4709-4716.

怎样正确地使用图表

1. 确定主题-你想表达什么观点？
2. 图表还是文字更有效？
3. 那种图表最适合你的目的？
4. 是否真实、有效地展示了数据？
5. 是否启发读者思考数据的本质和规律？
6. 是否表达了你的观点？

1. 你想表达什么观点？


中国女排22年战绩走向
（表中姓名为各时期女排主帅）
冠军
第二名
第三名
第四名
第五名
第六名
第七名
第八名
袁伟民
邓若曾
袁伟民
袁伟民
张蓉芳
李耀先
胡进
胡进
胡进
胡进
栗晓峰
郎平
郎平
郎平
胡进
胡进
陈忠和
陈忠和
叶舜绘
1981年
1982年
1984年
1985年
1986年
1988年
1989年
1990年
1991年
1992年
1994年
1995年
1996年
1998年
1999年
2000年
2002年
2003年

2. 用文字还是图表？

Table 3. Oxygen requirements of various species of *Streptomyces*

Organism	Growth under aerobic conditions[a]	Growth under anaerobic conditions
Streptomyces griseus	+	−
S. coelicolor	+	−
S. nocolor	−	+
S. everycolor	+	−
S. greenicus	−	+
S. rainbowenski	+	−

[a] See Table 1 for explanation of symbols. In this experiment, the cultures were aerated by a shaking machine (New Brunswick Shaking Co., Scientific, NJ).

没有必要时不要用

Table 1. Effect of aeration on growth of *Streptomyces coelicolor*

Temp (°C)	No. of expt	Aeration of growth medium	Growth[a]
24	5	+[b]	78
24	5	–	0

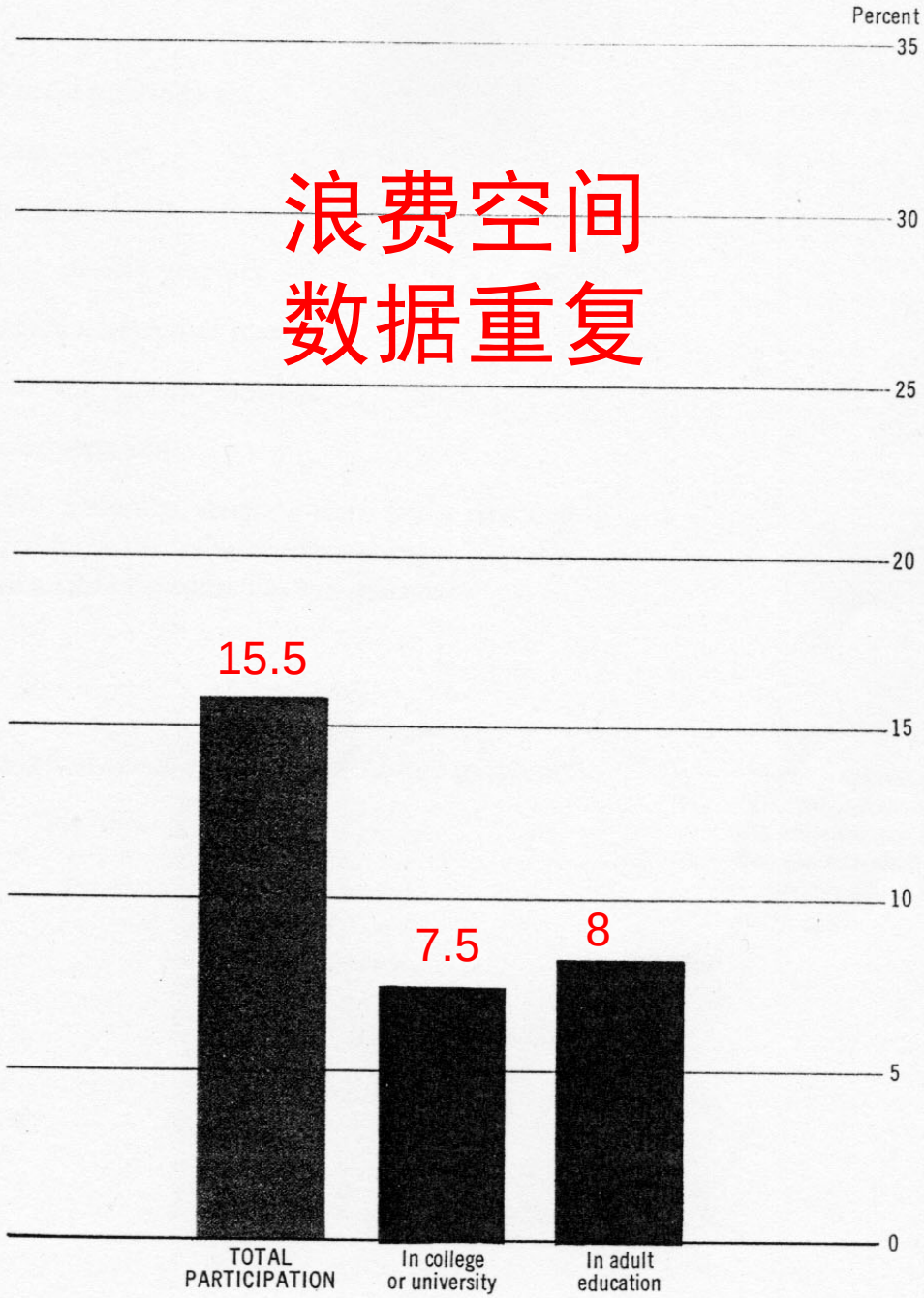
[a] As determined by optical density (Klett units).
[b] Symbols: +, 500-ml Erlenmeyer flasks were aerated by having a graduate student blow into the bottles for 15 min out of each hour; –, identical test conditions, except that the aeration was provided by an elderly professor.

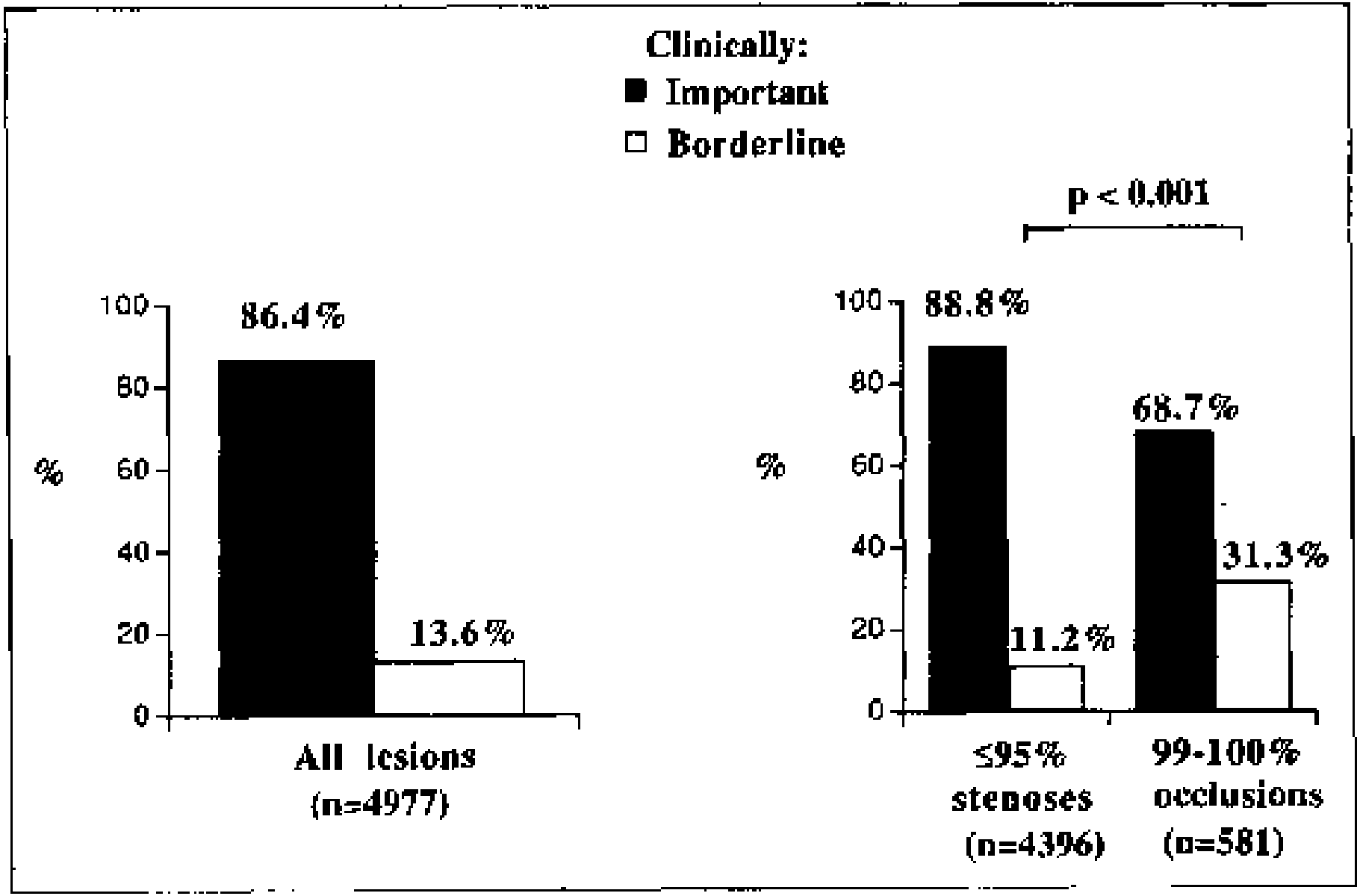
Table 2. Effect of temperature on growth of oak (*Quercus*) seedlings[a]

Temp (°C)	Growth in 48 h (mm)
–50	0
–40	0
–30	0
–20	0
–10	0
0	0
10	0
20	7
30	8
40	1
50	0
60	0
70	0
80	0
90	0
100	0

[a] Each individual seedling was maintained in an individual round pot, 10 cm in diameter and 100 m high, in a rich growth medium containing 50% Michigan peat and 50% dried horse manure. Actually, it wasn't "50% Michigan"; the peat was 100% "Michigan," all of it coming from that state. And the manure wasn't half-dried (50%); it was all dried. And, come to think about it, I should have said "50% dried manure (horse)"; I didn't dry the horse at all.

浪费空间
数据重复


Percent
35
30
25
20
15
10
5
0
15.5
7.5
8
TOTAL PARTICIPATION
In college or university
In adult education


Clinically:
Important
Borderline
p < 0.001
%
100
80
60
40
20
0
86.4%
13.6%
All lesions
(n=4977)
88.8%
11.2%
68.7%
31.3%
≤95% stenoses
(n=4396)
99-100% occlusions
(n=581)

标题和关联、空间

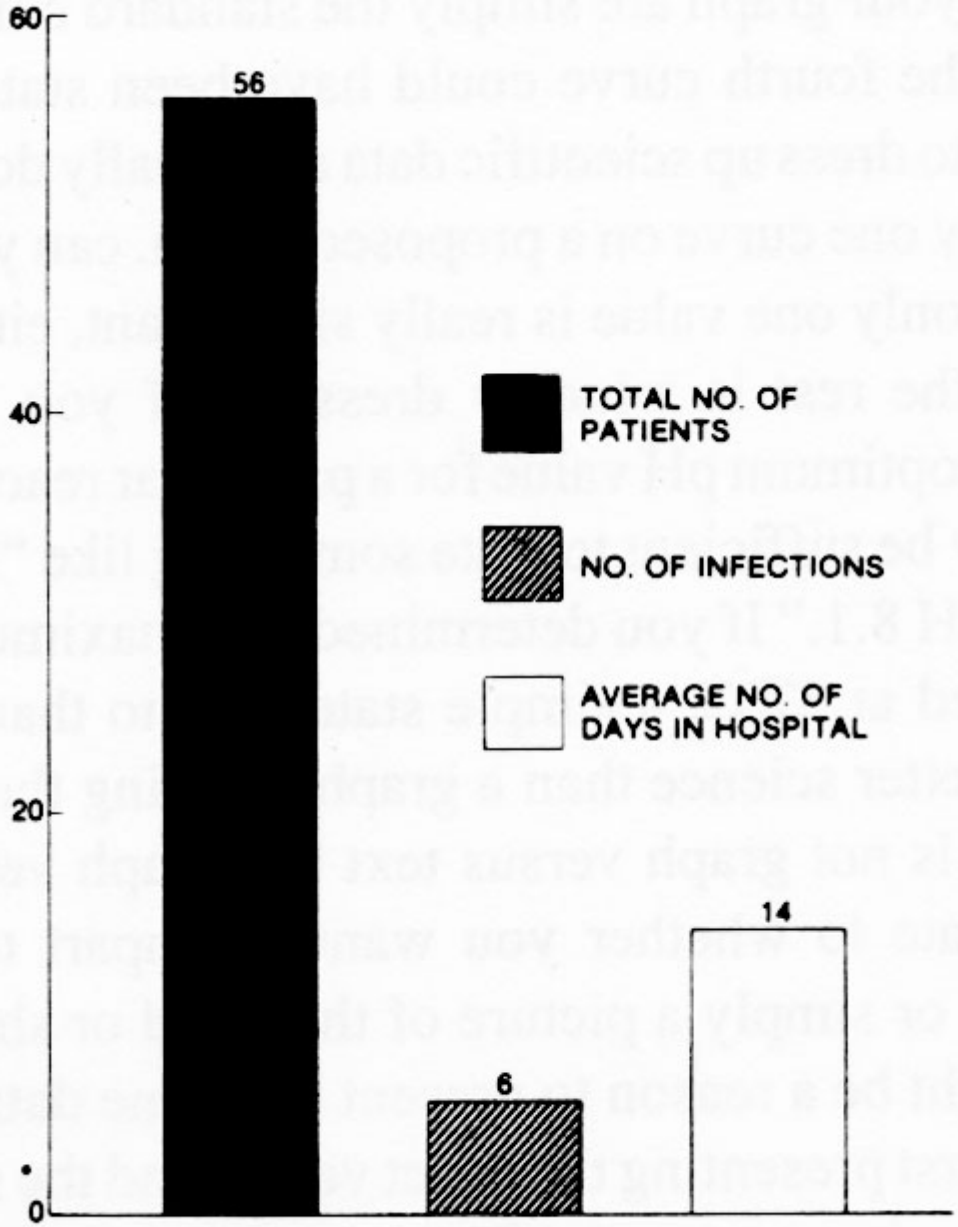


Figure 1. Incidence of hospital-acquired infections.

3. 哪种图表？

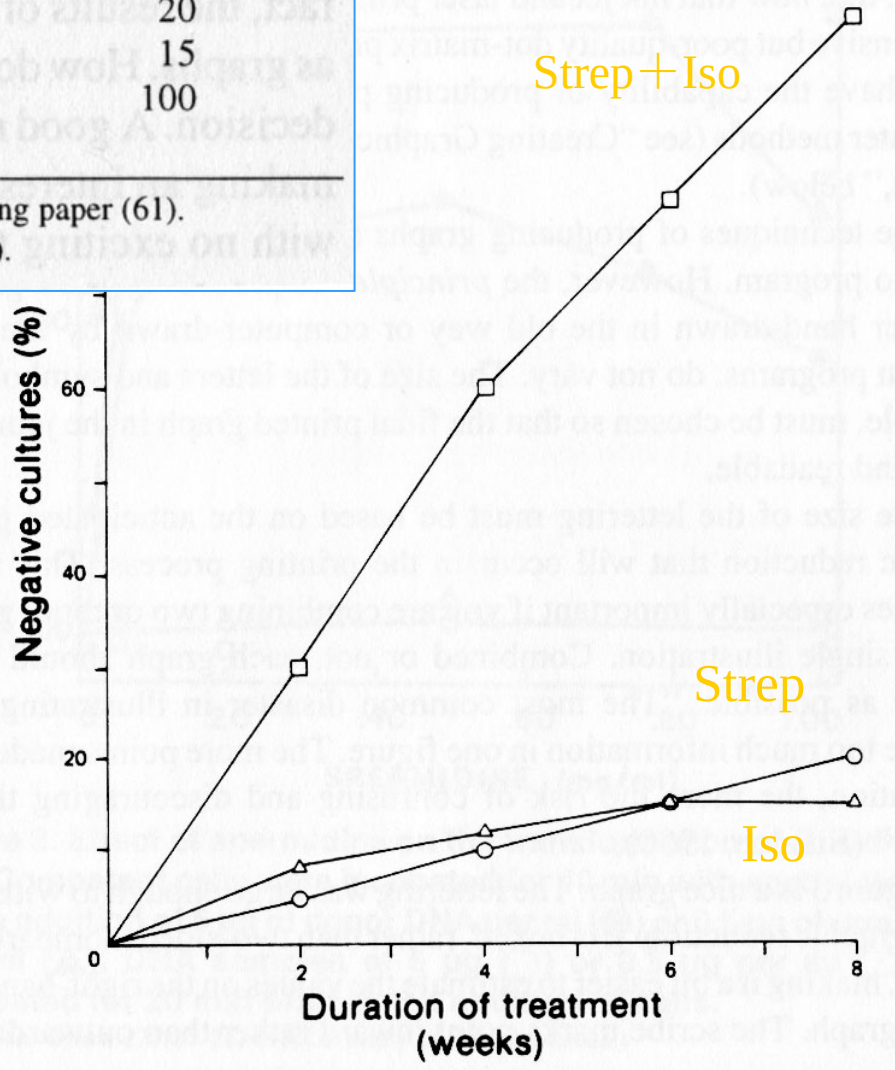
表： 侧重数字、描述。适用于很多数据，但缺乏趋势

图： 侧重表现关联、趋势、因果关系等

Table 9. Effect of streptomycin, isoniazid, and streptomycin plus isoniazid on *Mycobacterium tuberculosis*[a]

Treatment[b]	Percentage of negative cultures at:			
	2 wk	4 wk	6 wk	8 wk
Streptomycin	5	10	15	20
Isoniazid	8	12	15	15
Streptomycin + isoniazid	30	60	80	100

[a]The patient population, now somewhat less so, was described in a preceding paper (61).
[b]Highest quality available from our supplier (Town Pharmacy, Podunk, IA).



真实地、准确地展示数据

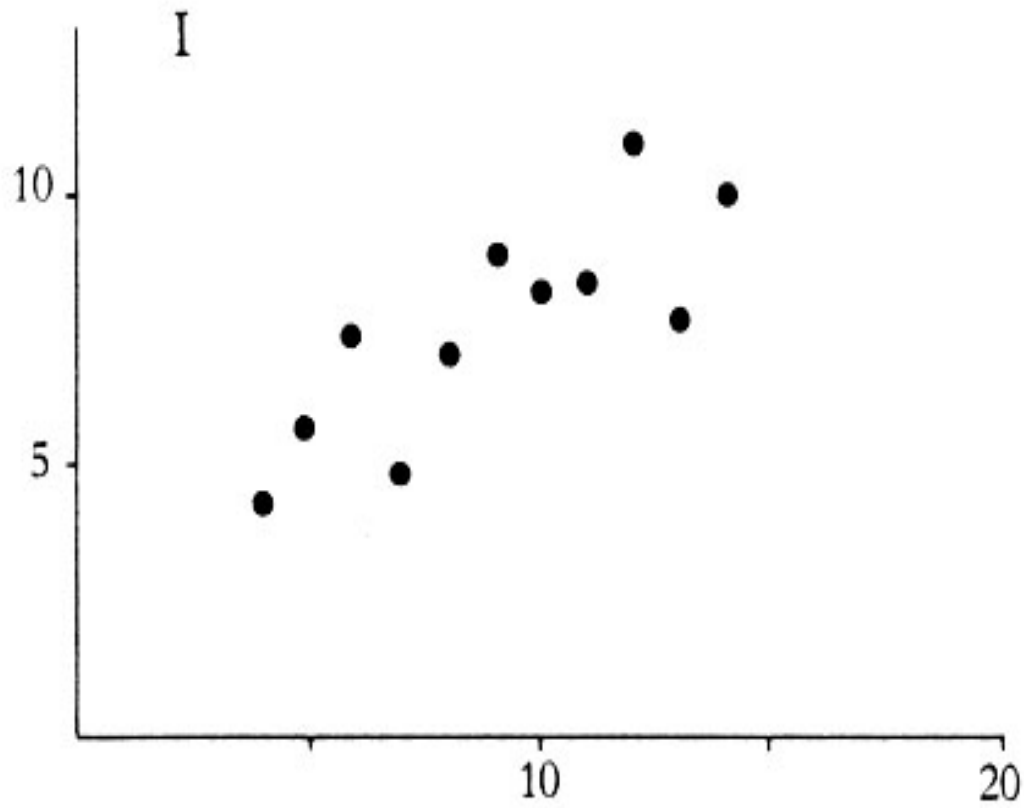
N＝11 X均值＝9.0 Y均值=7.5

Y=3+0.5X　　r =0.82

I		II		III		IV	
X	Y	X	Y	X	Y	X	Y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

揭示规律

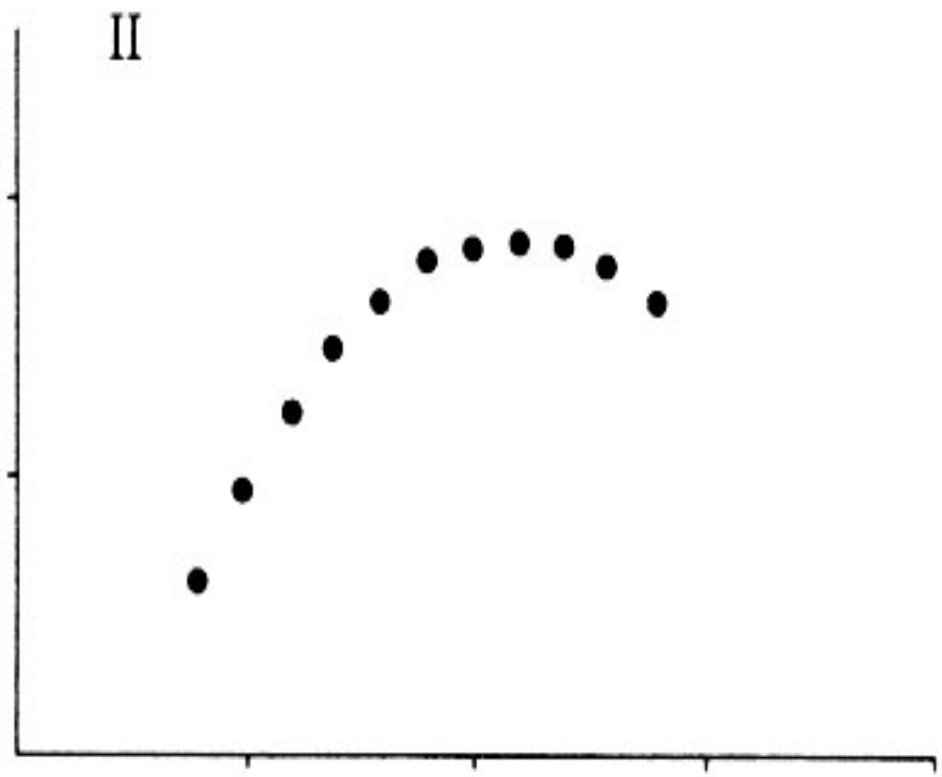
I	
X	Y
10.0	8.04
8.0	6.95
13.0	7.58
9.0	8.81
11.0	8.33
14.0	9.96
6.0	7.24
4.0	4.26
12.0	10.84
7.0	4.82
5.0	5.68



揭示规律

II

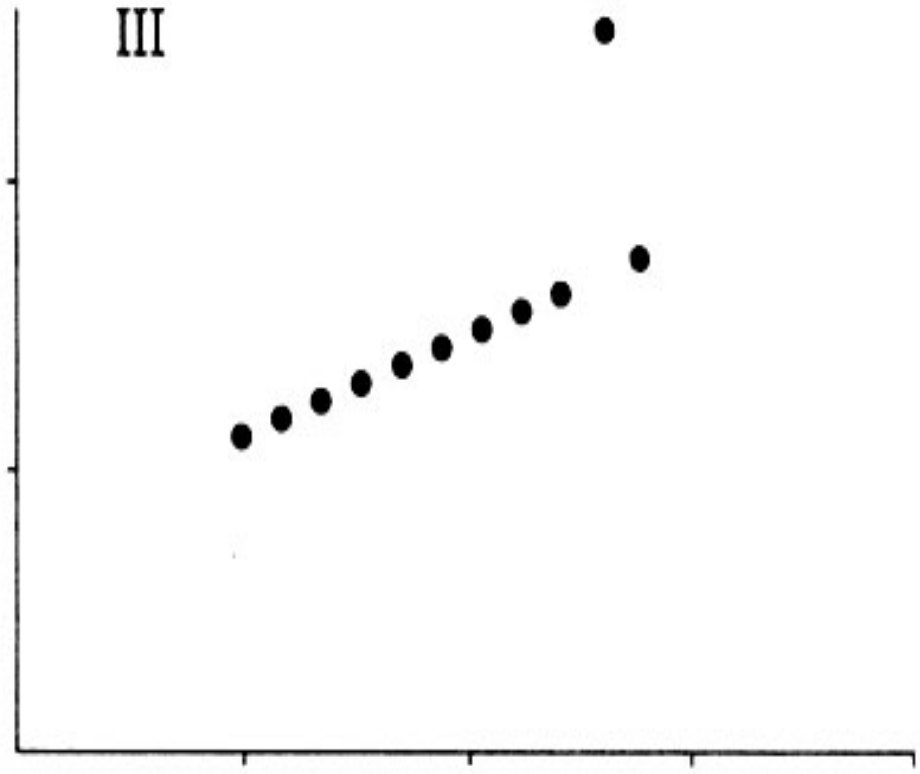
X	Y
10.0	9.14
8.0	8.14
13.0	8.74
9.0	8.77
11.0	9.26
14.0	8.10
6.0	6.13
4.0	3.10
12.0	9.13
7.0	7.26
5.0	4.74



揭示规律

III

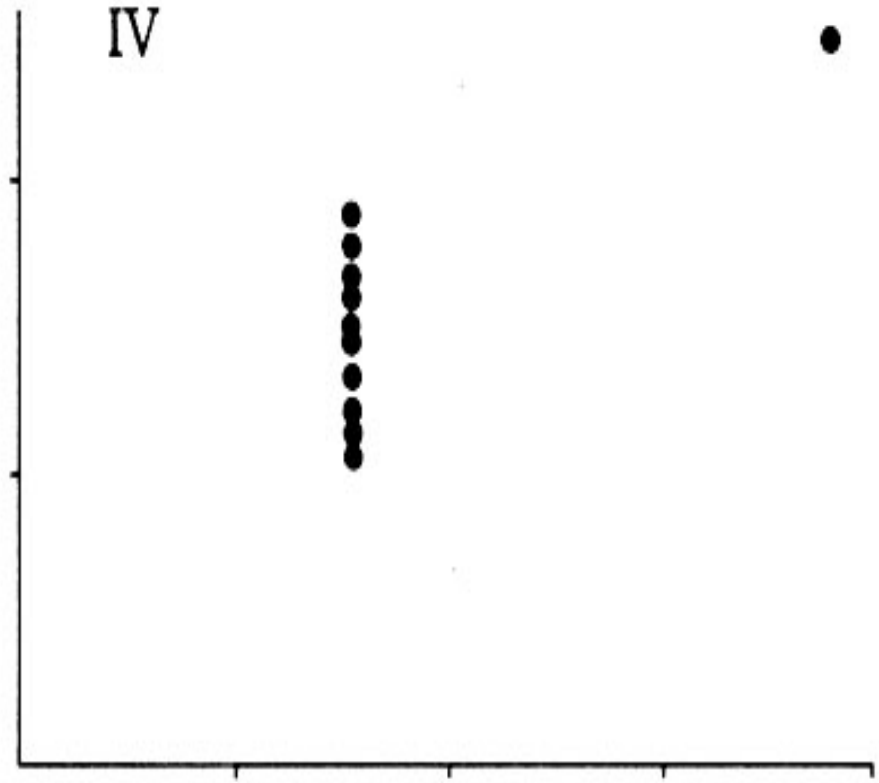
X	Y
10.0	7.46
8.0	6.77
13.0	12.74
9.0	7.11
11.0	7.81
14.0	8.84
6.0	6.08
4.0	5.39
12.0	8.15
7.0	6.42
5.0	5.73



揭示规律

IV

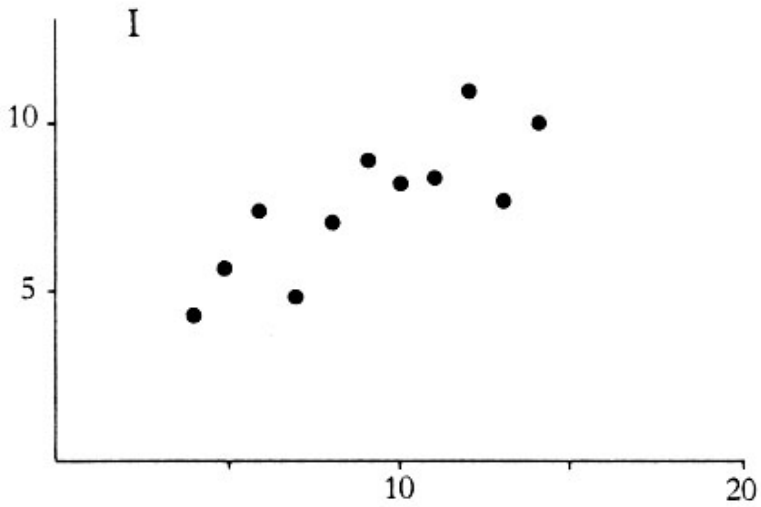
x	y
8.0	6.58
8.0	5.76
8.0	7.71
8.0	8.84
8.0	8.47
8.0	7.04
8.0	5.25
19.0	12.50
8.0	5.56
8.0	7.91
8.0	6.89

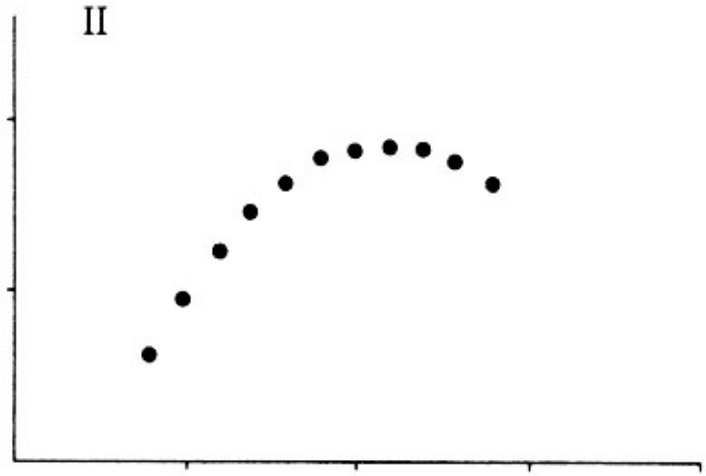


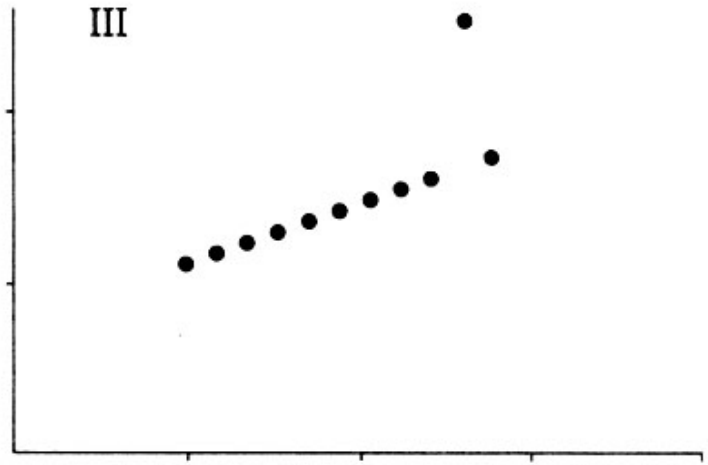
揭示规律

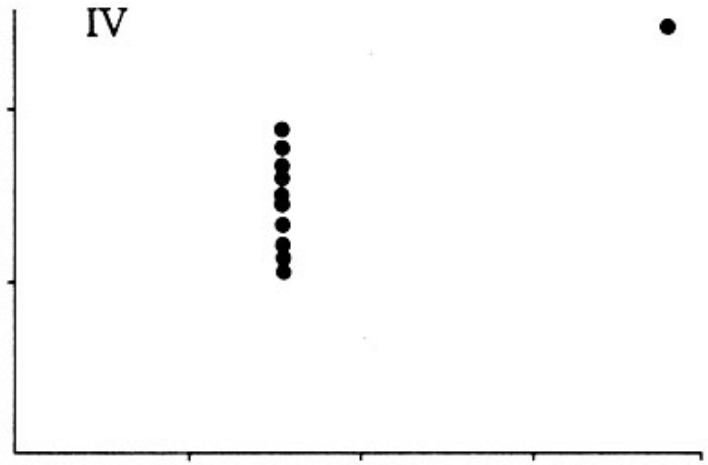
马兰教授（2007年11月26日）

Anscombe: *Am. Stat. Anal.* 27,17-21 (1973)









授）

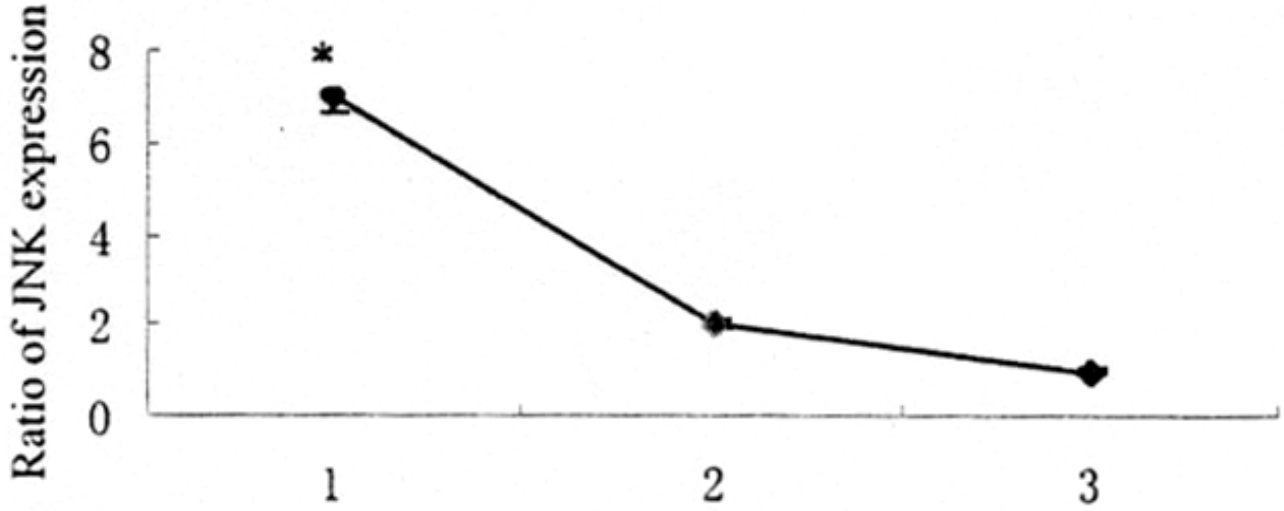


图　3　睡眠剥夺引起大鼠海马 JNK 表达量的变化

Fig.　3　Change of JNK expression in hippocampus after sleep eprivation

1:PSD　;　2:LC　;　3:HC

*:PSD　vs　LC $P<0.05$;　PSD　vs　HC $P<0.05$　.n=8　for each group

应为条形图

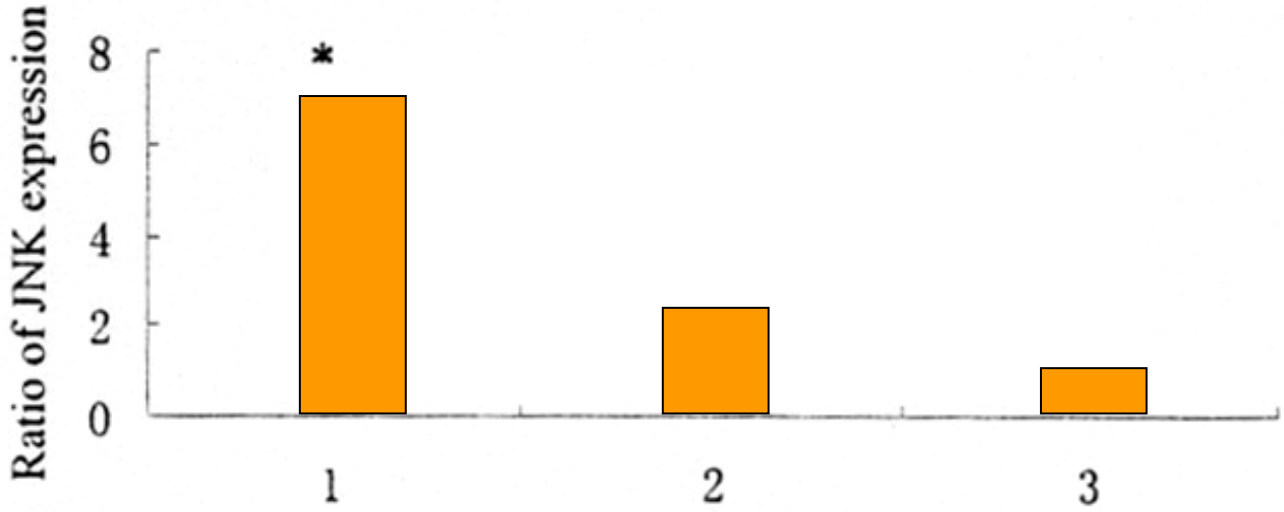


图　3　睡眠剥夺引起大鼠海马 JNK 表达量的变化

Fig.　3　Change of JNK expression in hippocampus after sleep eprivation

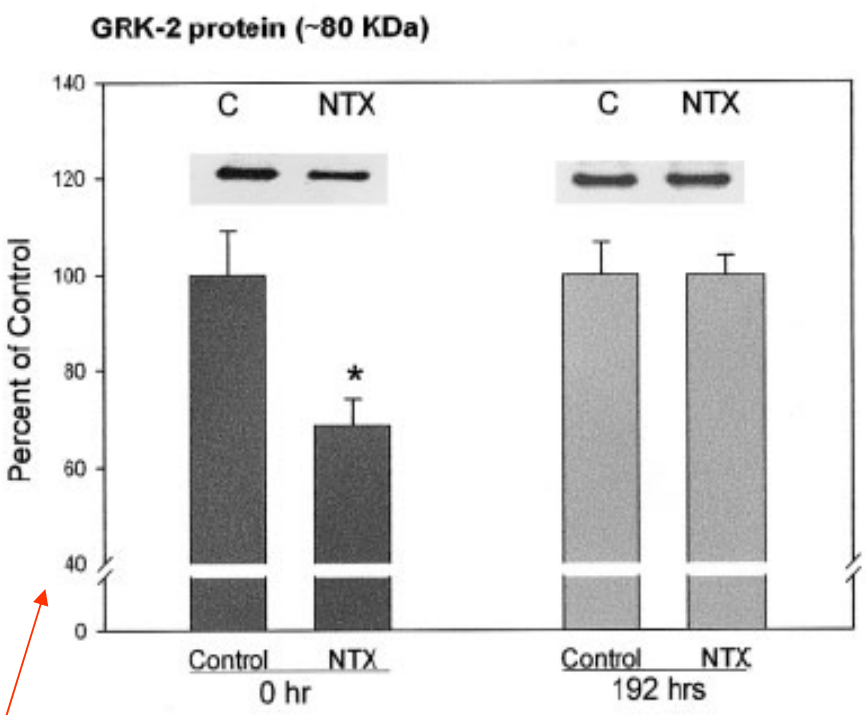
1:PSD　;　2:LC　;　3:HC

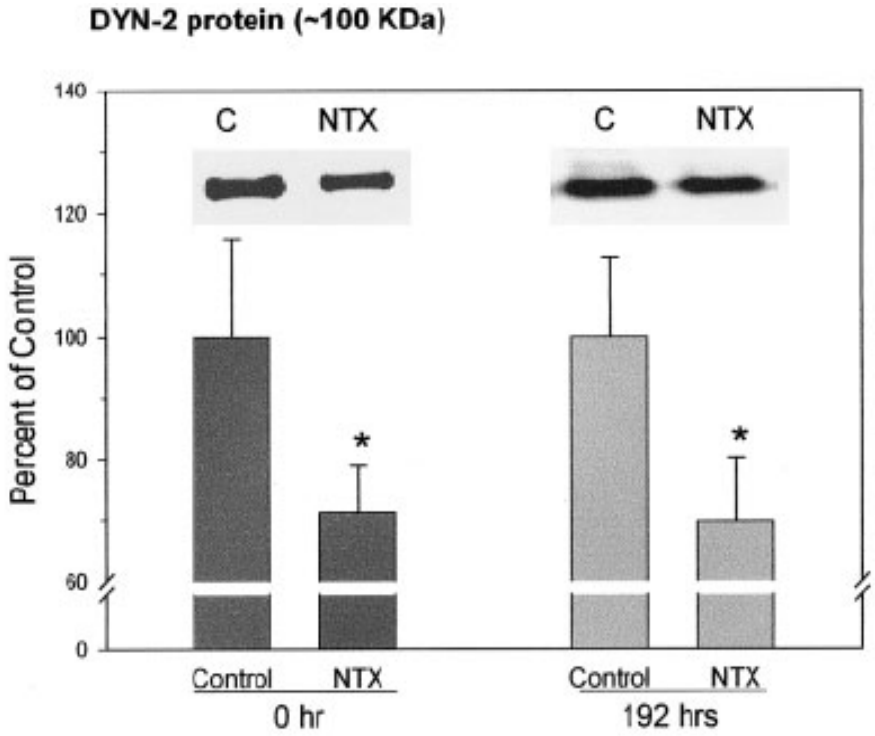
*:PSD　vs　LC $P<0.05$;　PSD　vs　HC $P<0.05$　.n=8　for each group

应为条形图

4. 是否真实、有效地展示了数据？

SYNAPSE 50:67–76 (2003)

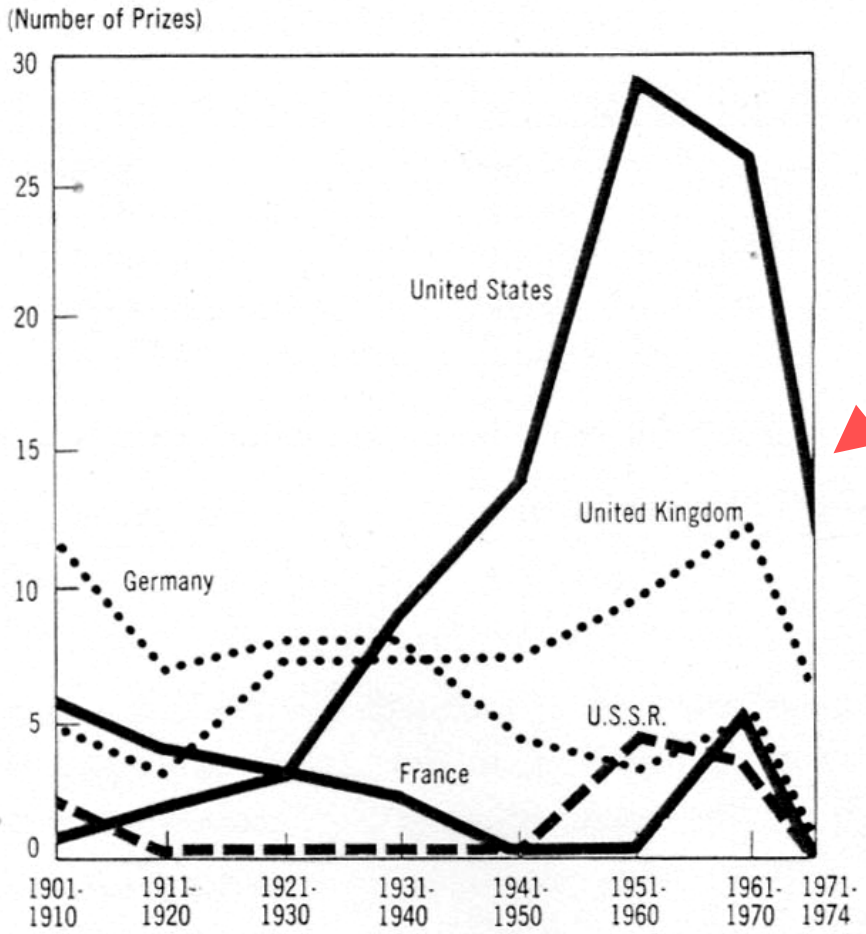


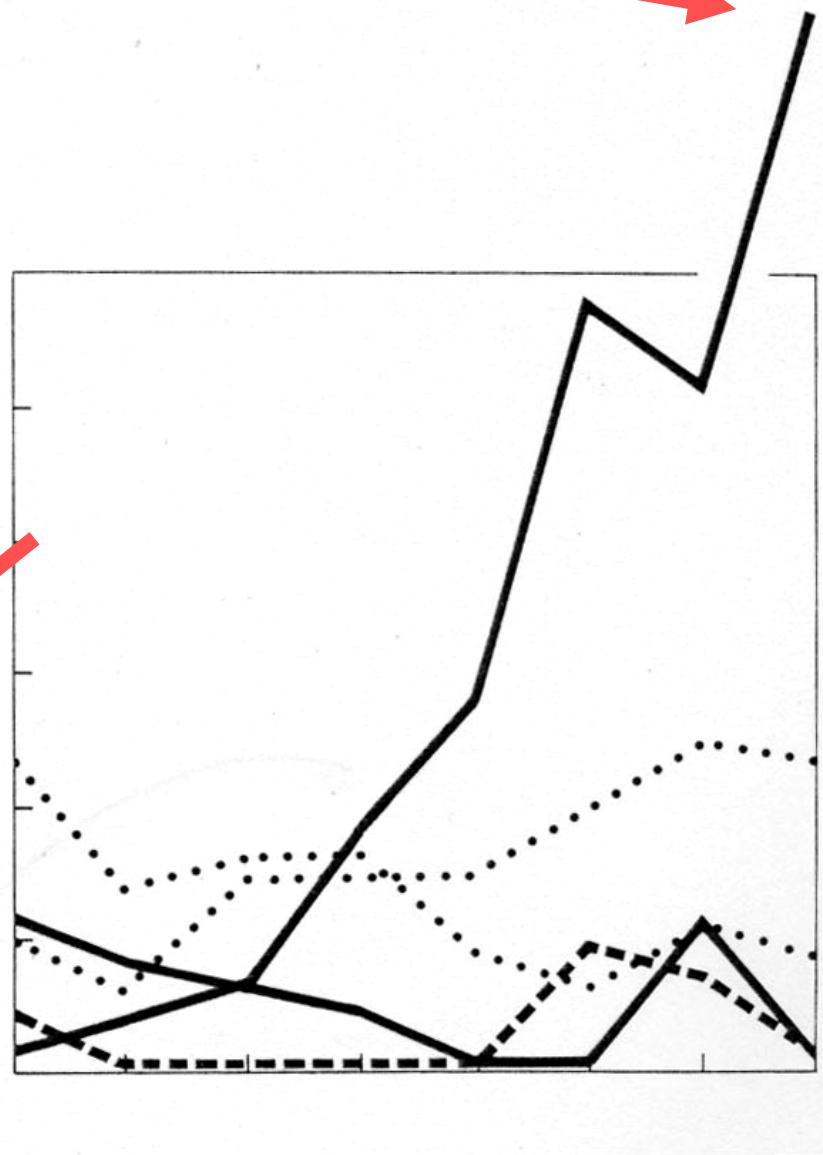


错误的图表导致错误的分析

(NSF, 1976)

(1971-1980)





Molecular and Cellular Neuroscience **18,** 13–25 (2001)

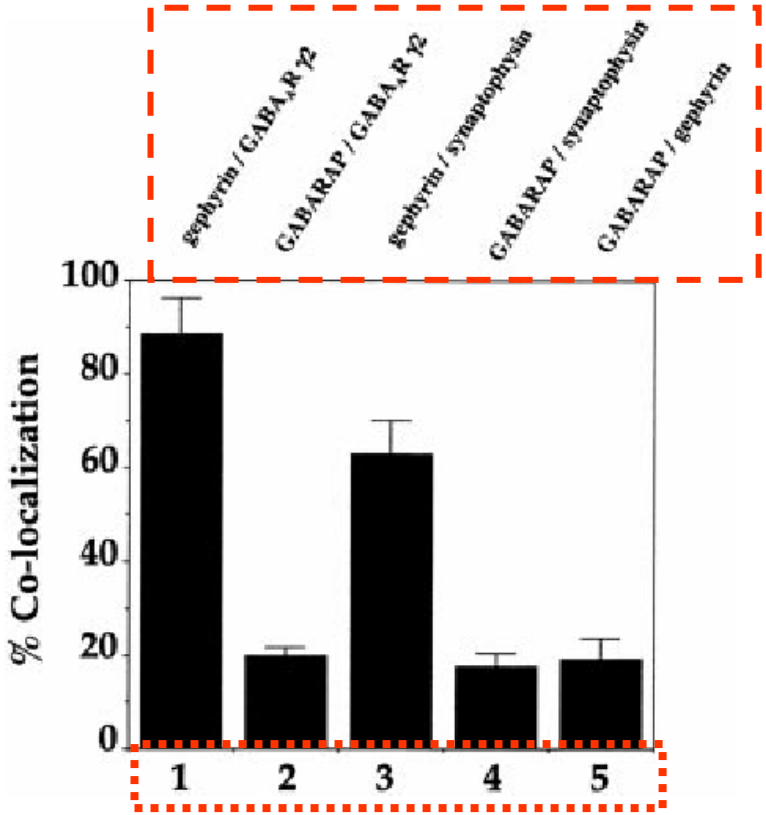
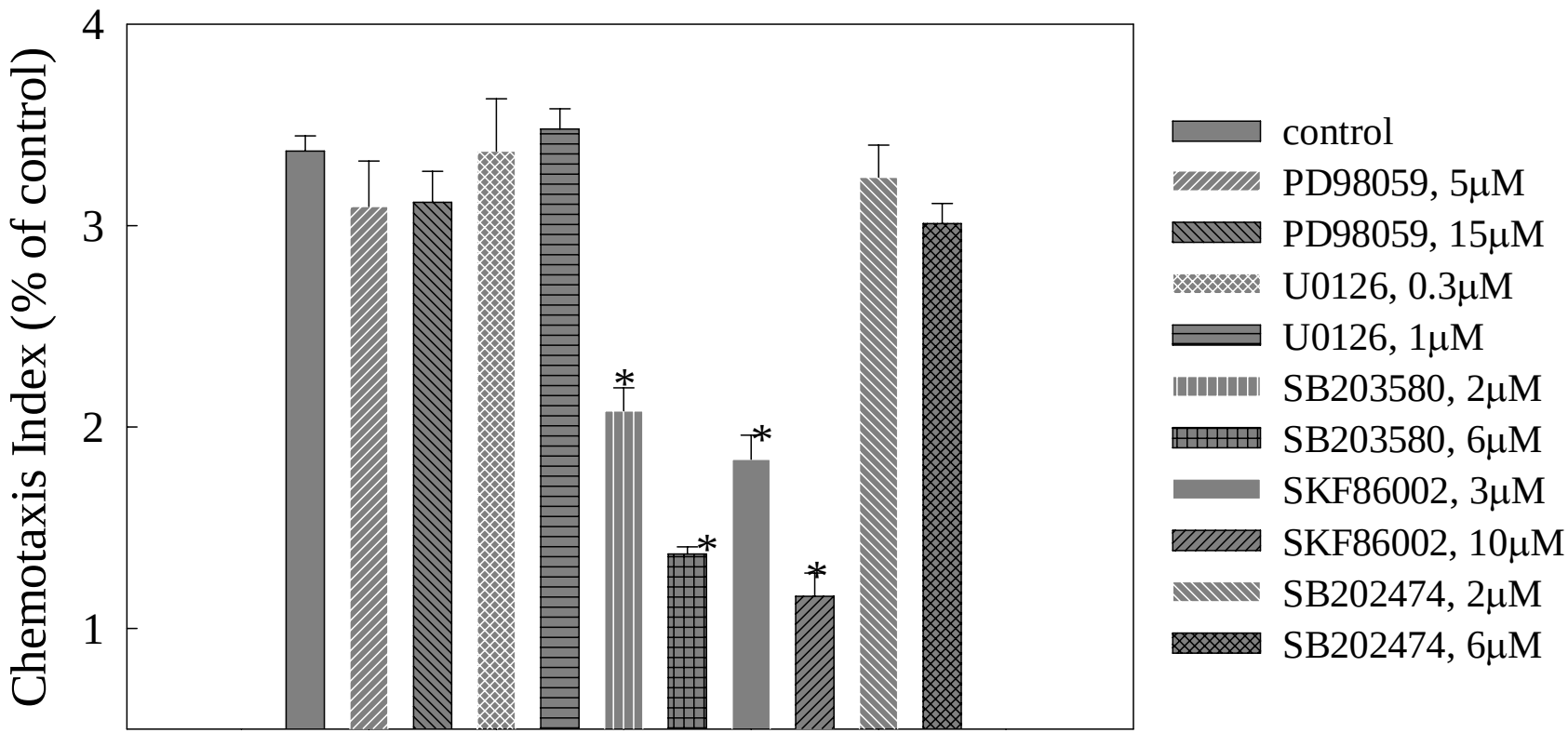


FIG. 3. Only low levels of GABARAP are found at the inhibitory postsynaptic scaffold. Colocalization of gephyrin (column 1) and GABARAP (column 2) with the $GABA_A$ receptor γ2 subunit. Colocalization of gephyrin (column 3) and GABARAP (column 4) to synaptophysin positive synaptic sites. Colocalization of gephyrin and GABARAP (column 5).



不简洁 不清晰 重点不突出

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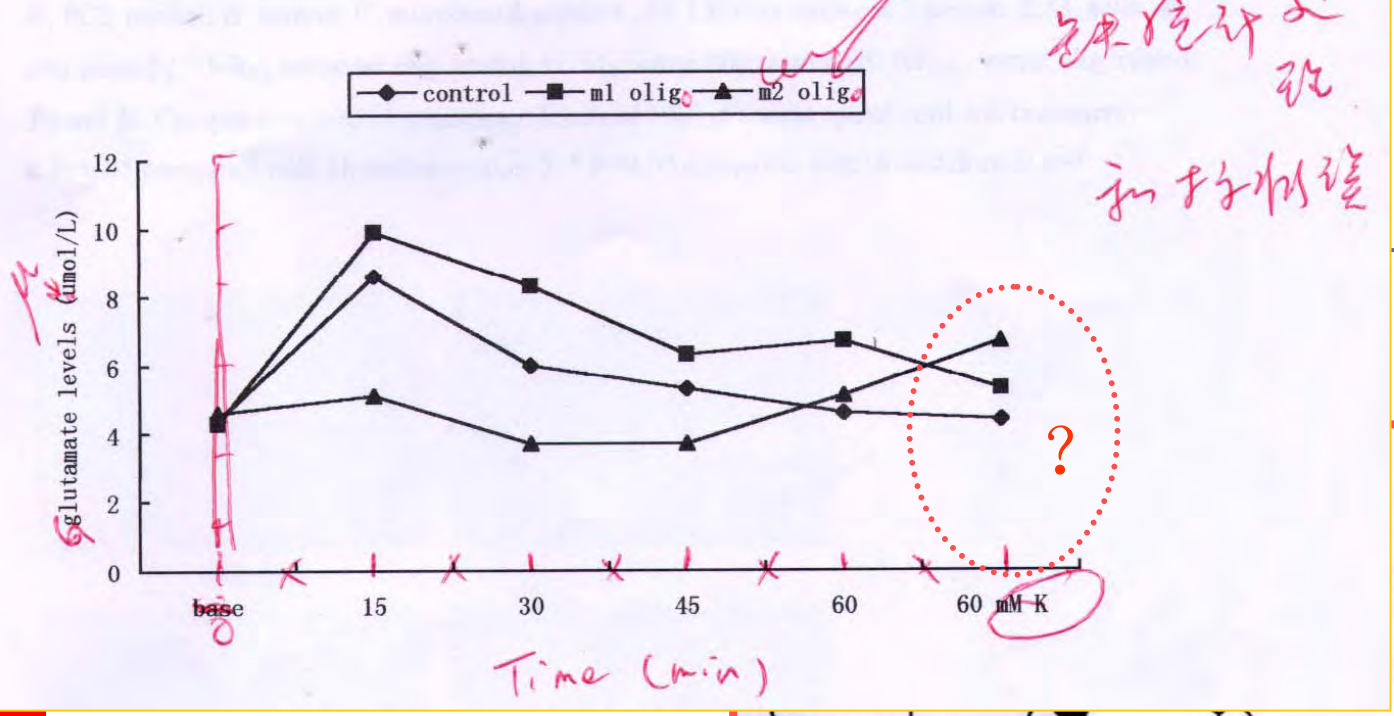
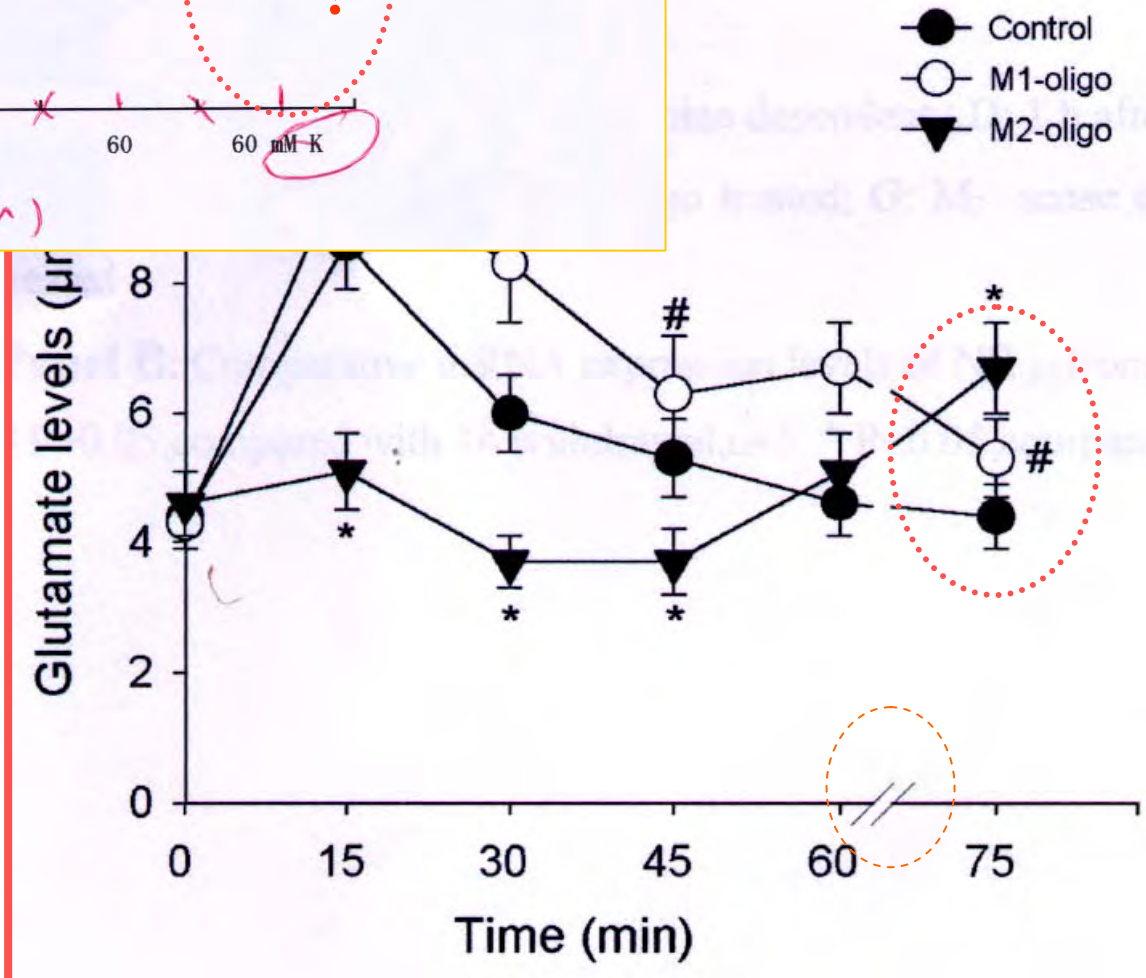
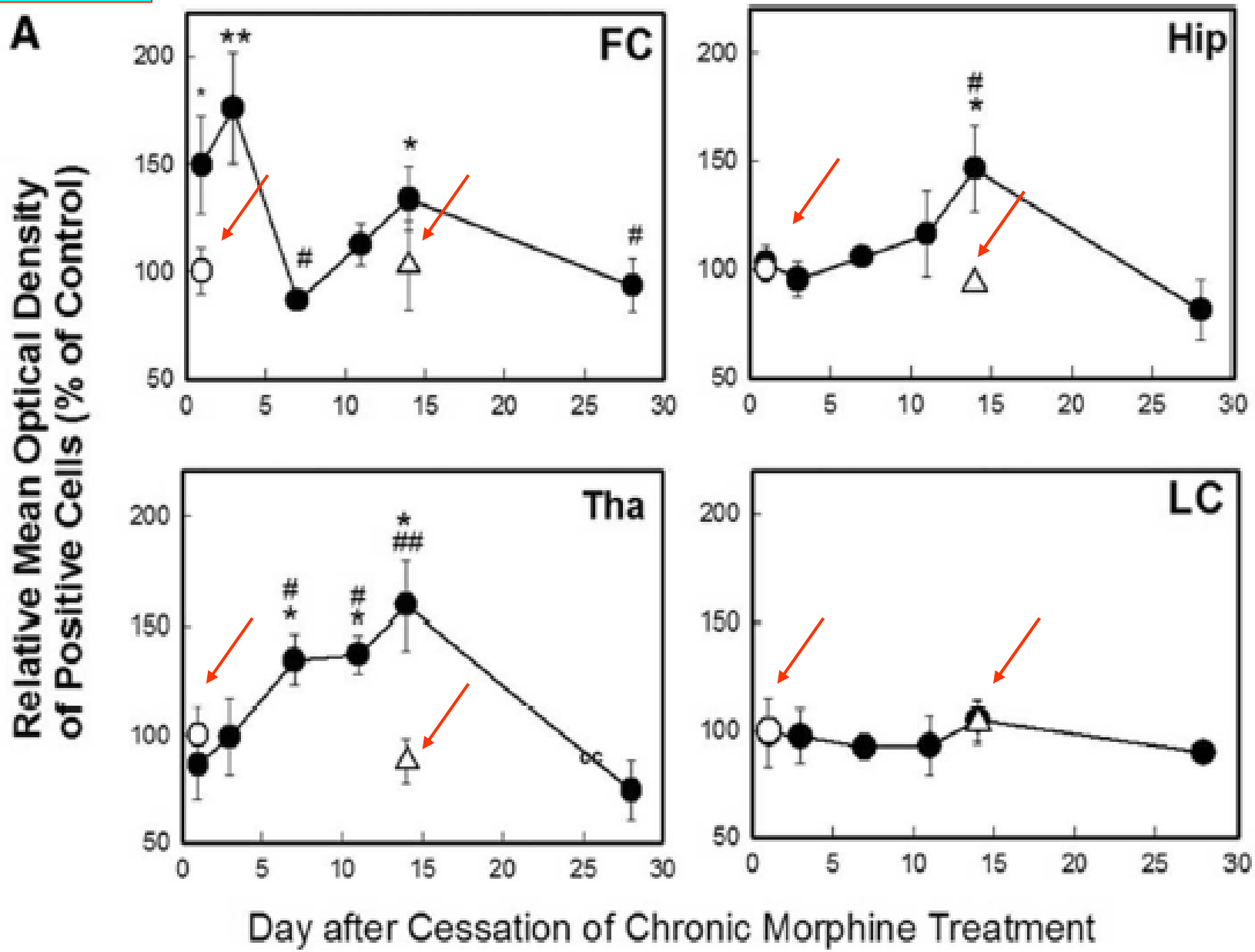


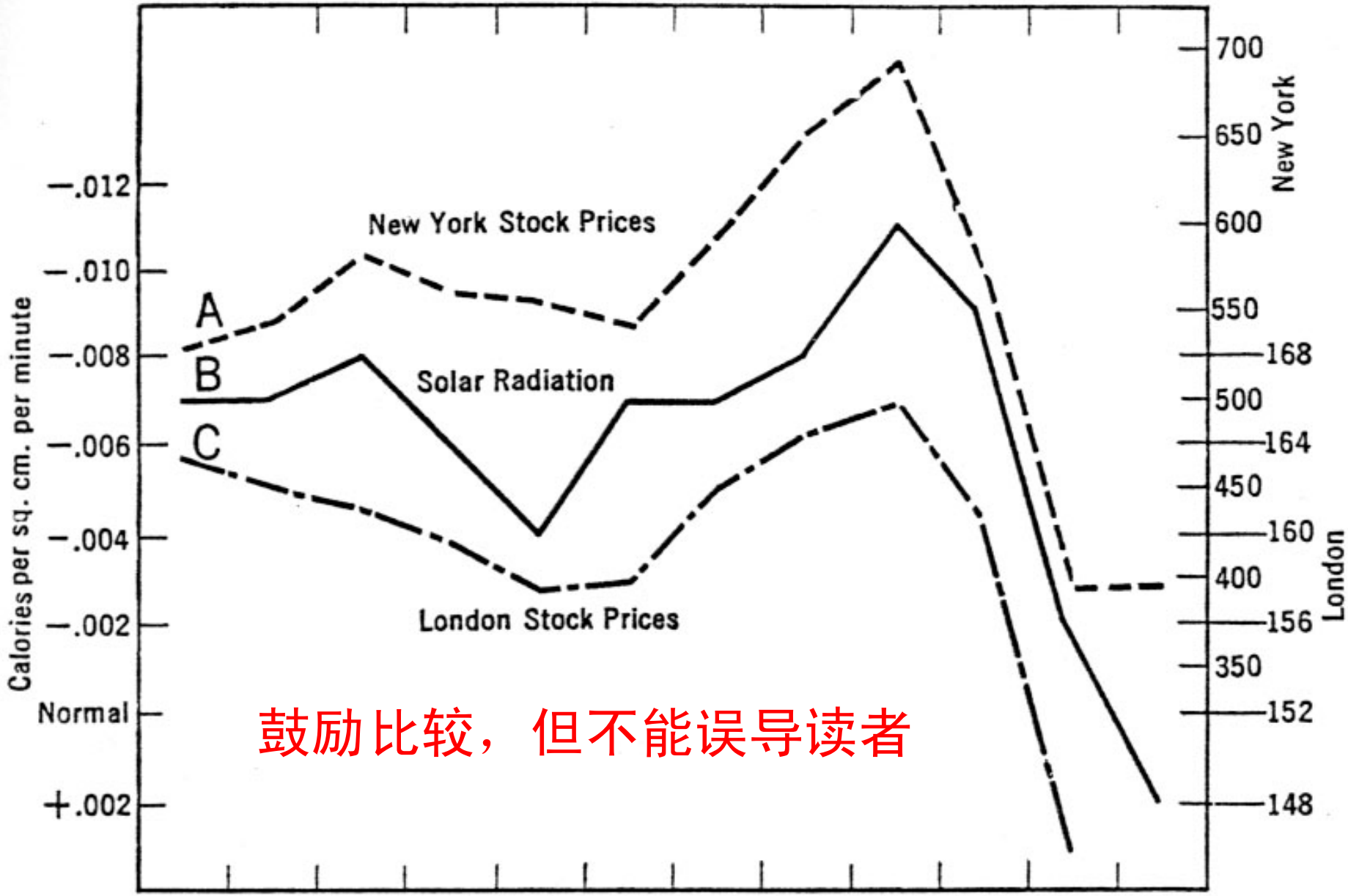


正确做法

X.-L. Fan et al. / Neuroscience 0 (2003) 000



5. 是否启发思考数据的本质和内在规律？



鼓励比较，但不能误导读者

SOLAR RADIATION AND STOCK PRICES

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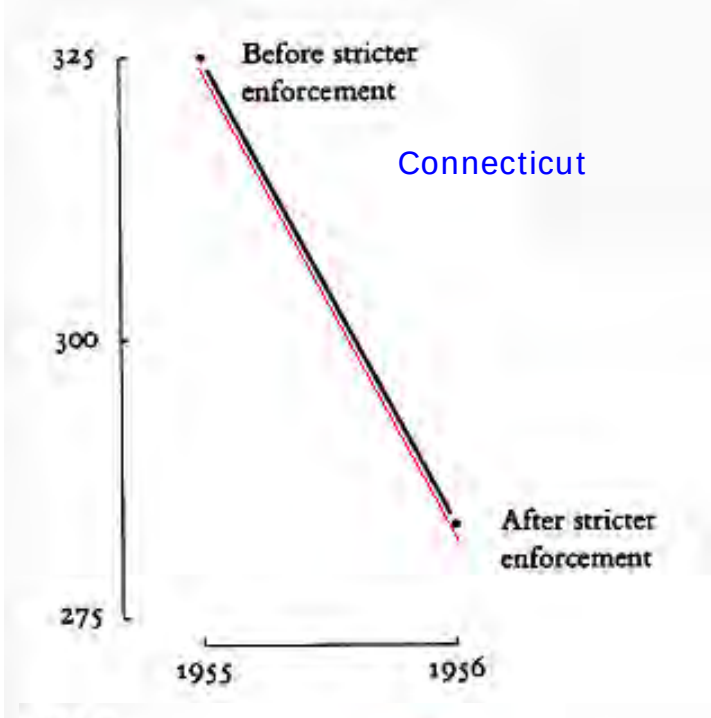
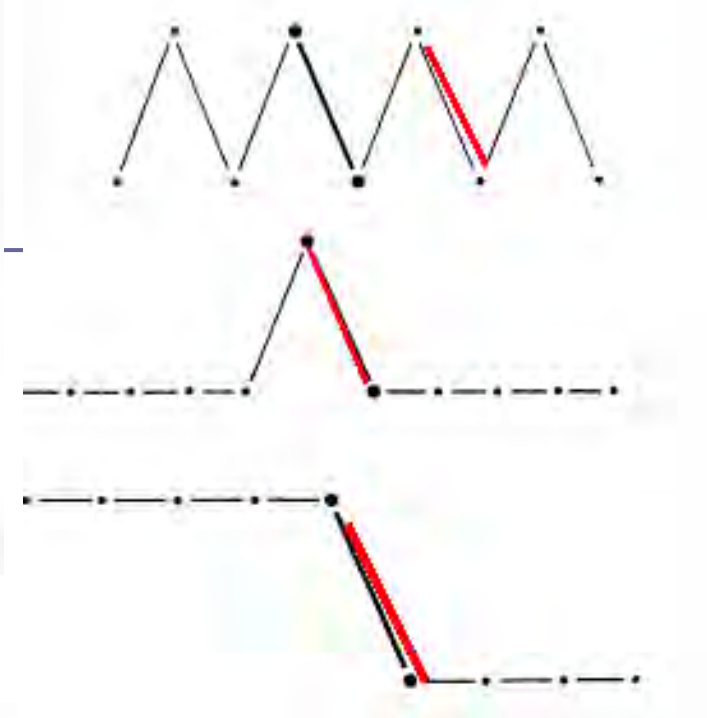
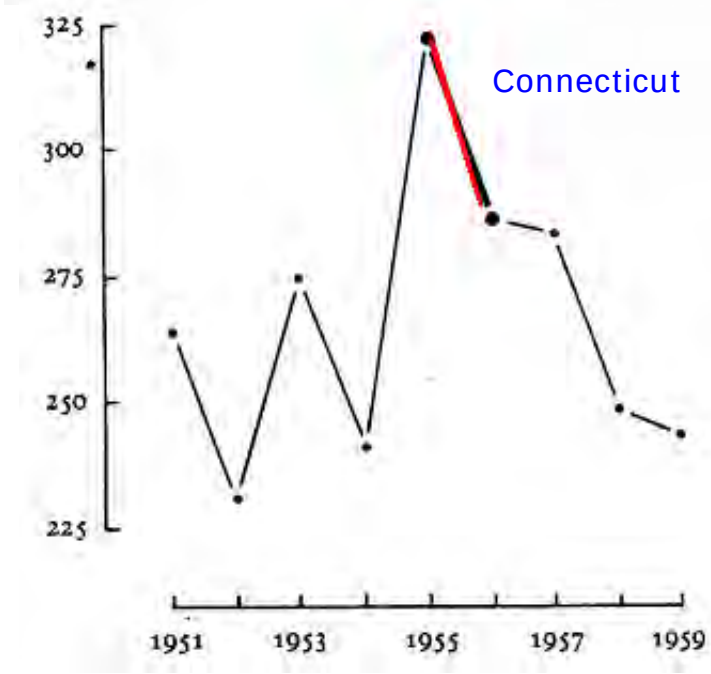
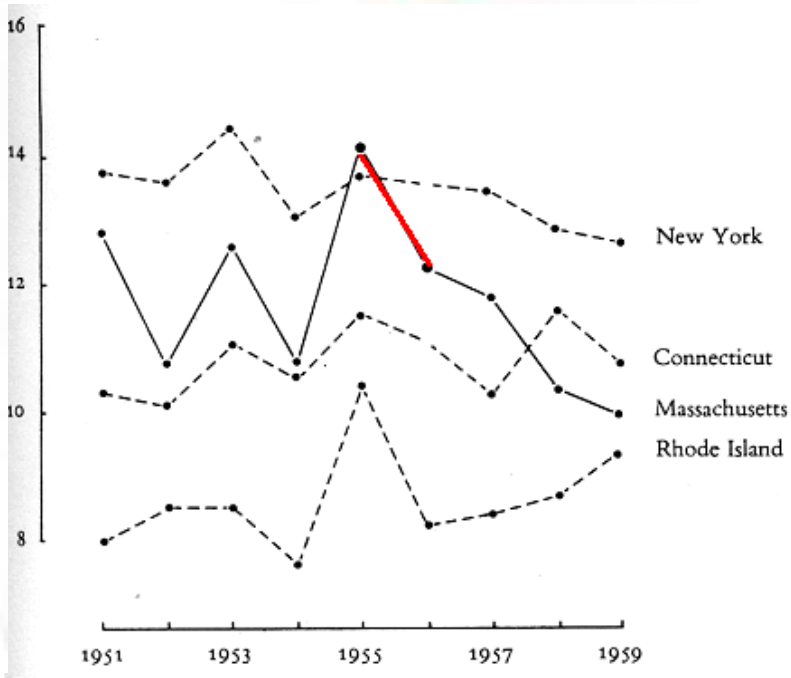
不能断章取义、歪曲数据









"（主讲教师：马兰教授）

图表修改举例

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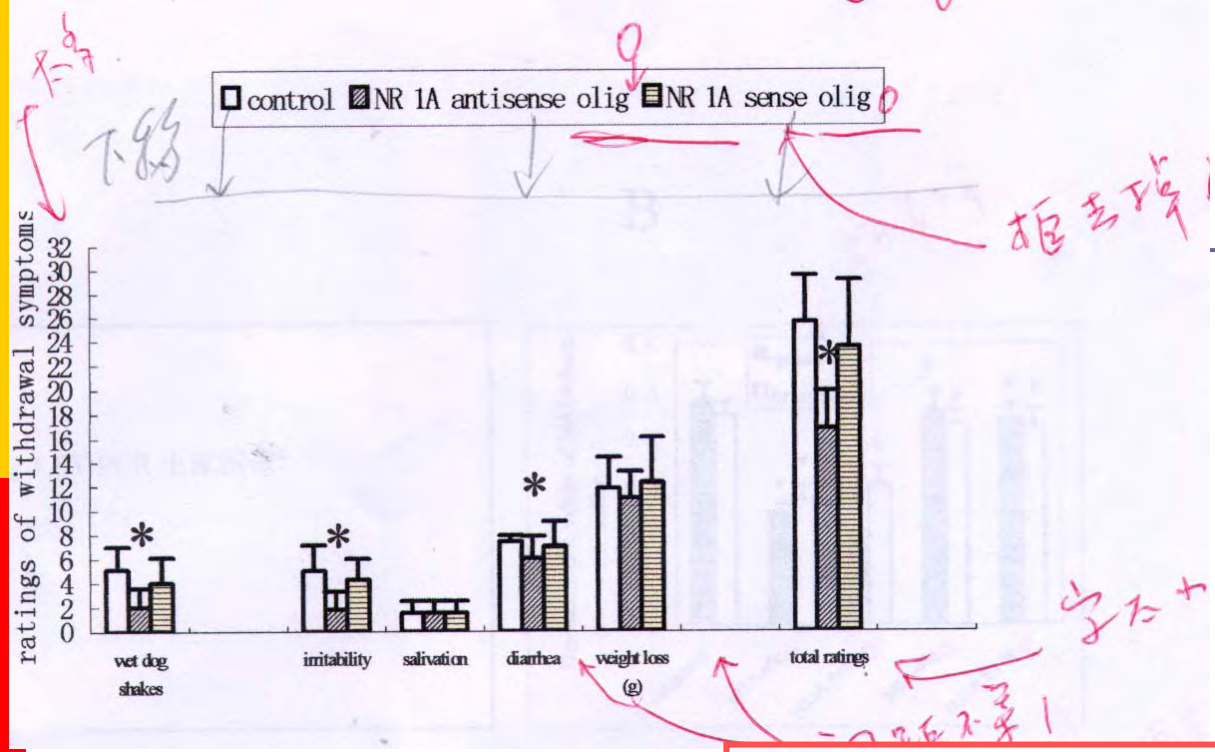
投稿



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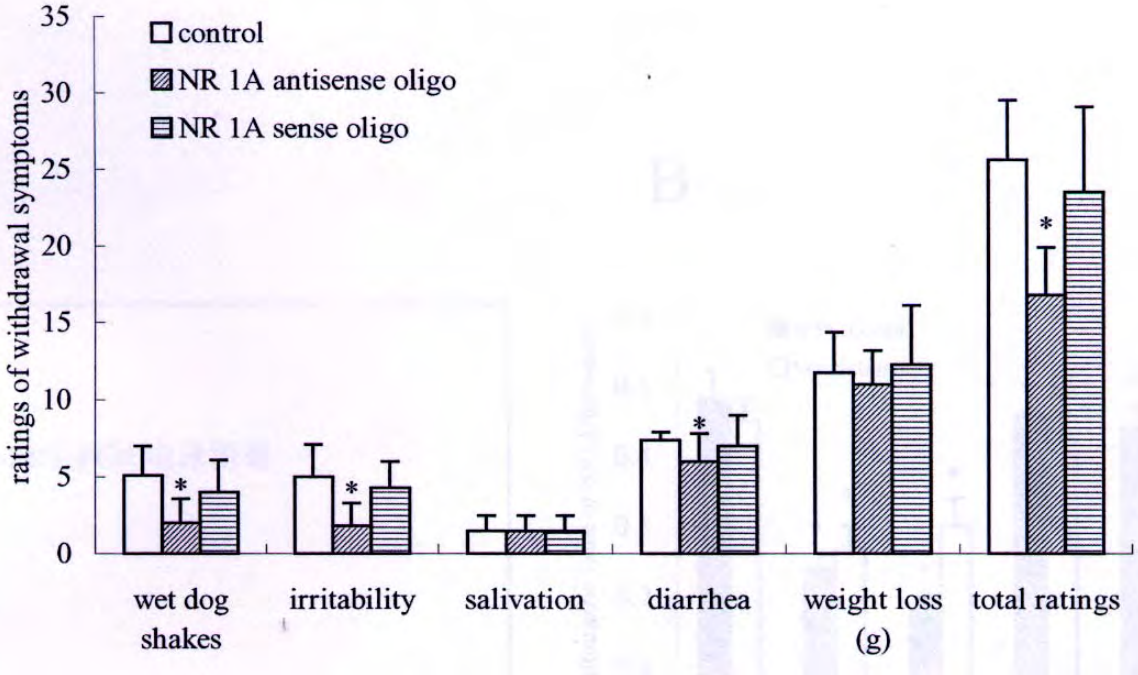


投稿

不清楚
柱的图案太相近

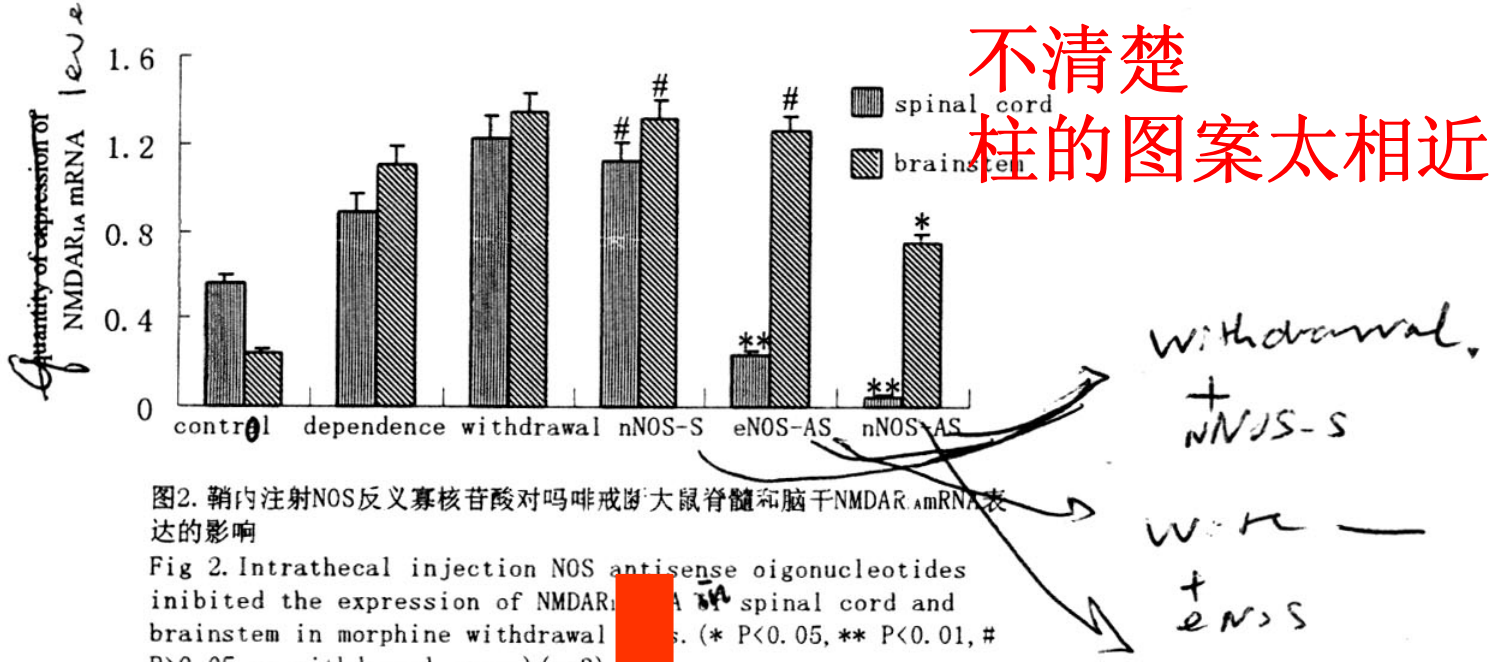
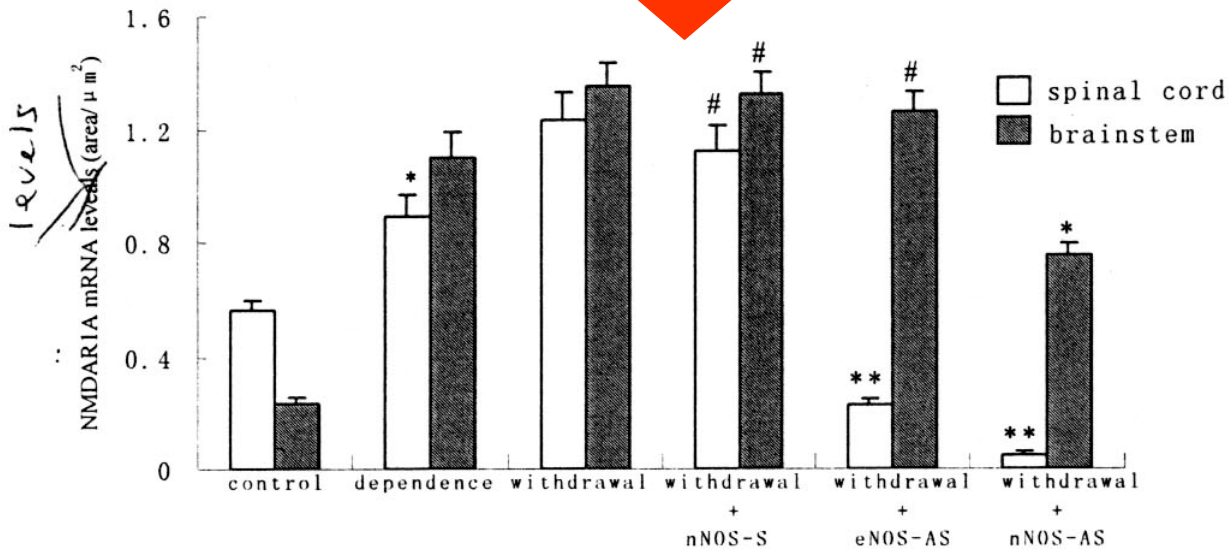


图2. 鞘内注射NOS反义寡核苷酸对吗啡戒断大鼠脊髓和脑干NMDAR1AmRNA表达的影响

Fig 2. Intrathecal injection NOS antisense oigonucleotides inibited the expression of NMDAR1A mRNA in spinal cord and brainstem in morphine withdrawal rats. (* P<0.05, ** P<0.01, # P>0.05 vs withdrawal group) (n=3)

修改稿



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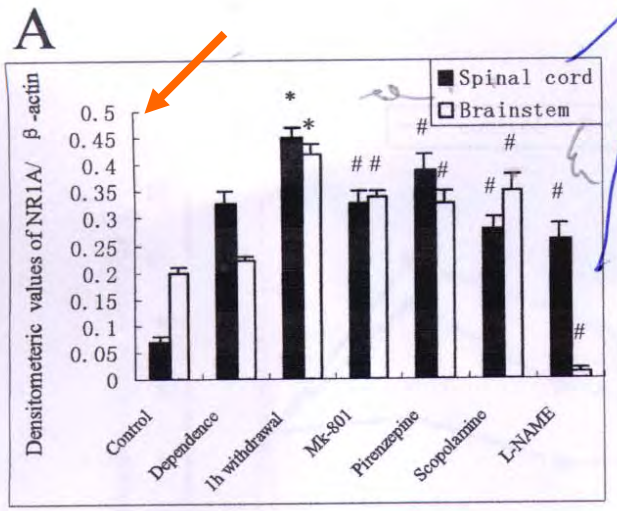
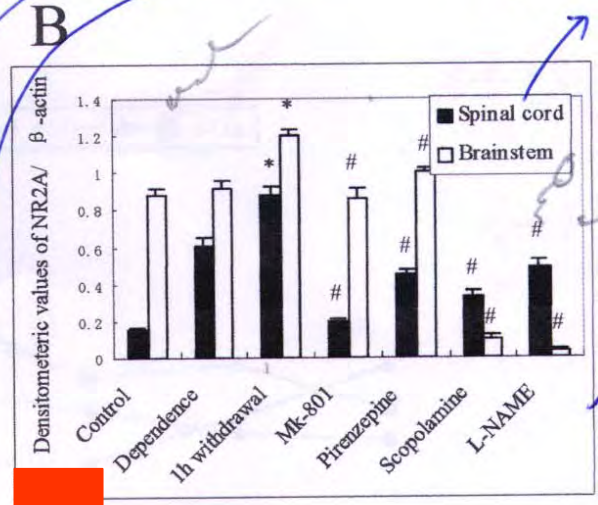
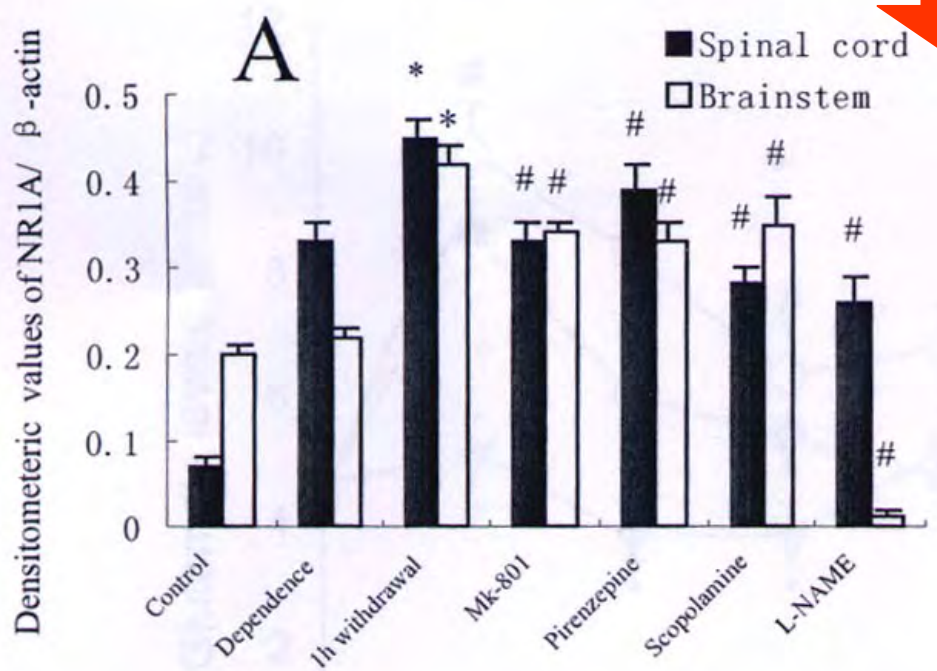
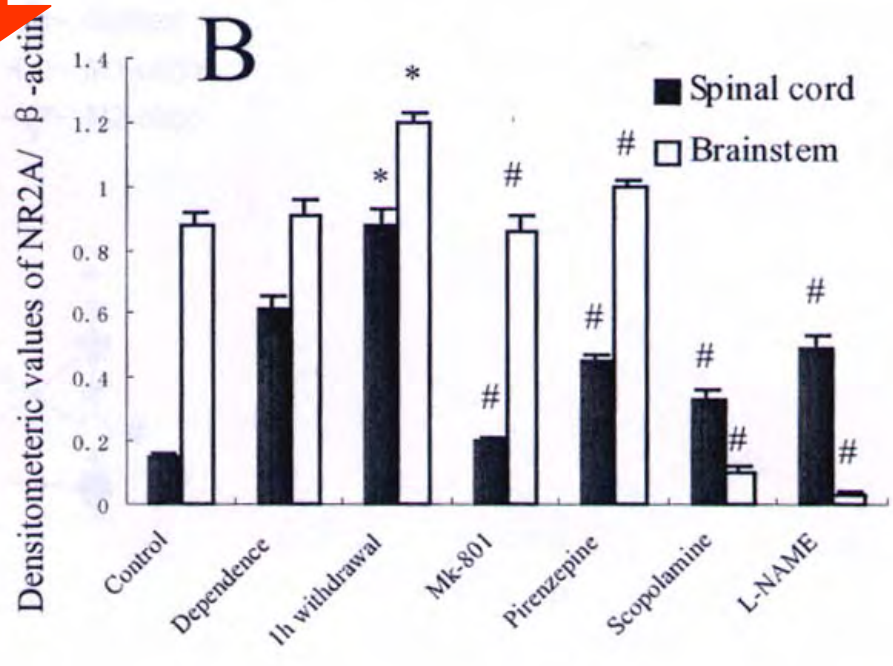
（2007年11月26日）



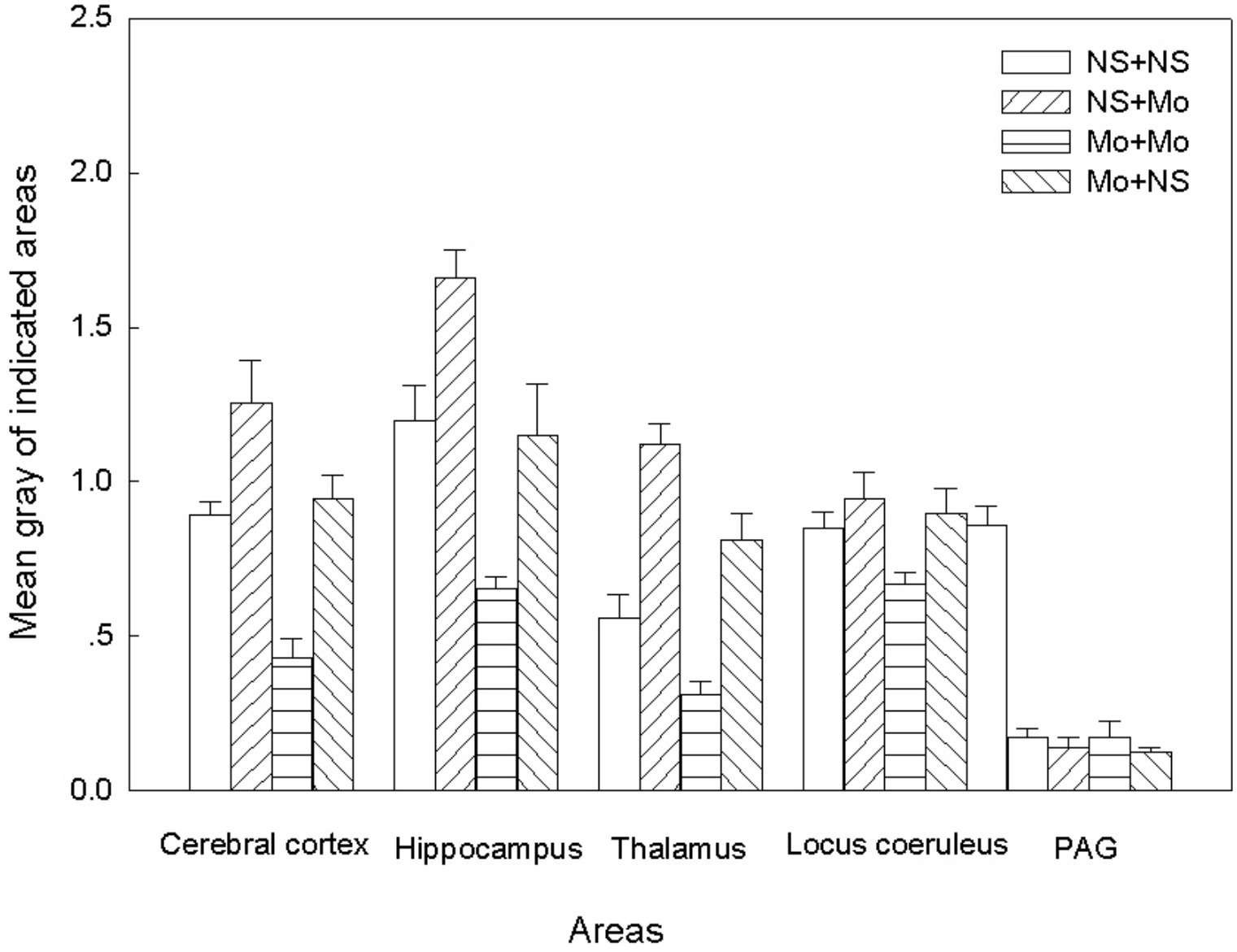






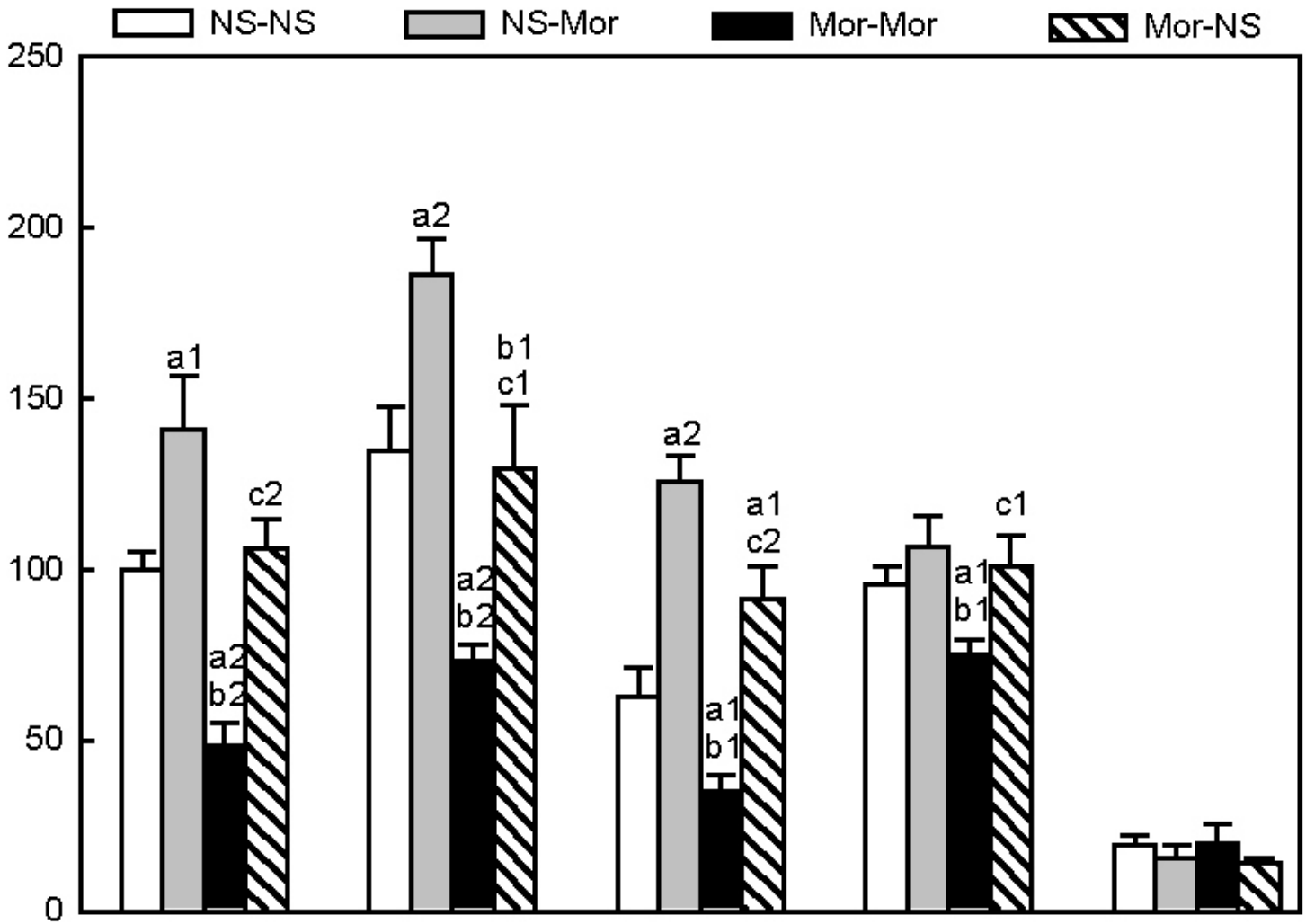
第一稿：图案不易分辨、缺统计

马兰教授（2007年11月26日）



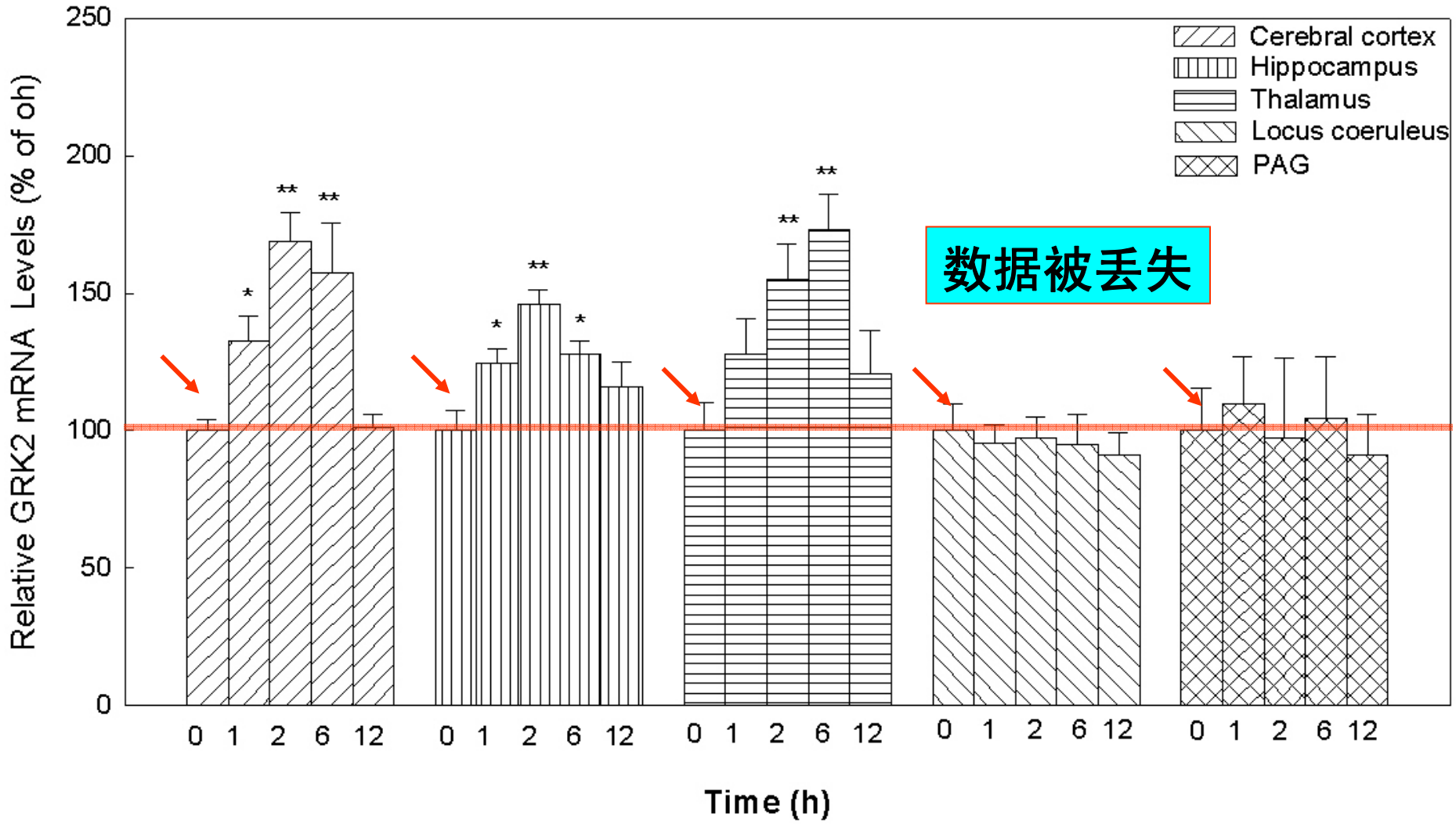
第二稿

马兰教授（2007年11月26日）

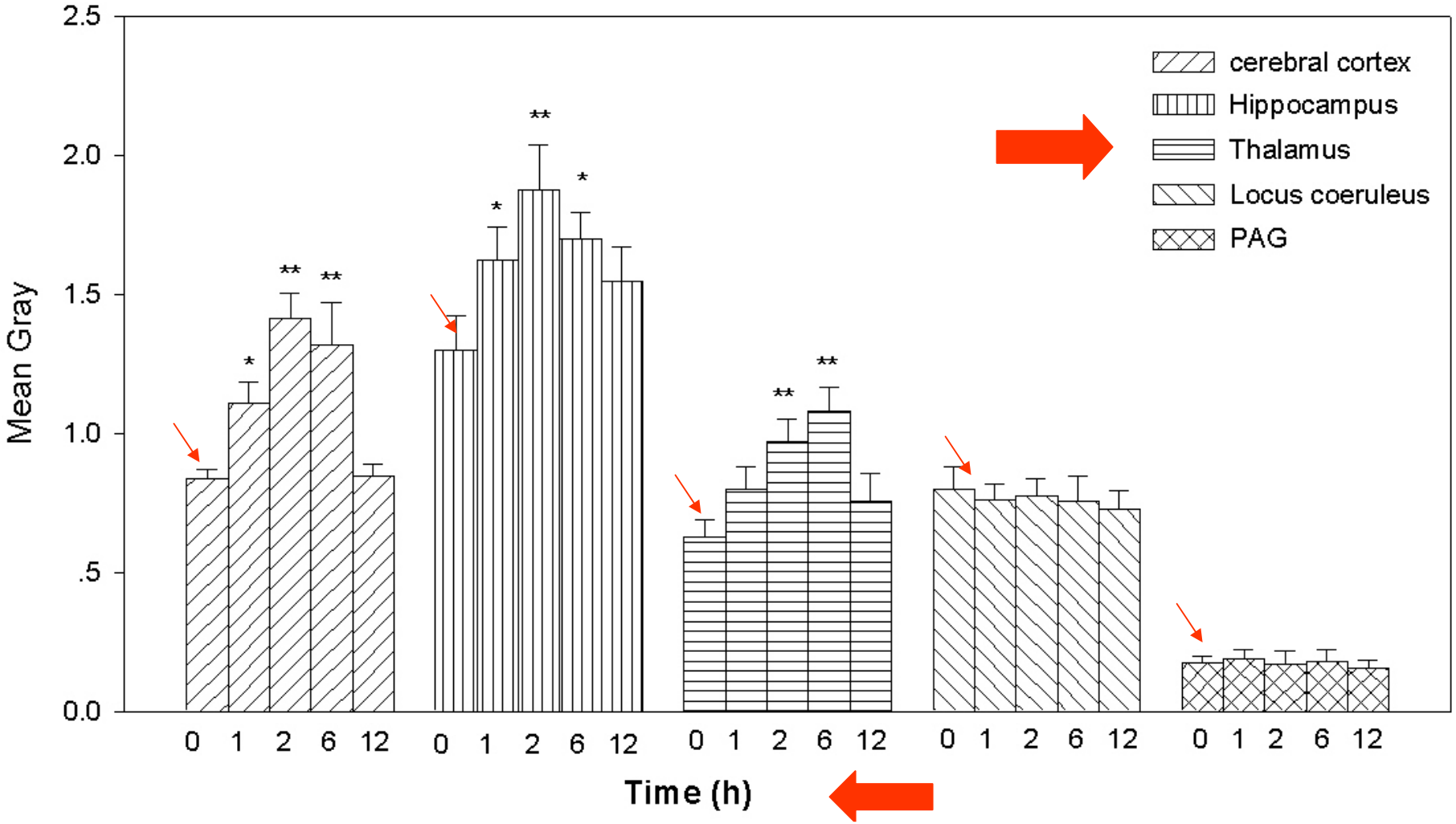


第一稿：没有充分地显示数据

马兰教授（2007年11月26日）

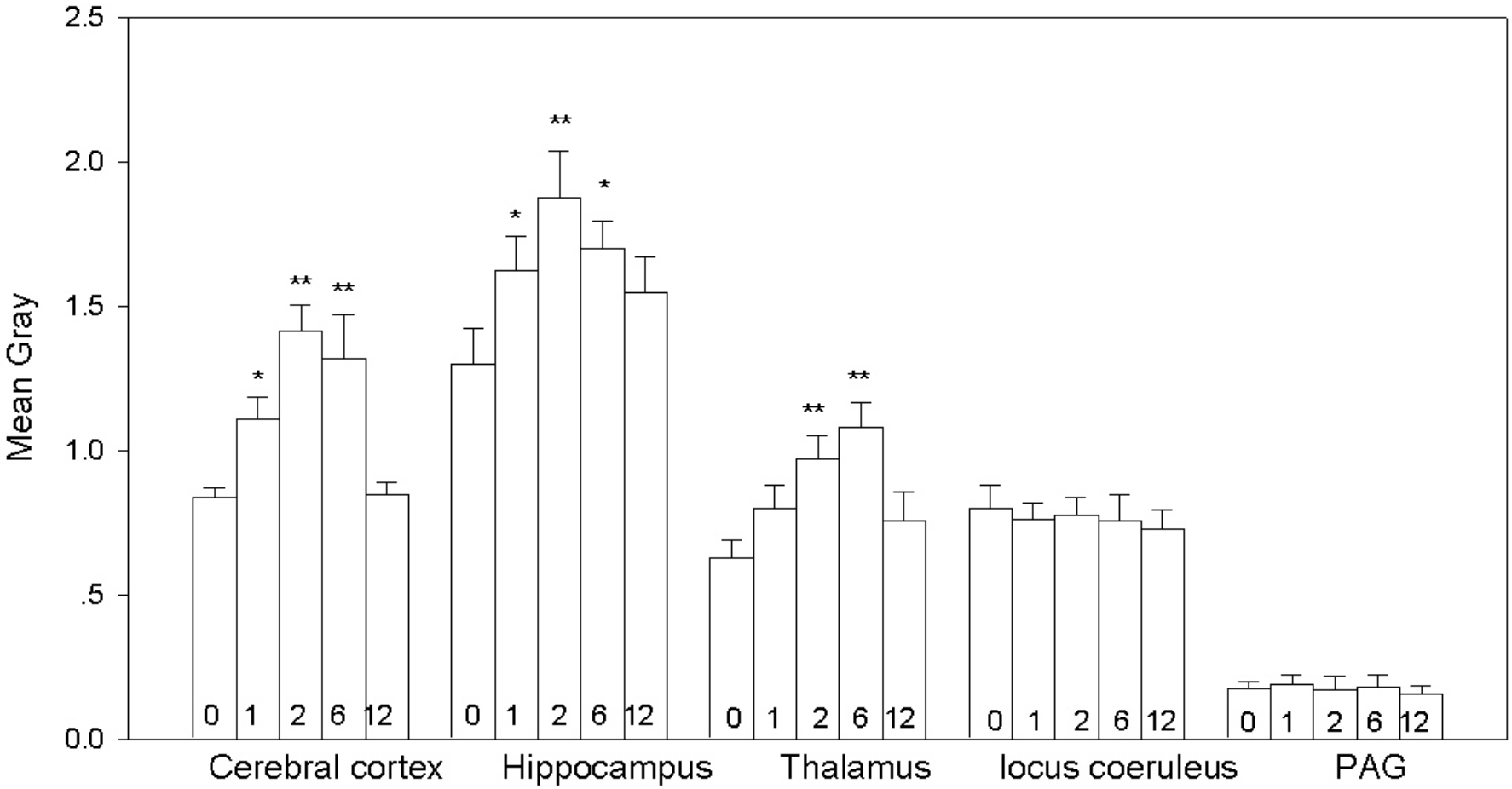


第二稿：图案的必要性？横座标标题？马兰教授（2007年11月26日）



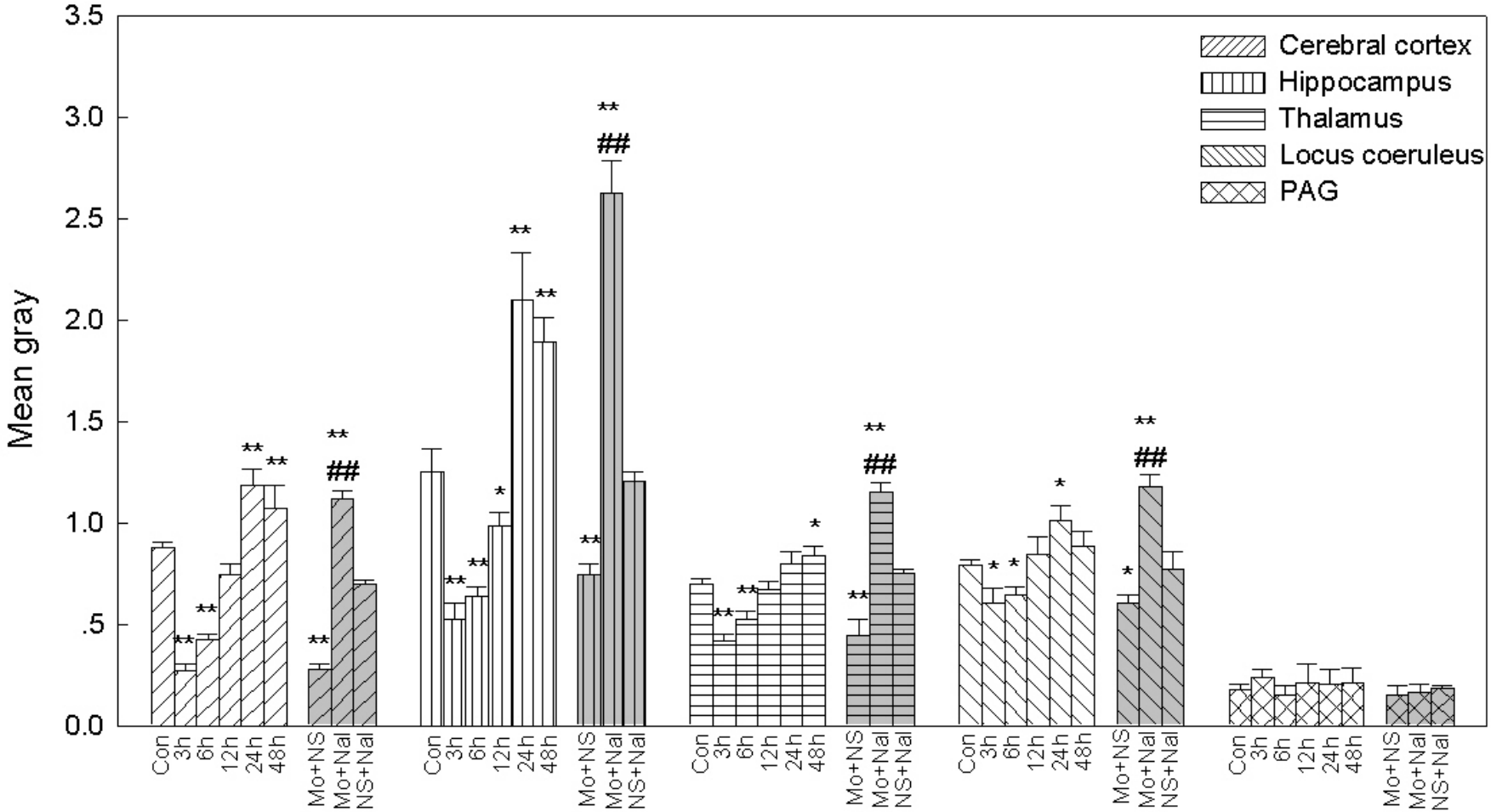
第三（发表）稿

马兰教授（2007年11月26日）

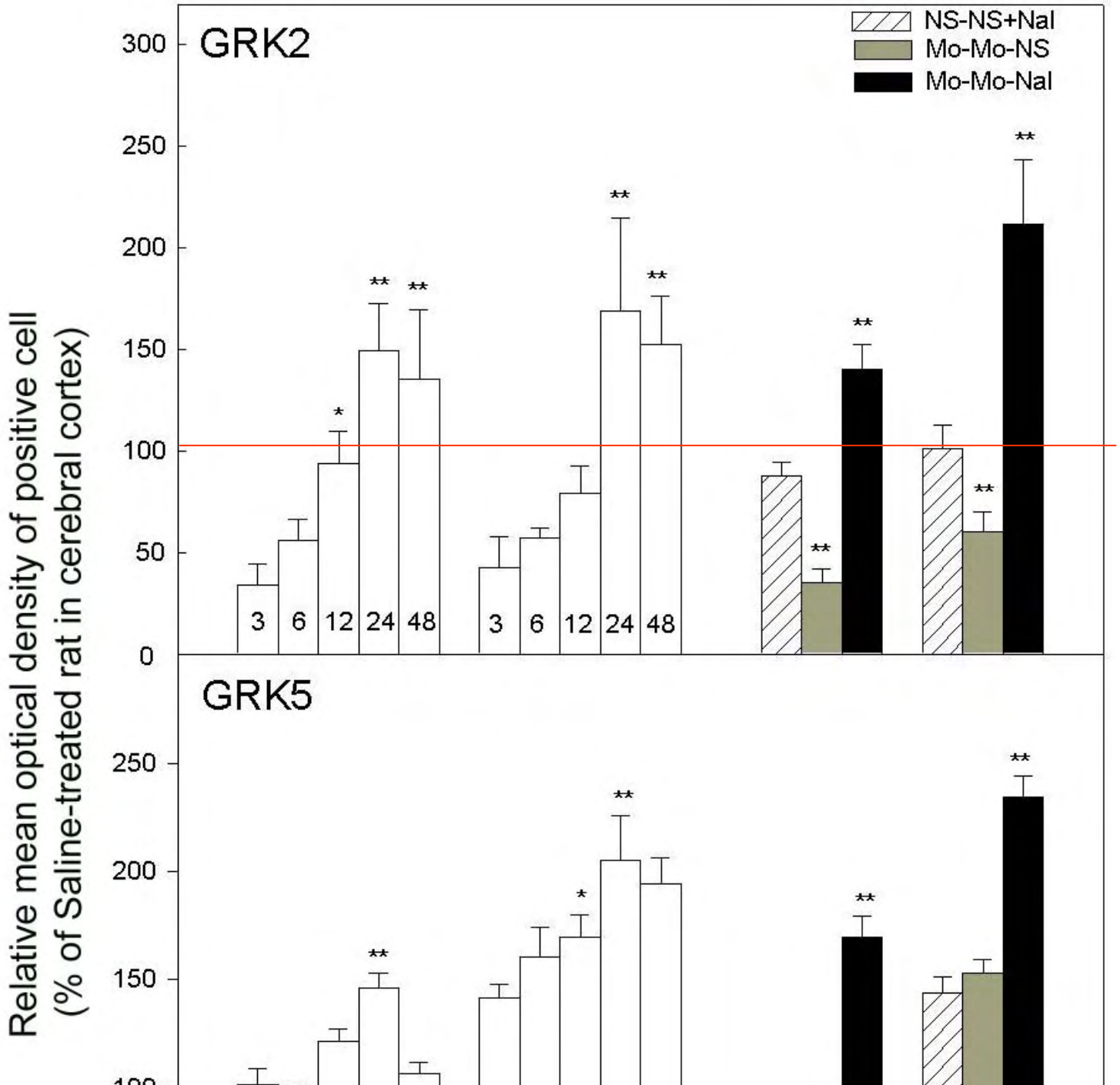


第一稿：难以看懂

马兰教授（2007年11月26日）

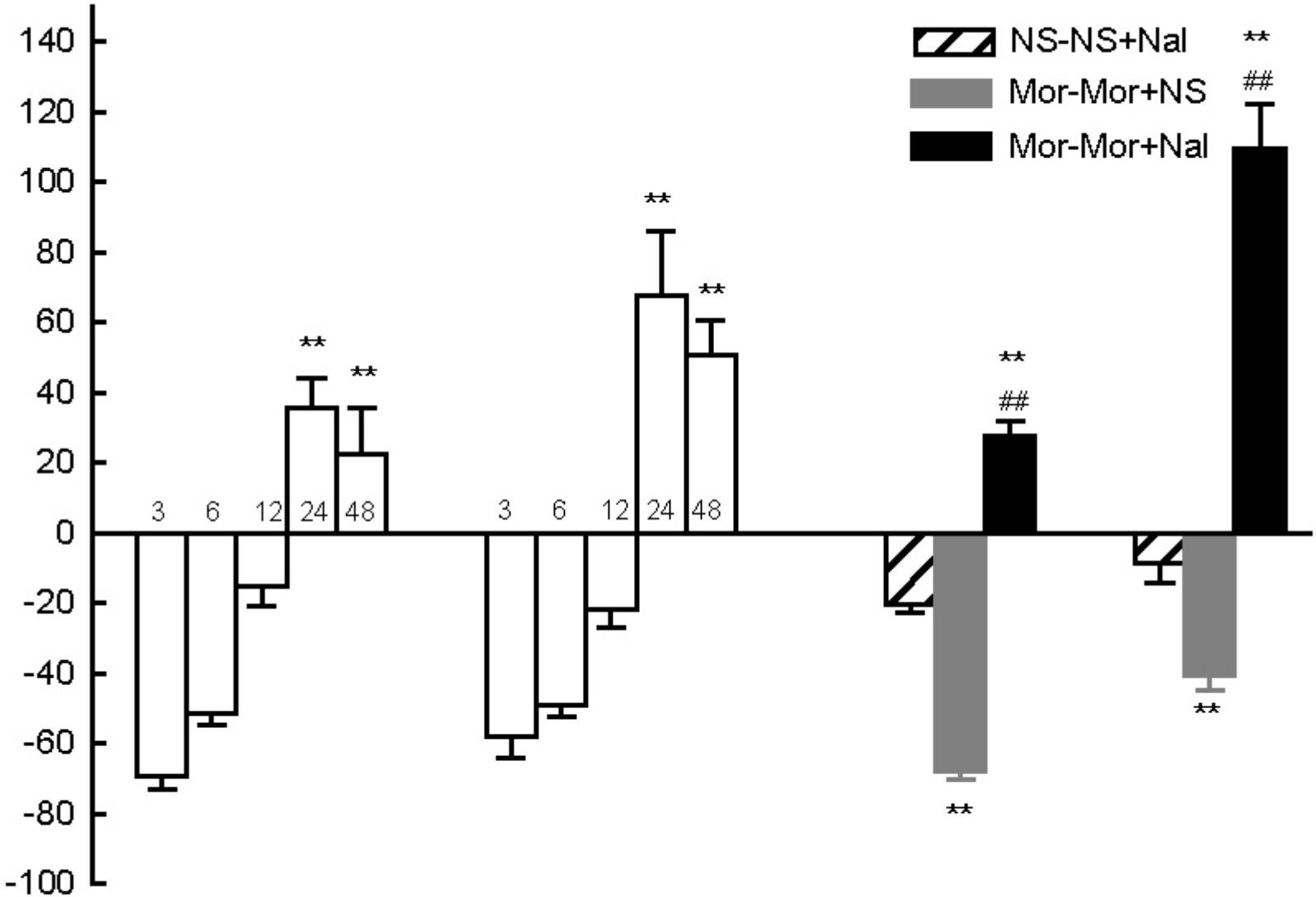


第二稿


GRK2
GRK5
NS-NS+Nal
Mo-Mo-NS
Mo-Mo-Nal
Relative mean optical density of positive cell
(% of Saline-treated rat in cerebral cortex)
300
250
200
150
100
50
0
3
6
12
24
48
*
**

第三稿

马兰教授（2007年11月26日）



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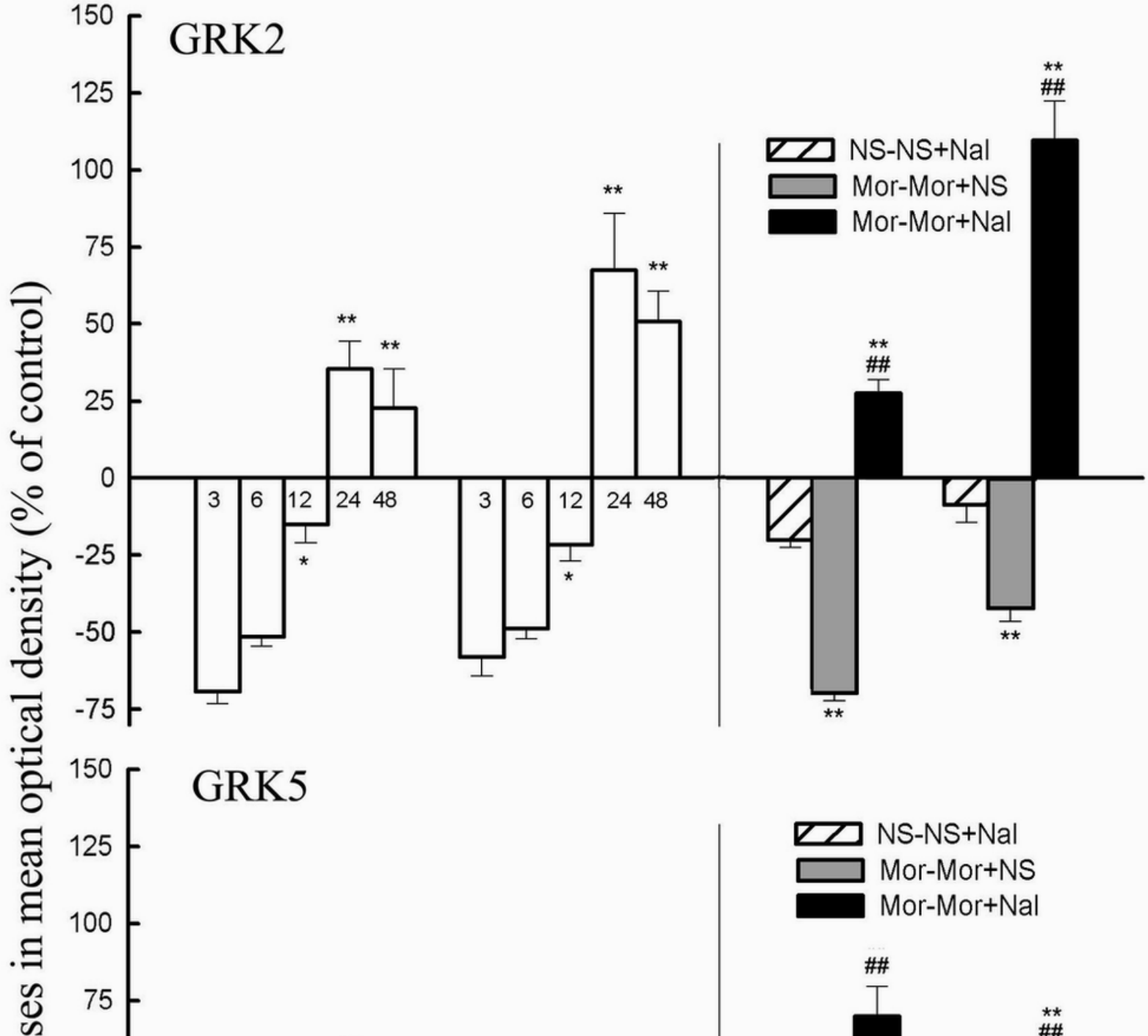
GRK2
GRK5
NS-NS+Nal
Mor-Mor+NS
Mor-Mor+Nal
ses in mean optical density (% of control)
150
125
100
75
50
25
0
-25
-50
-75
3
6
12
24
48
*
**
##

好的图表应该：

- 巧妙地展示有意义的数据
- 防止对数据的曲解
- 鼓励读者比较不同的数据
- 吸引读者注意数据的实质，而不是其它
- 与数据统计和文字描述有机地整合

Figure it Early !

Figure it Right !

Figure it Out !