FIG. 1

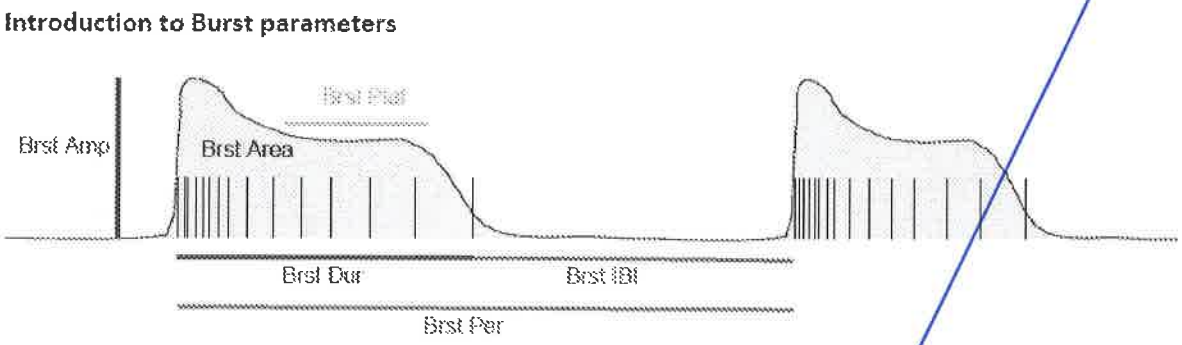

Introduction to Burst parameters
Brst Amp
Brst Area
Brst Dur
Brst IBI
Brst Per

FIG. 2

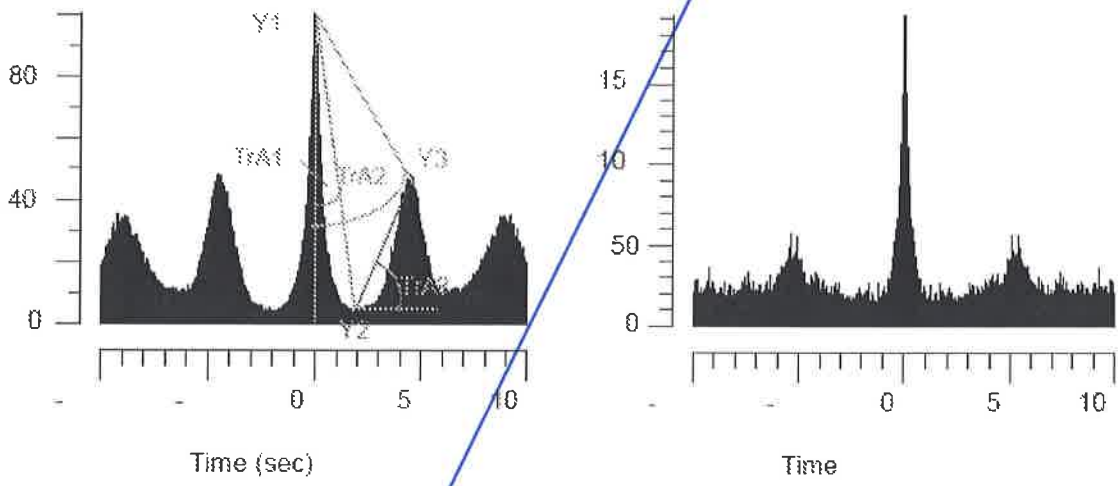

Y1
Y2
Y3
80
40
0
0
5
10
Time (sec)
15
10
50
0
0
5
10
Time

FIG. 3

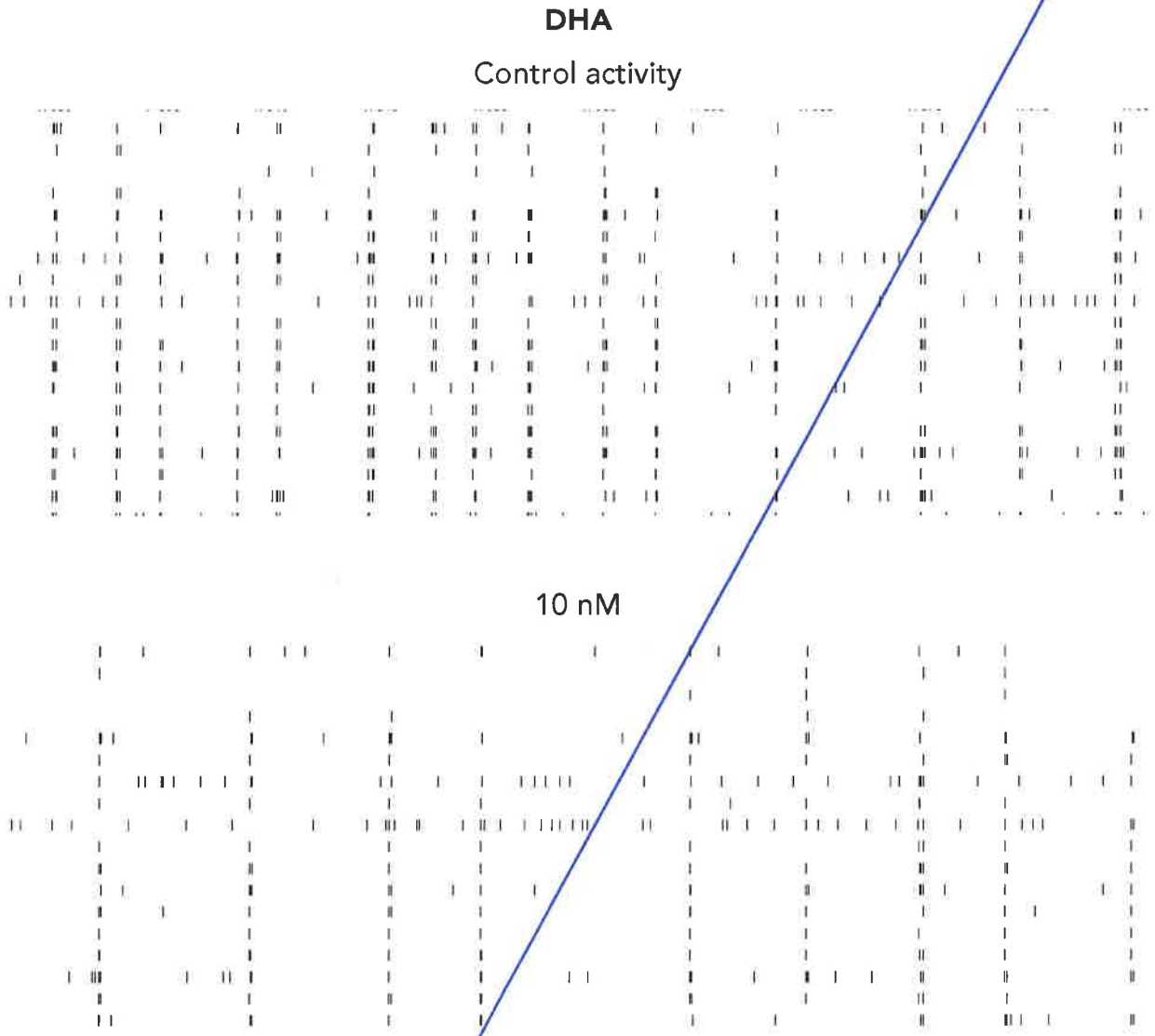


FIG. 3 (cont.)

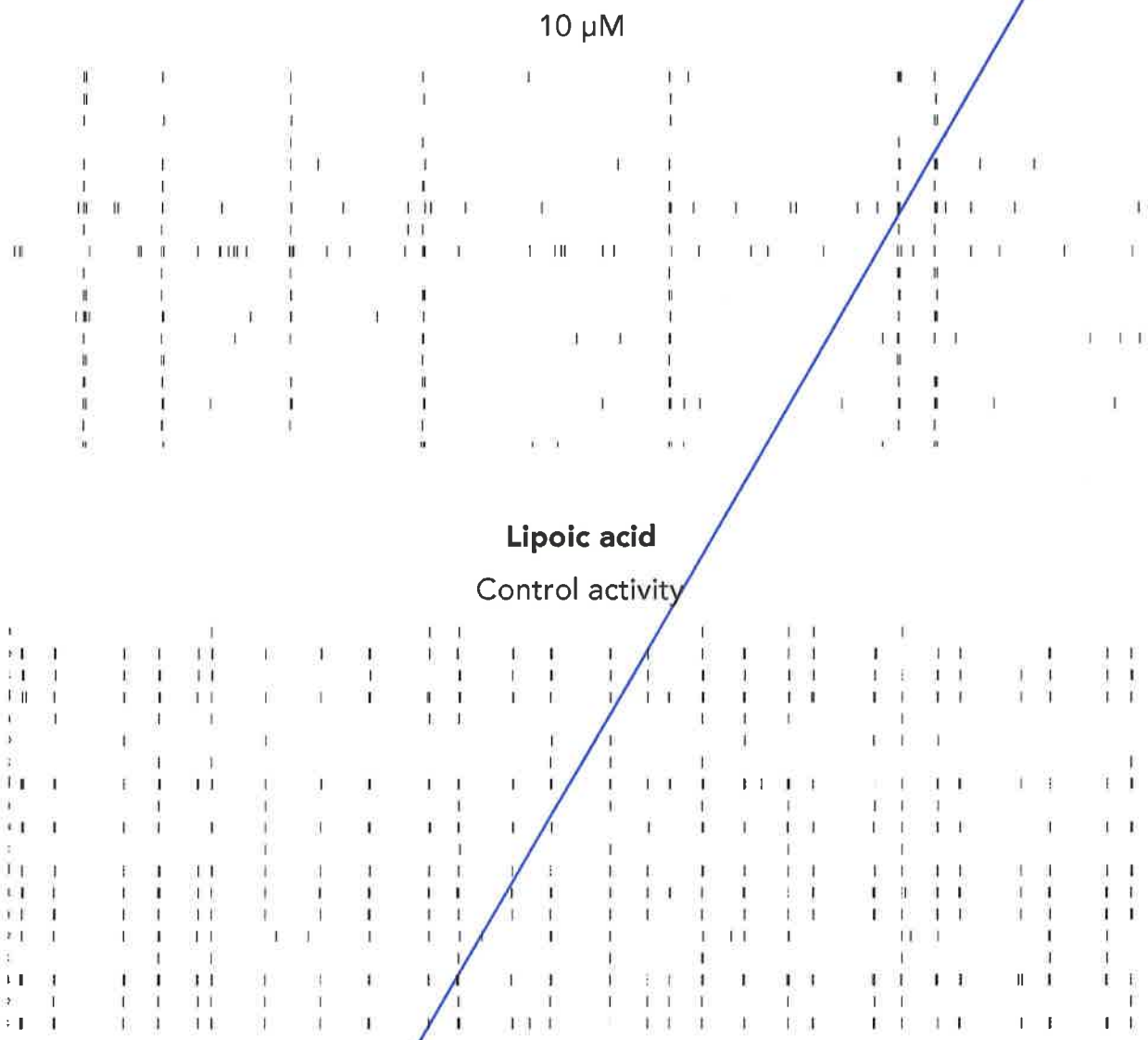


FIG. 3 (cont.)

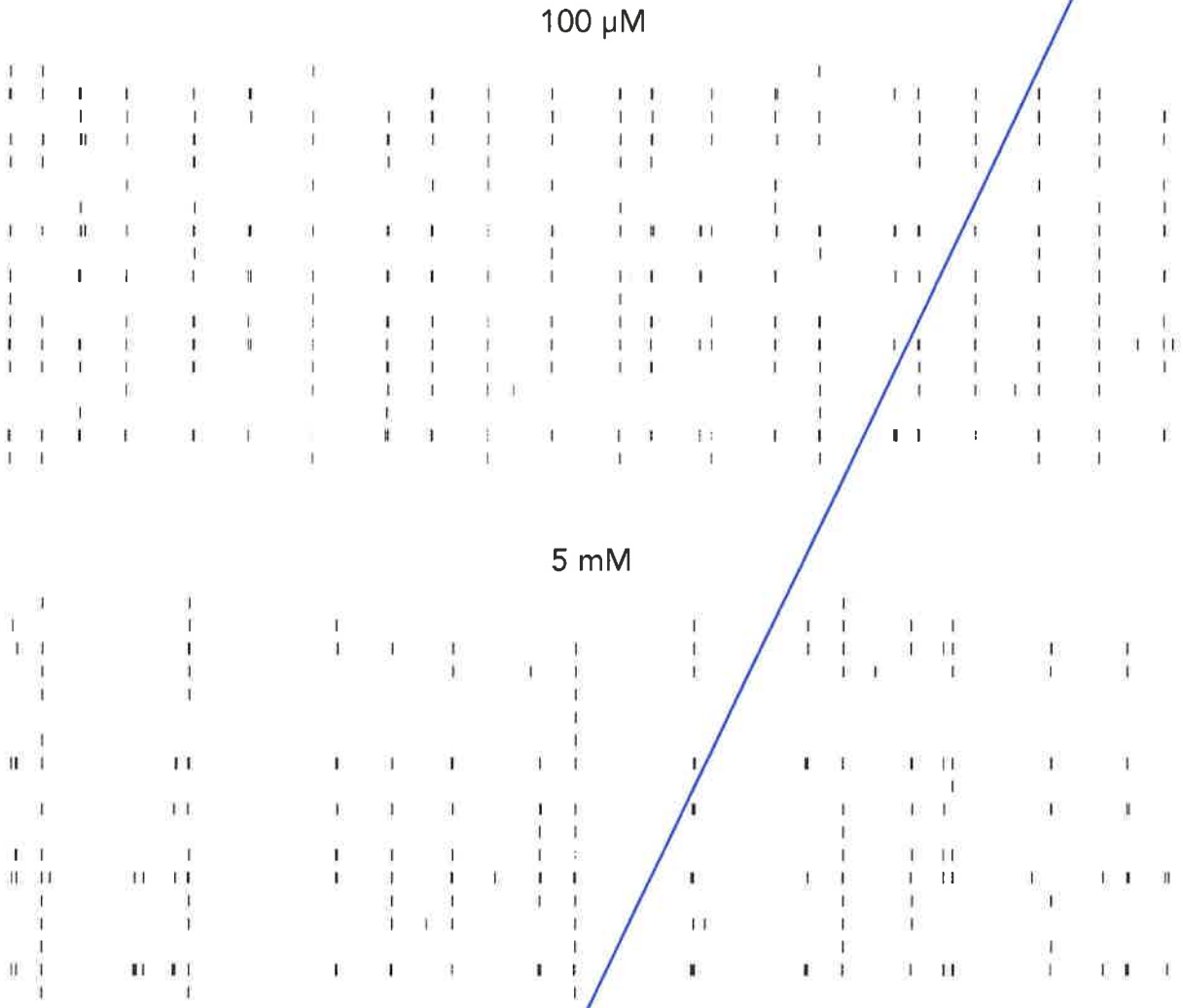


FIG. 4

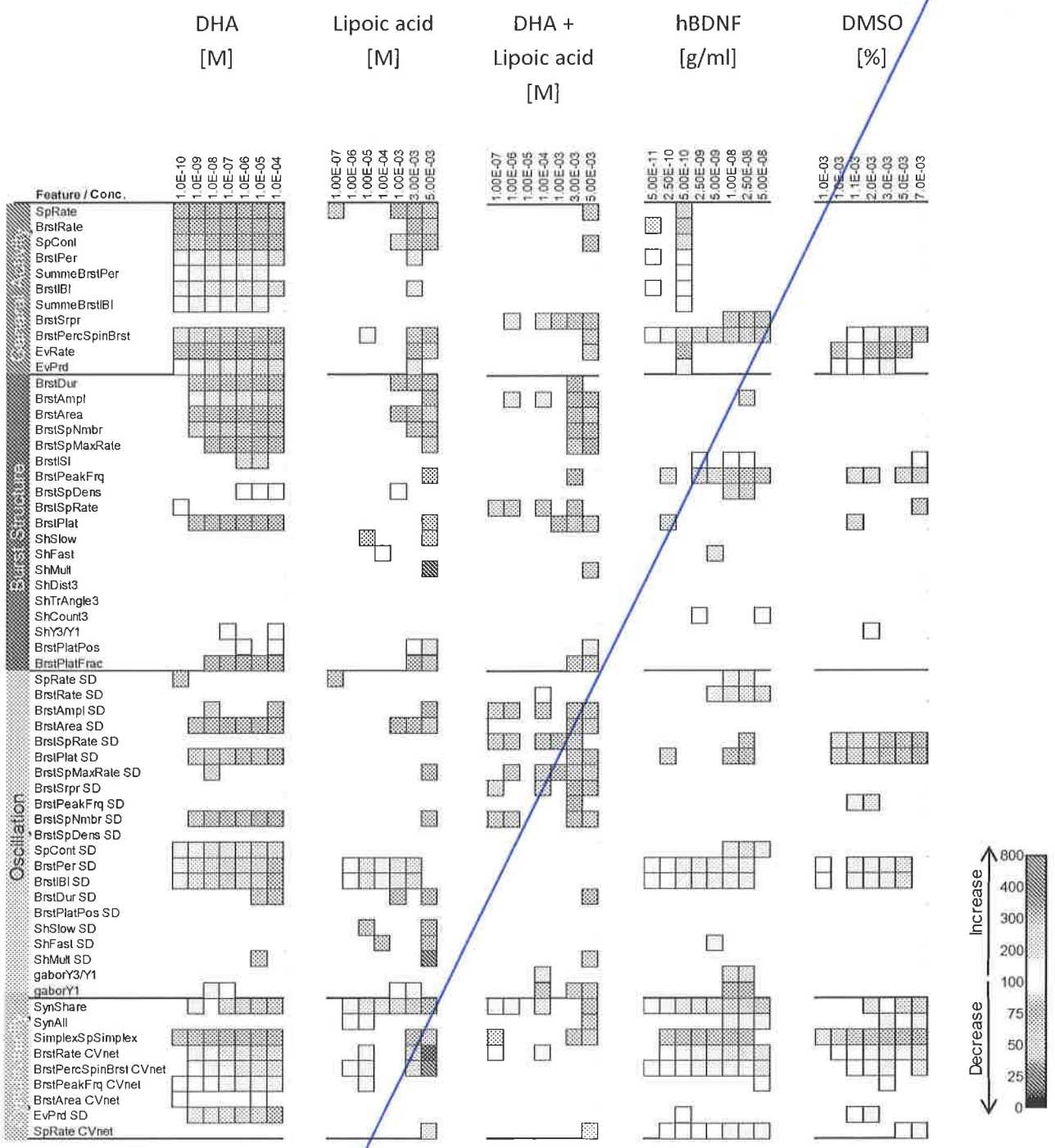

DHA [M]
Lipoic acid [M]
DHA + Lipoic acid [M]
hBDNF [g/ml]
DMSO [%]
Feature / Conc.
1.0E-10
1.0E-09
1.0E-08
1.0E-07
1.0E-06
1.0E-05
1.0E-04
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
3.00E-03
5.00E-03
5.00E-11
2.50E-10
5.00E-10
2.50E-09
5.00E-09
1.00E-08
2.50E-08
5.00E-08
1.0E-03
1.5E-03
1.1E-03
2.0E-03
3.0E-03
5.0E-03
7.0E-03
Burst Structure
Oscillation
SpRate
BrstRate
SpCont
BrstPer
SummeBrstPer
BrstIBI
SummeBrstIBI
BrstSrpr
BrstPercSpinBrst
EvRate
EvPrd
BrstDur
BrstAmpl
BrstArea
BrstSpNmbr
BrstSpMaxRate
BrstISI
BrstPeakFrq
BrstSpDens
BrstSpRate
BrstPlat
ShSlow
ShFast
ShMult
ShDist3
ShTrAngle3
ShCount3
ShY3/Y1
BrstPlatPos
BrstPlatFrac
SpRate SD
BrstRate SD
BrstAmpl SD
BrstArea SD
BrstSpRate SD
BrstPlat SD
BrstSpMaxRate SD
BrstSrpr SD
BrstPeakFrq SD
BrstSpNmbr SD
BrstSpDens SD
SpCont SD
BrstPer SD
BrstIBI SD
BrstDur SD
BrstPlatPos SD
ShSlow SD
ShFast SD
ShMult SD
gaborY3/Y1
gaborY1
SynShare
SynAll
SimplexSpSimplex
BrstRate CVnet
BrstPercSpinBrst CVnet
BrstPeakFrq CVnet
BrstArea CVnet
EvPrd SD
SpRate CVnet
Increase
Decrease
800
400
300
200
100
75
50
25
0

FIG. 5

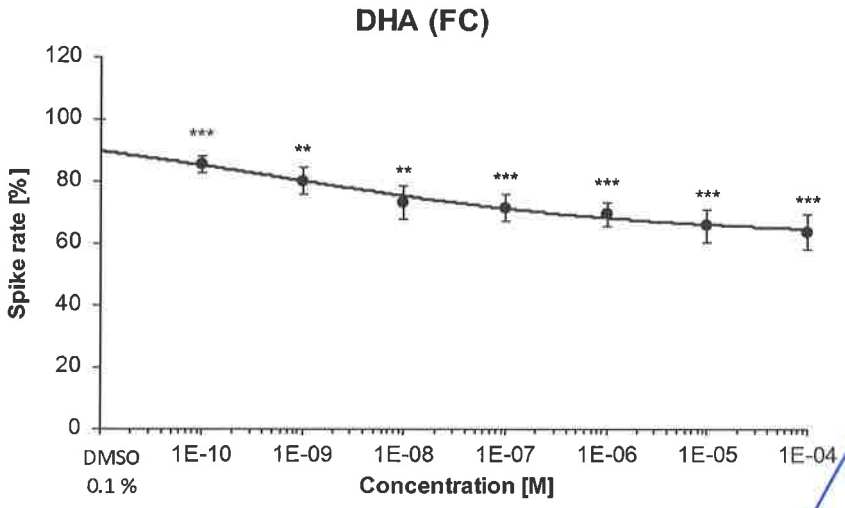

DHA (FC)
Spike rate [%]
120
100
80
60
40
20
0
***
**
**
***
***
***
***
DMSO
0.1 %
1E-10
1E-09
1E-08
1E-07
1E-06
1E-05
1E-04
Concentration [M]

FIG. 6

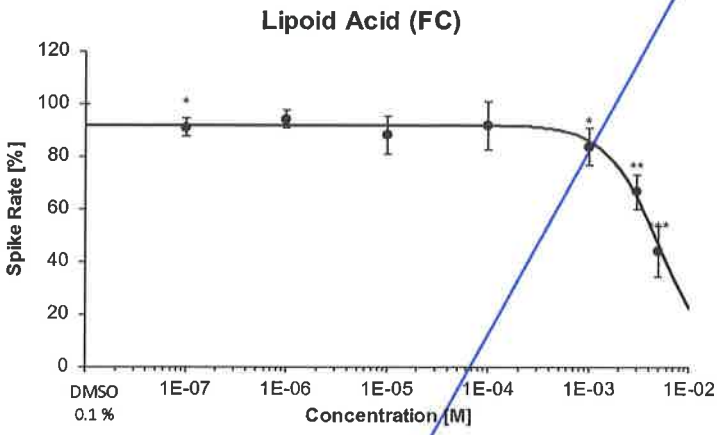

Lipoid Acid (FC)
Spike Rate [%]
120
100
80
60
40
20
0
*
*
**
**
DMSO
0.1 %
1E-07
1E-06
1E-05
1E-04
1E-03
1E-02
Concentration [M]

FIG. 7

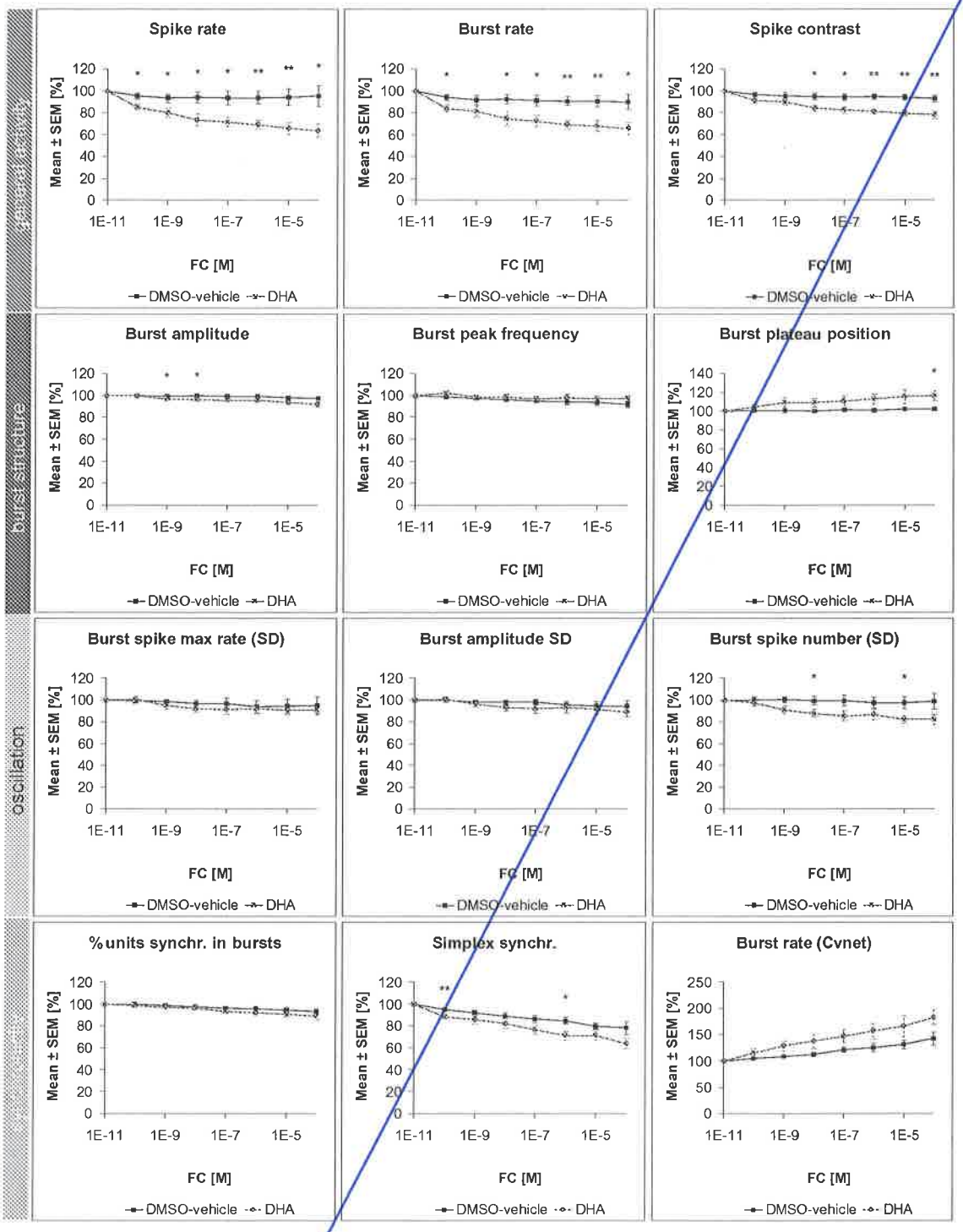

general activity
burst structure
oscillation
Spike rate
Burst rate
Spike contrast
Burst amplitude
Burst peak frequency
Burst plateau position
Burst spike max rate (SD)
Burst amplitude SD
Burst spike number (SD)
%units synchr. in bursts
Simplex synchr.
Burst rate (Cvnet)
Mean ± SEM [%]
FC [M]
1E-11
1E-9
1E-7
1E-5
DMSO-vehicle
DHA

FIG. 8

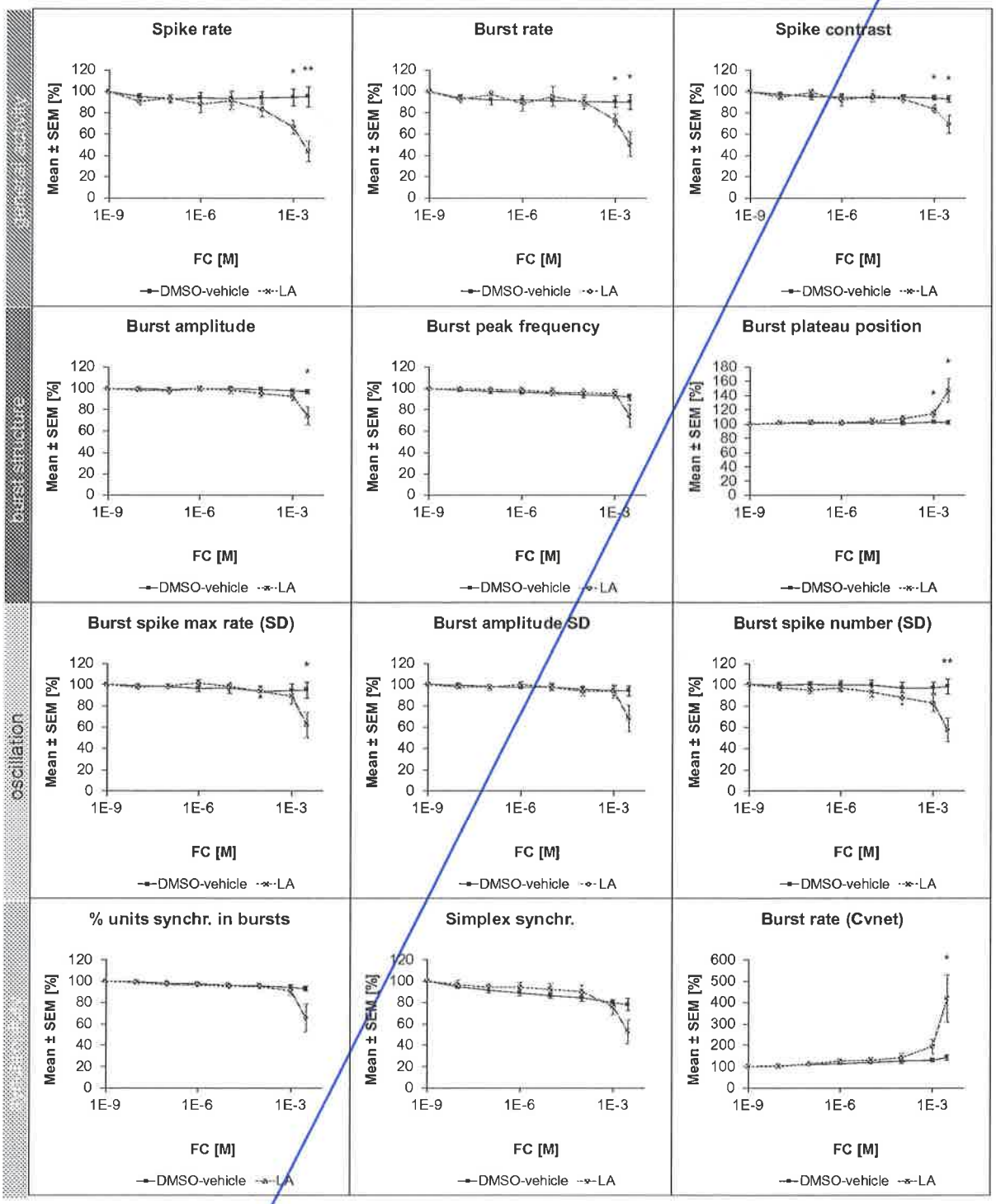

Spike rate
Burst rate
Spike contrast
Burst amplitude
Burst peak frequency
Burst plateau position
Burst spike max rate (SD)
Burst amplitude SD
Burst spike number (SD)
% units synchr. in bursts
Simplex synchr.
Burst rate (Cvnet)
Mean ± SEM [%]
FC [M]
1E-9
1E-6
1E-3
DMSO-vehicle
LA
burst structure
oscillation

FIG. 9

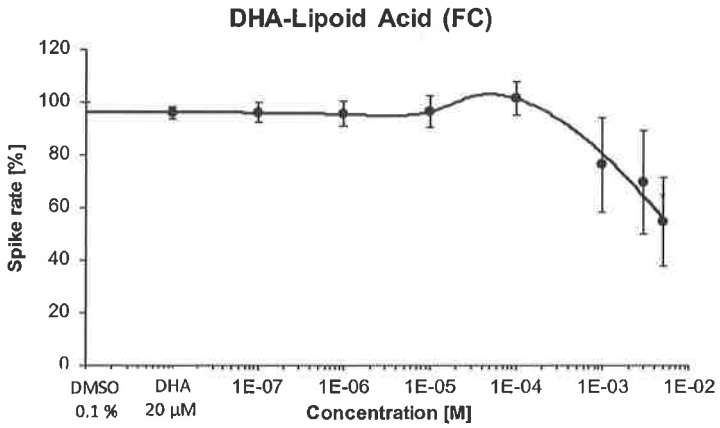

DHA-Lipoid Acid (FC)
Spike rate [%]
120
100
80
60
40
20
0
DMSO
0.1 %
DHA
20 µM
1E-07
1E-06
1E-05
1E-04
1E-03
1E-02
Concentration [M]

FIG. 10

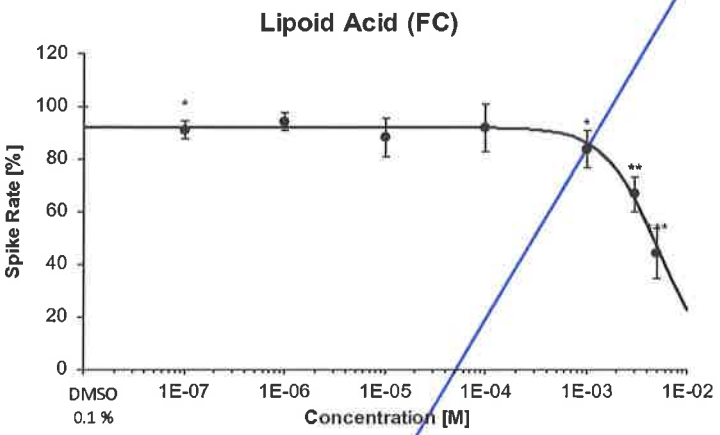

Lipoid Acid (FC)
Spike Rate [%]
120
100
80
60
40
20
0
DMSO
0.1 %
1E-07
1E-06
1E-05
1E-04
1E-03
1E-02
Concentration [M]

FIG. 11

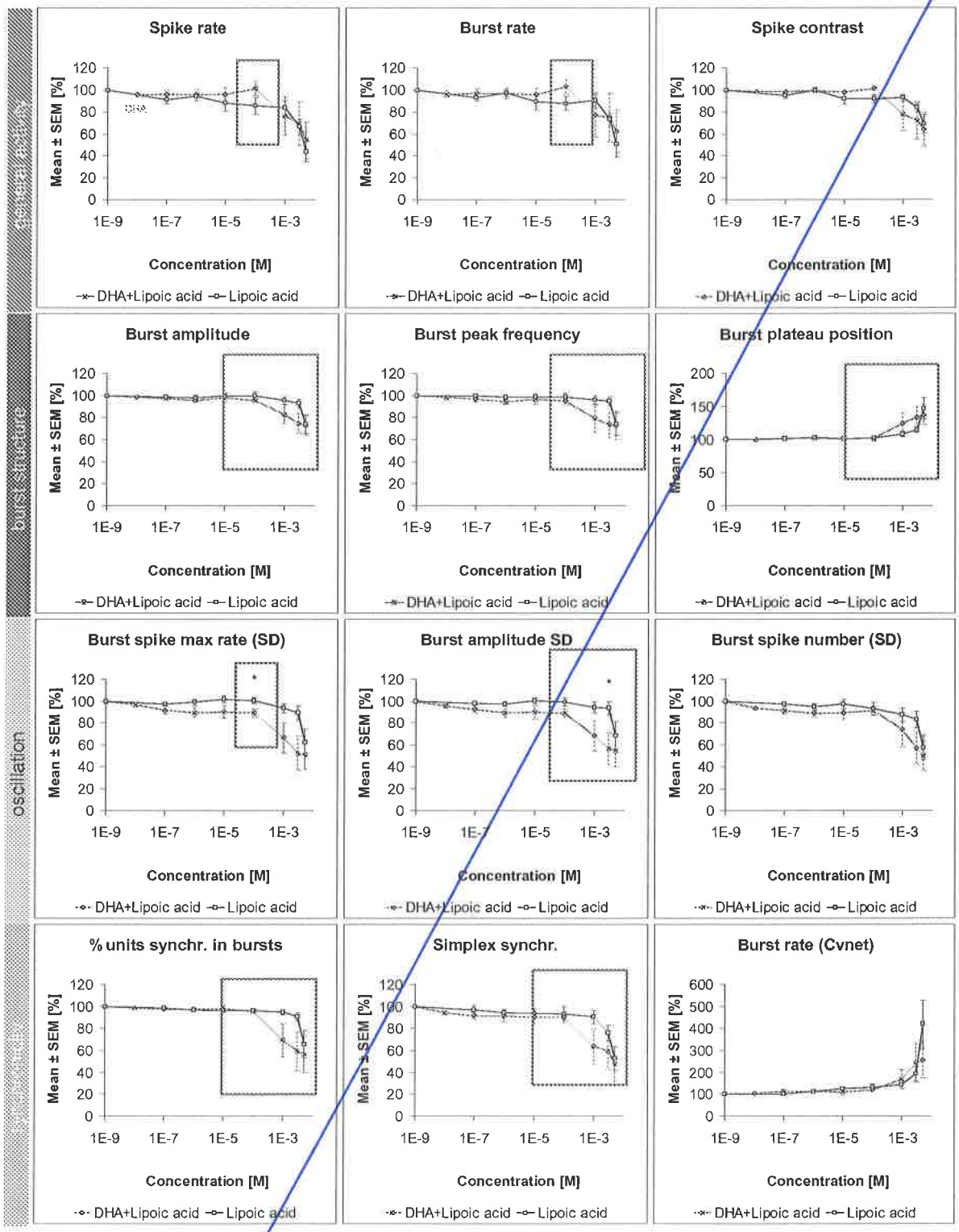

general activity
burst structure
oscillation
Spike rate
Burst rate
Spike contrast
Burst amplitude
Burst peak frequency
Burst plateau position
Burst spike max rate (SD)
Burst amplitude SD
Burst spike number (SD)
% units synchr. in bursts
Simplex synchr.
Burst rate (Cvnet)
Mean ± SEM [%]
Concentration [M]
1E-9
1E-7
1E-5
1E-3
DHA+Lipoic acid
Lipoic acid

FIG. 12a

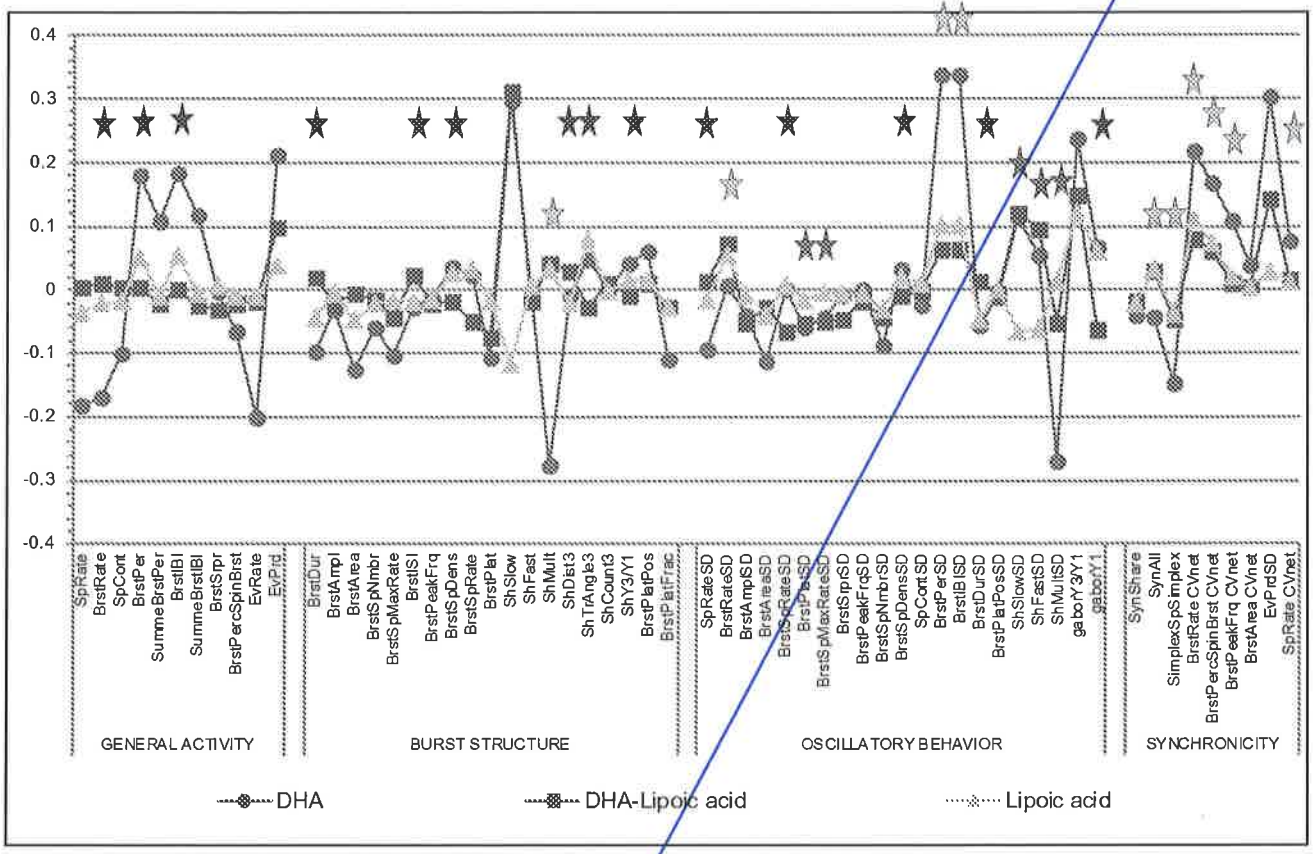


FIG. 12b

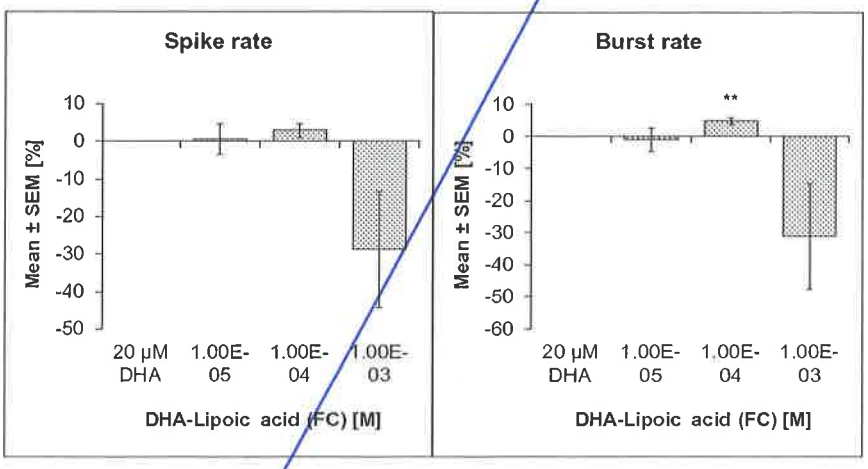


Fig. 12c

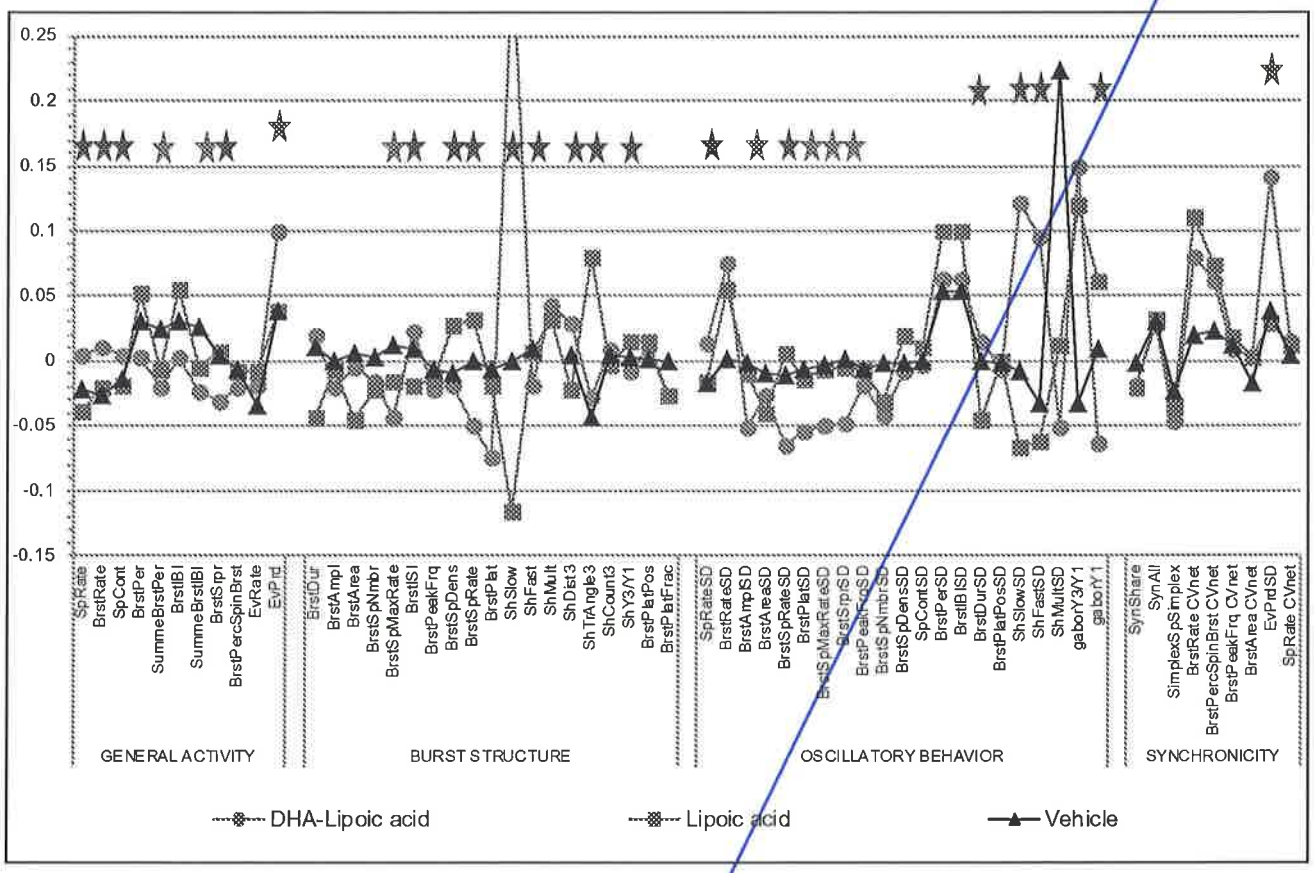

0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
SpRate
BrstRate
SpCont
BrstPer
SummeBrstPer
BrstIBI
SummeBrstIBI
BrstSpr
BrstPercSpinBrst
EvRate
EvPrd
BrstDur
BrstAmpl
BrstArea
BrstSpNmbr
BrstSpMaxRate
BrstISI
BrstPeakFrq
BrstSpDens
BrstSpRate
BrstPlat
ShSlow
ShFast
ShMult
ShDist3
ShTrAngle3
ShCount3
ShY3/Y1
BrstPlatPos
BrstPlatFrac
SpRateSD
BrstRateSD
BrstAmplSD
BrstAreaSD
BrstSpRateSD
BrstPlatSD
BrstSpMaxRateSD
BrstSpnISD
BrstPeakFrqSD
BrstSpNmbrSD
BrstSpDensSD
SpContSD
BrstPerSD
BrstIBISD
BrstDurSD
BrstPlatPosSD
ShSlowSD
ShFastSD
ShMultSD
gaborY3/Y1
gaborY1
SynShare
SynAll
SimplexSpSimplex
BrstRate CVnet
BrstPercSpinBrst CVnet
BrstPeakFrq CVnet
BrstArea CVnet
EvPrdSD
SpRate CVnet
GENERAL ACTIVITY
BURST STRUCTURE
OSCILLATORY BEHAVIOR
SYNCHRONICITY
DHA-Lipoic acid
Lipoic acid
Vehicle

FIG. 13

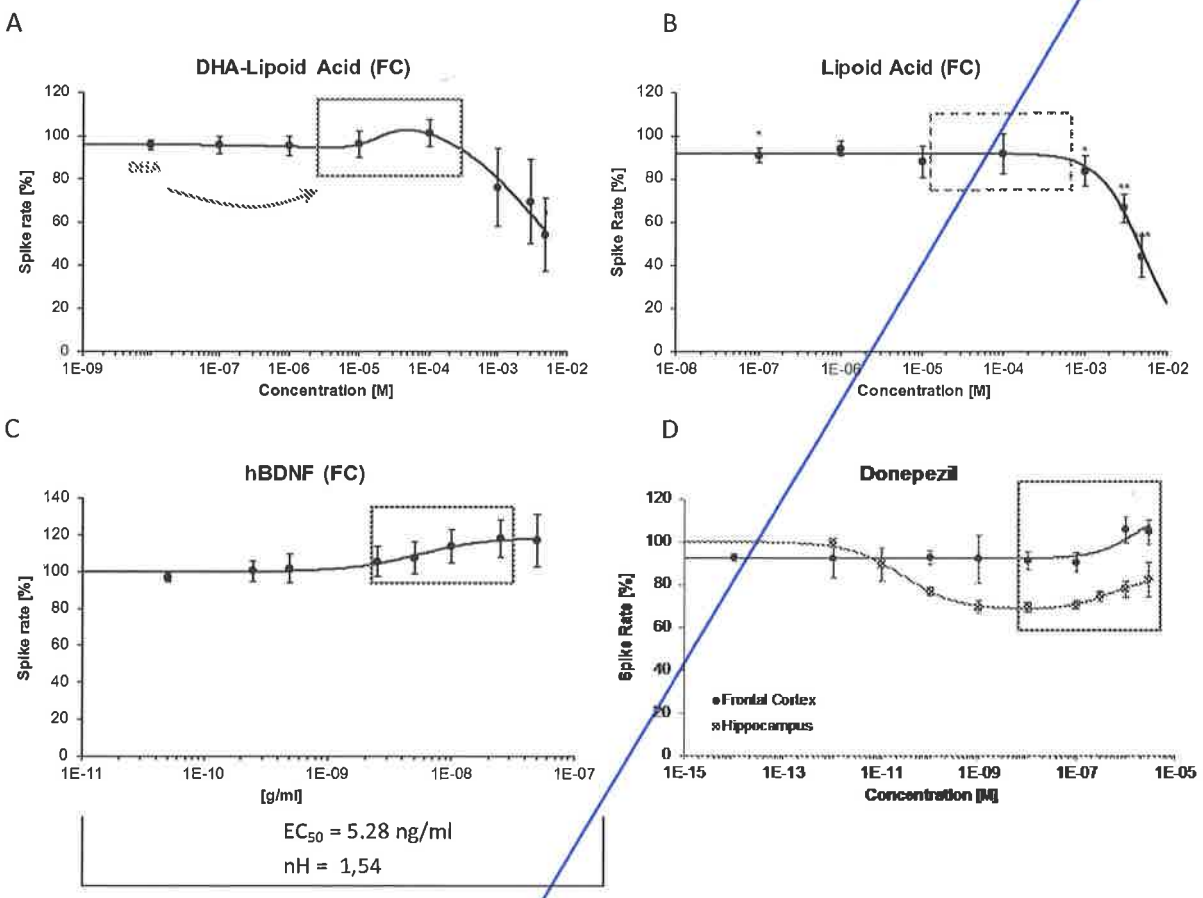

A
DHA-Lipoid Acid (FC)
Spike rate [%]
Concentration [M]
B
Lipoid Acid (FC)
Spike Rate [%]
Concentration [M]
C
hBDNF (FC)
Spike rate [%]
[g/ml]
EC50 = 5.28 ng/ml
nH = 1,54
D
Donepezil
Spike Rate [%]
Frontal Cortex
Hippocampus
Concentration [M]

FIG. 14

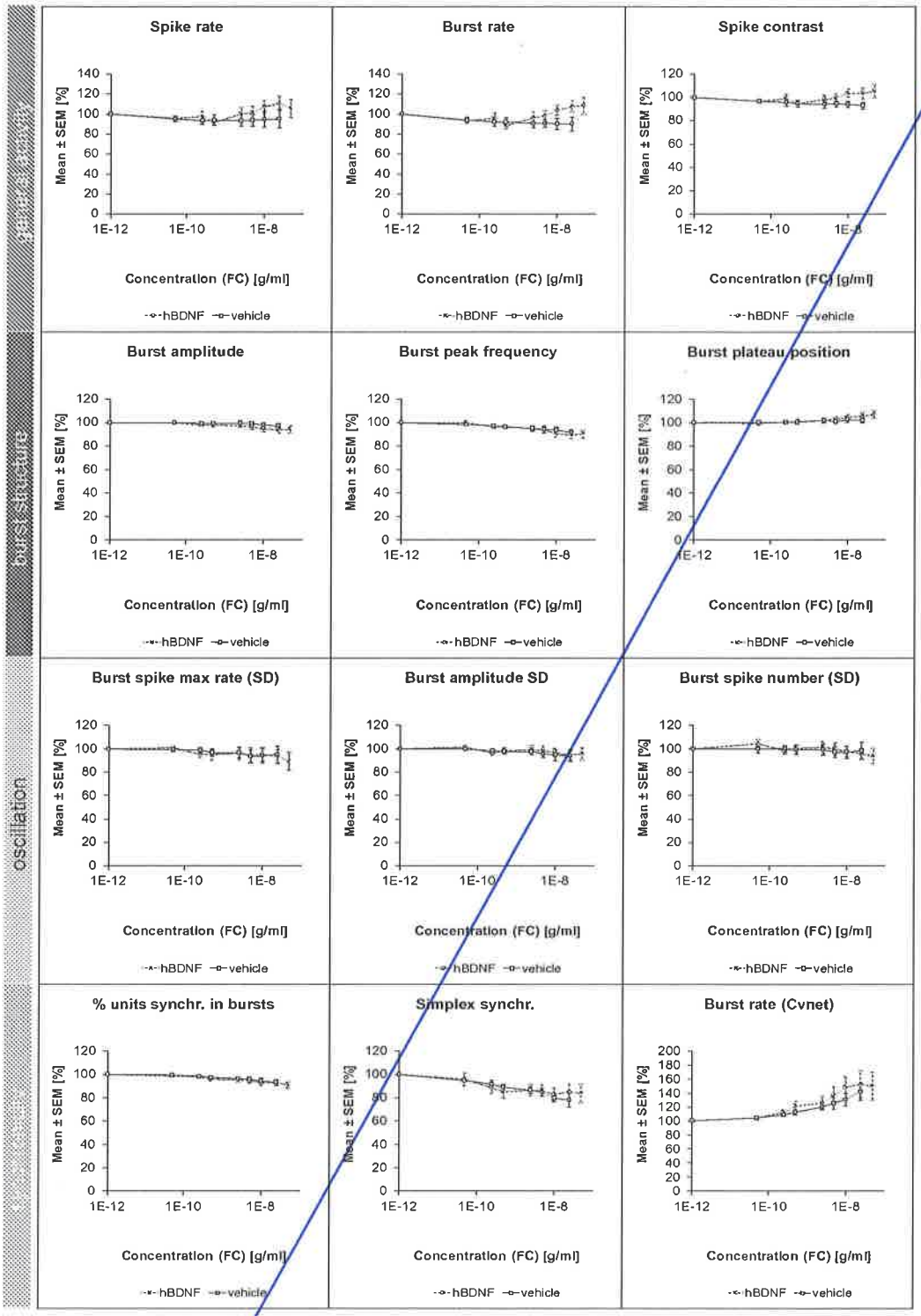
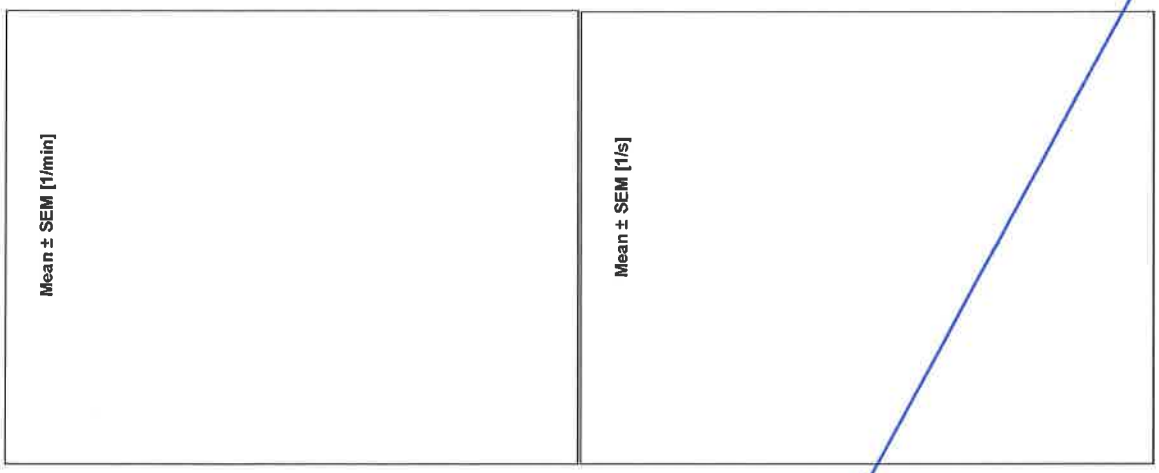

spike activity
burst structure
oscillation
Spike rate
Burst rate
Spike contrast
Burst amplitude
Burst peak frequency
Burst plateau position
Burst spike max rate (SD)
Burst amplitude SD
Burst spike number (SD)
% units synchr. in bursts
Simplex synchr.
Burst rate (Cvnet)
Mean ± SEM [%]
Concentration (FC) [g/ml]
1E-12
1E-10
1E-8
hBDNF
vehicle

FIG. 15



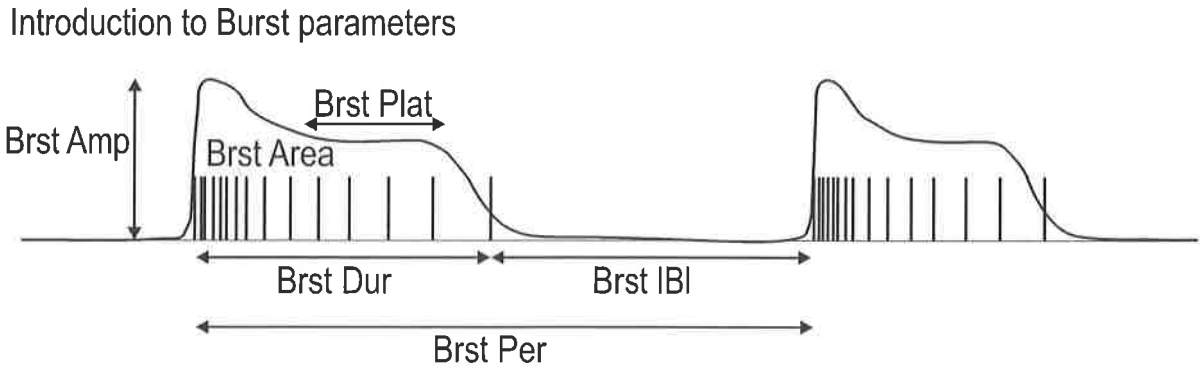

Introduction to Burst parameters
Brst Amp
Brst Plat
Brst Area
Brst Dur
Brst IBI
Brst Per

FIG. 1

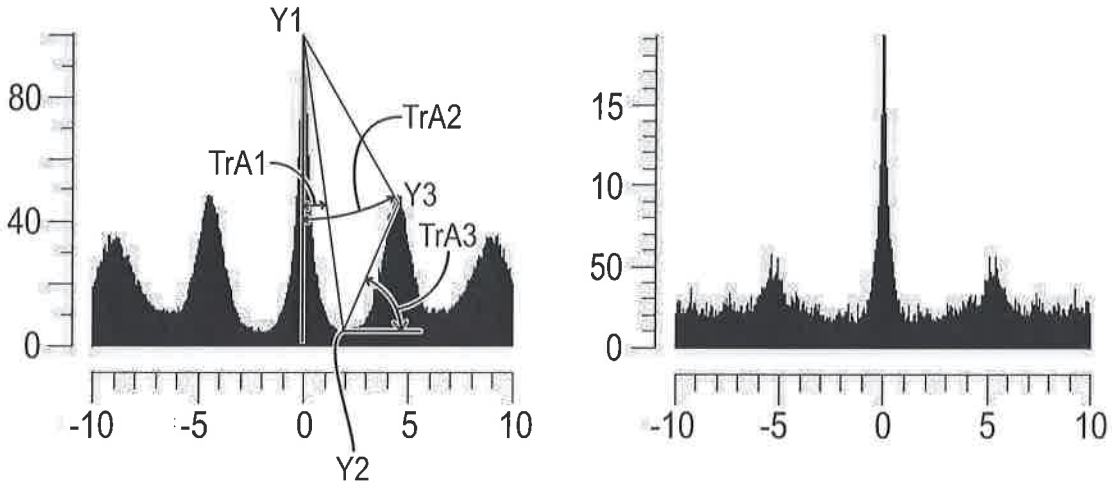

Y1
TrA2
TrA1
Y3
TrA3
Y2
80
40
0
-10
-5
0
5
10
15
10
50
0
-10
-5
0
5
10

FIG. 2

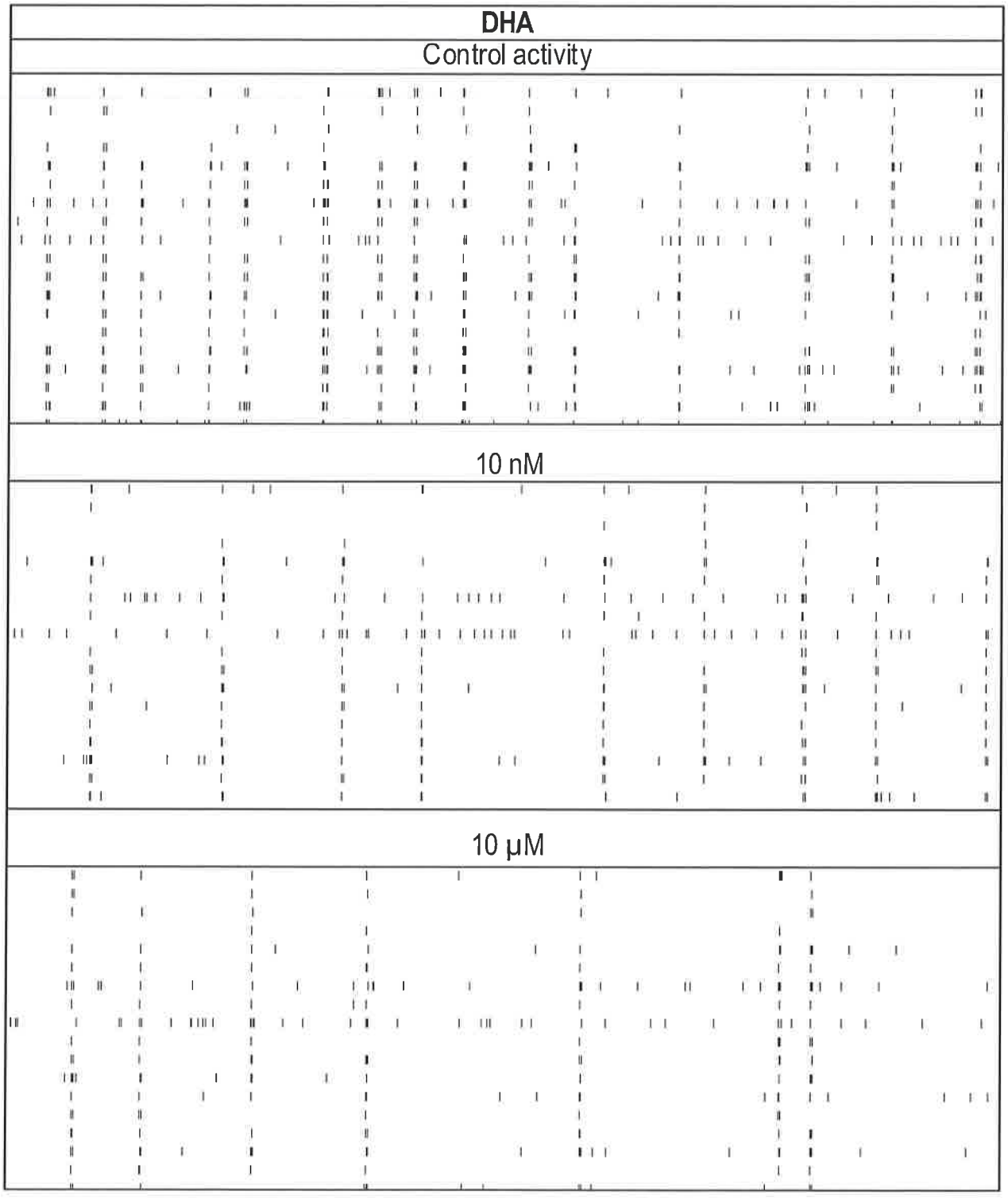


FIG. 3A

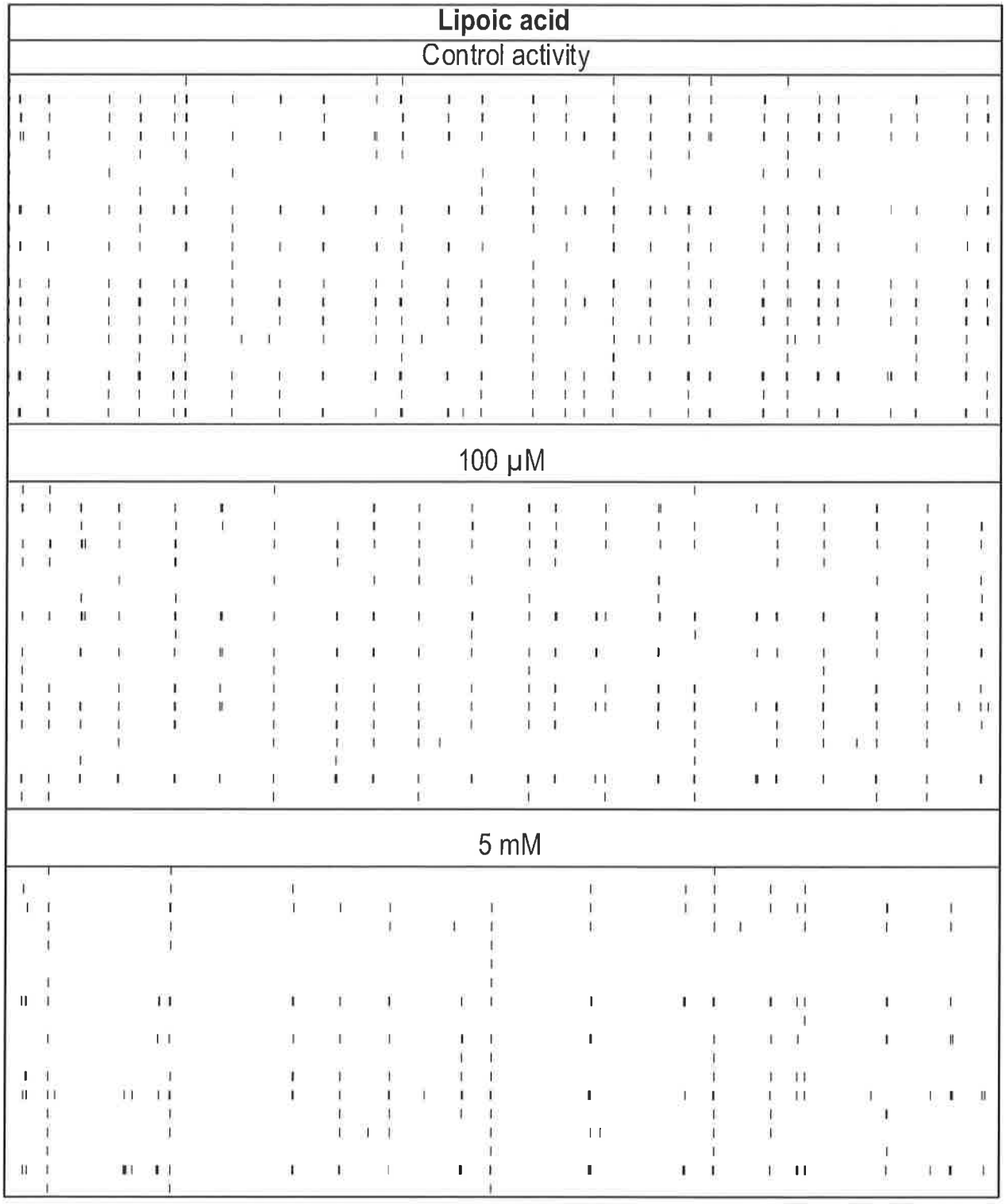


FIG. 3B

FIG. 4A	FIG. 4B	FIG. 4C
FIG. 4D	FIG. 4E	FIG. 4F
FIG. 4G	FIG. 4H	FIG. 4I
FIG. 4J	FIG. 4K	FIG. 4L

FIG. 4

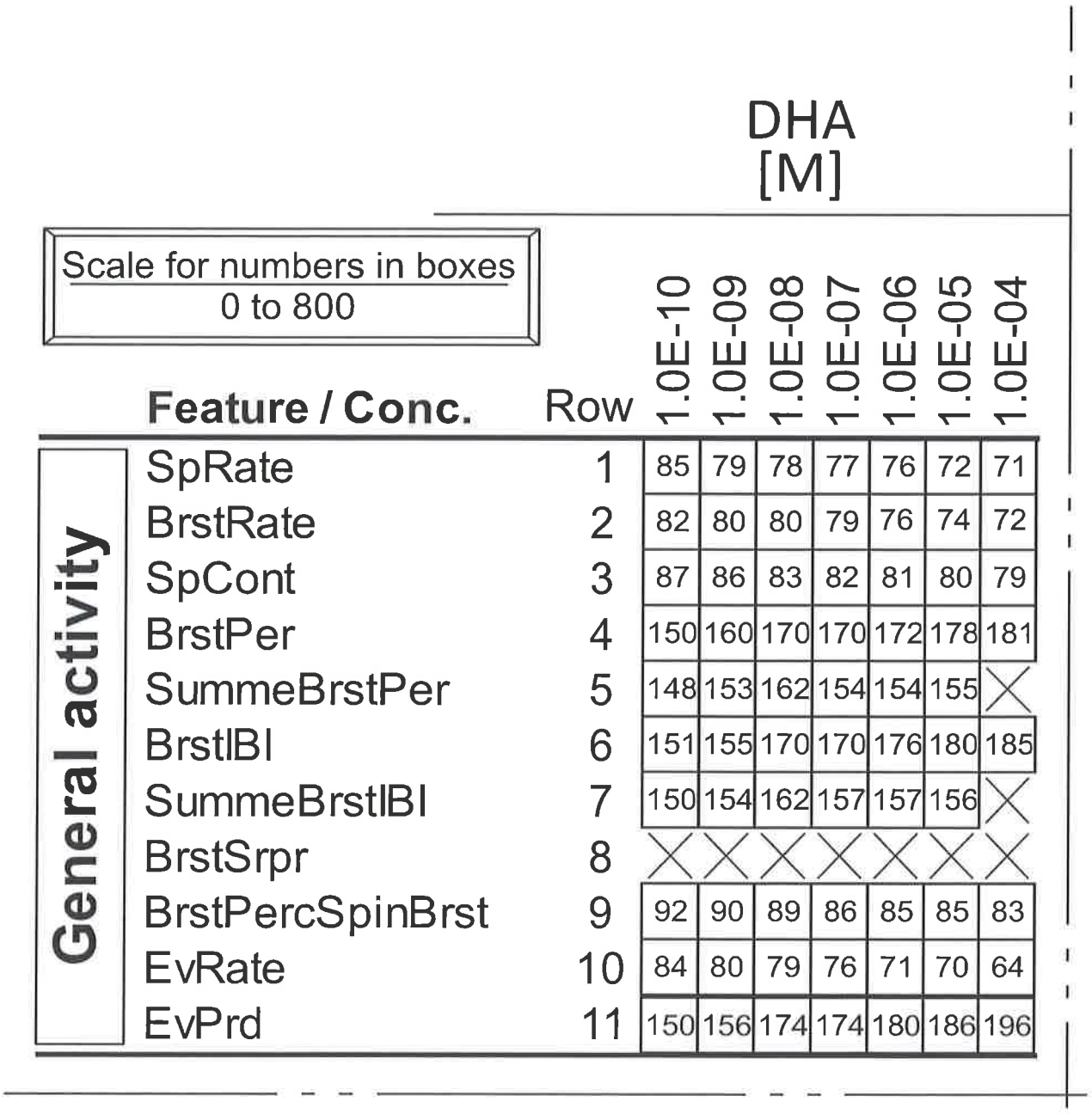

DHA
[M]
Scale for numbers in boxes
0 to 800
Feature / Conc.
Row
1.0E-10
1.0E-09
1.0E-08
1.0E-07
1.0E-06
1.0E-05
1.0E-04
General activity
SpRate 1 85 79 78 77 76 72 71
BrstRate 2 82 80 80 79 76 74 72
SpCont 3 87 86 83 82 81 80 79
BrstPer 4 150 160 170 170 172 178 181
SummeBrstPer 5 148 153 162 154 154 155
BrstIBI 6 151 155 170 170 176 180 185
SummeBrstIBI 7 150 154 162 157 157 156
BrstSrpr 8
BrstPercSpinBrst 9 92 90 89 86 85 85 83
EvRate 10 84 80 79 76 71 70 64
EvPrd 11 150 156 174 174 180 186 196

FIG. 4A

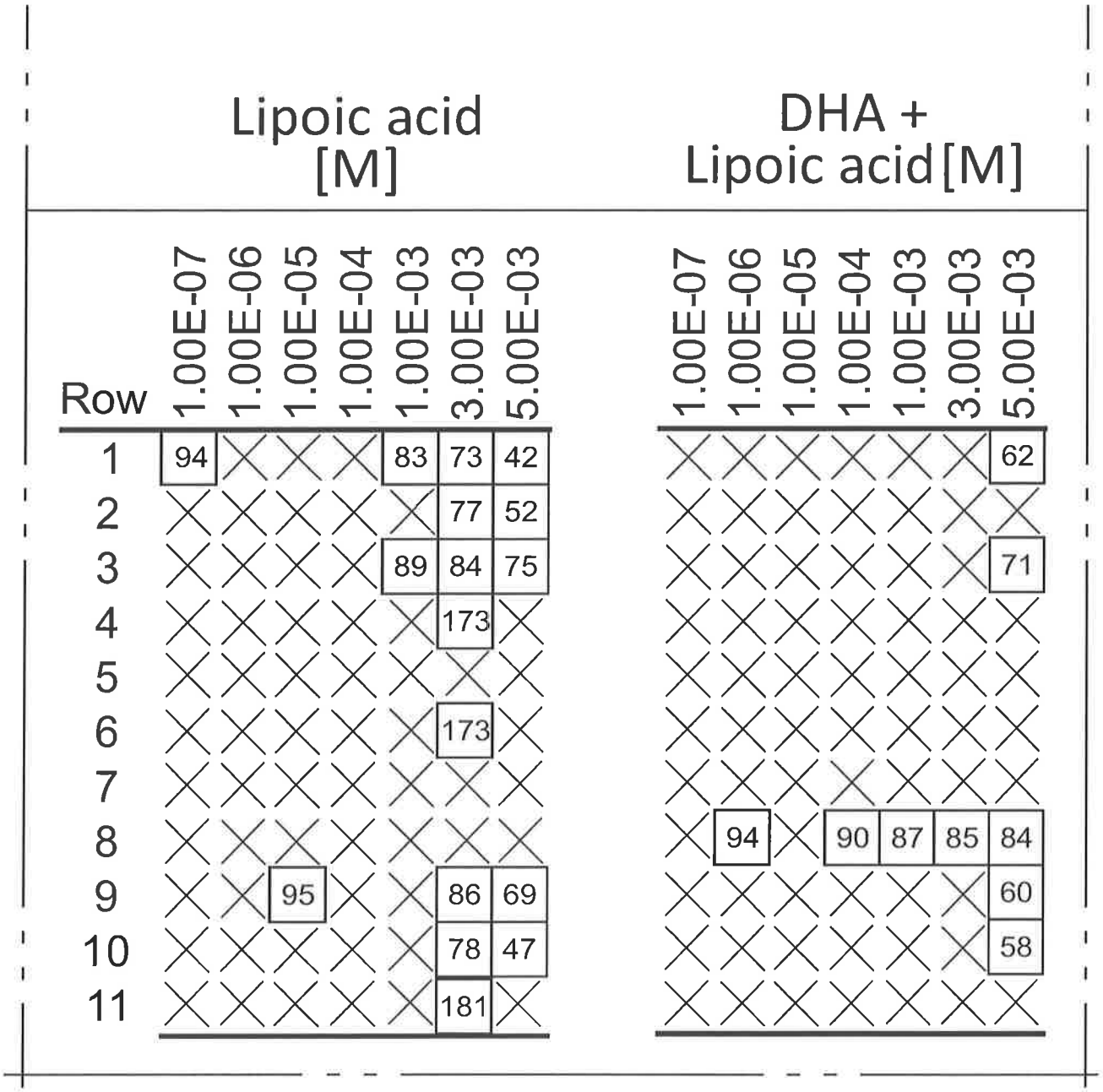

Lipoic acid [M]
DHA + Lipoic acid [M]
Row
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
3.00E-03
5.00E-03
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
3.00E-03
5.00E-03
1 94 83 73 42 62
2 77 52
3 89 84 75 71
4 173
5
6 173
7
8 94 90 87 85 84
9 95 86 69 60
10 78 47 58
11 181

FIG. 4B

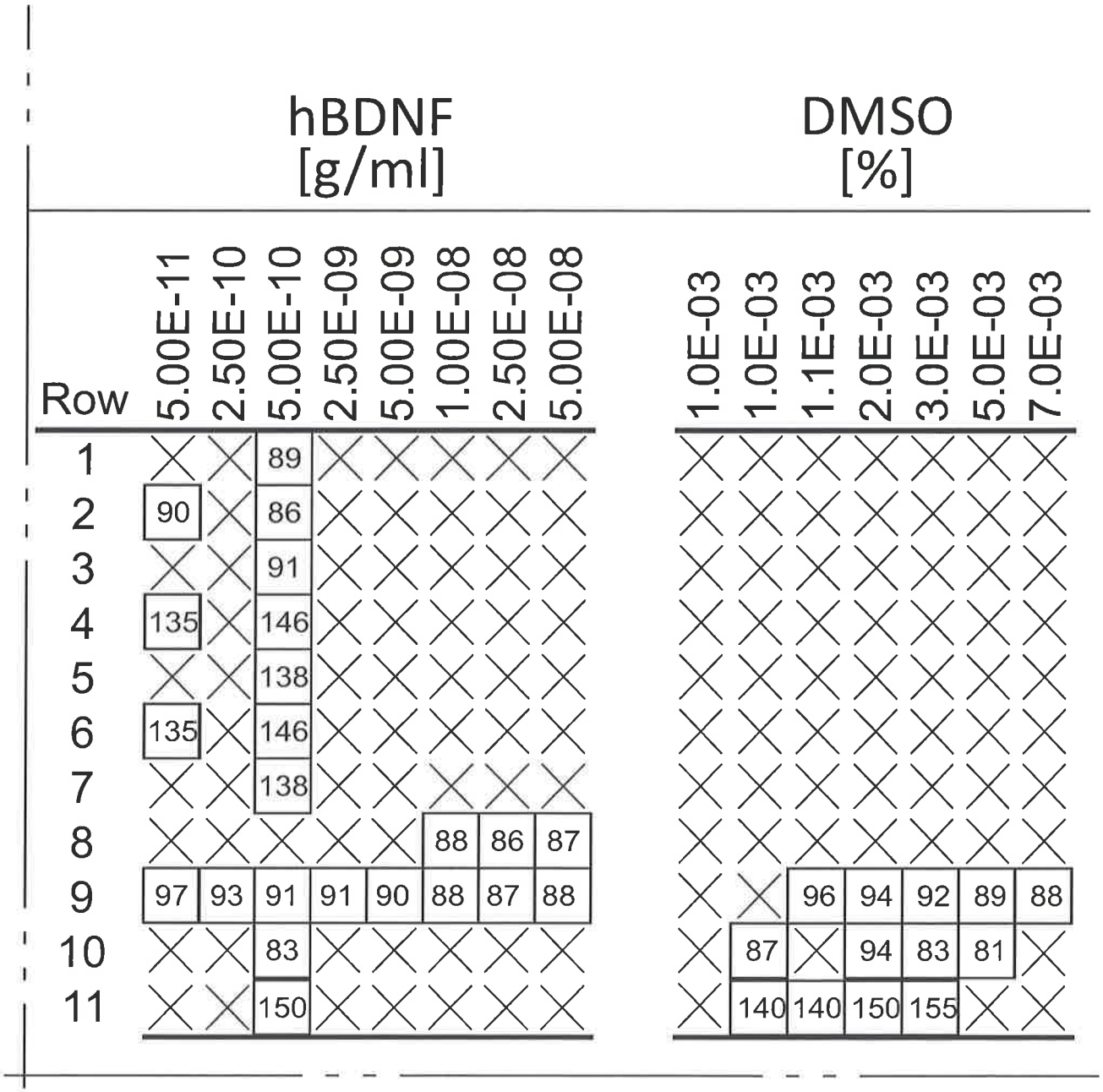

hBDNF
[g/ml]
DMSO
[%]
Row
5.00E-11
2.50E-10
5.00E-10
2.50E-09
5.00E-09
1.00E-08
2.50E-08
5.00E-08
1.0E-03
1.0E-03
1.1E-03
2.0E-03
3.0E-03
5.0E-03
7.0E-03
1
2
3
4
5
6
7
8
9
10
11
89
90
86
91
135
146
138
135
146
138
88
86
87
97
93
91
91
90
88
87
88
96
94
92
89
88
87
94
83
81
83
140
140
150
155
150

FIG. 4C

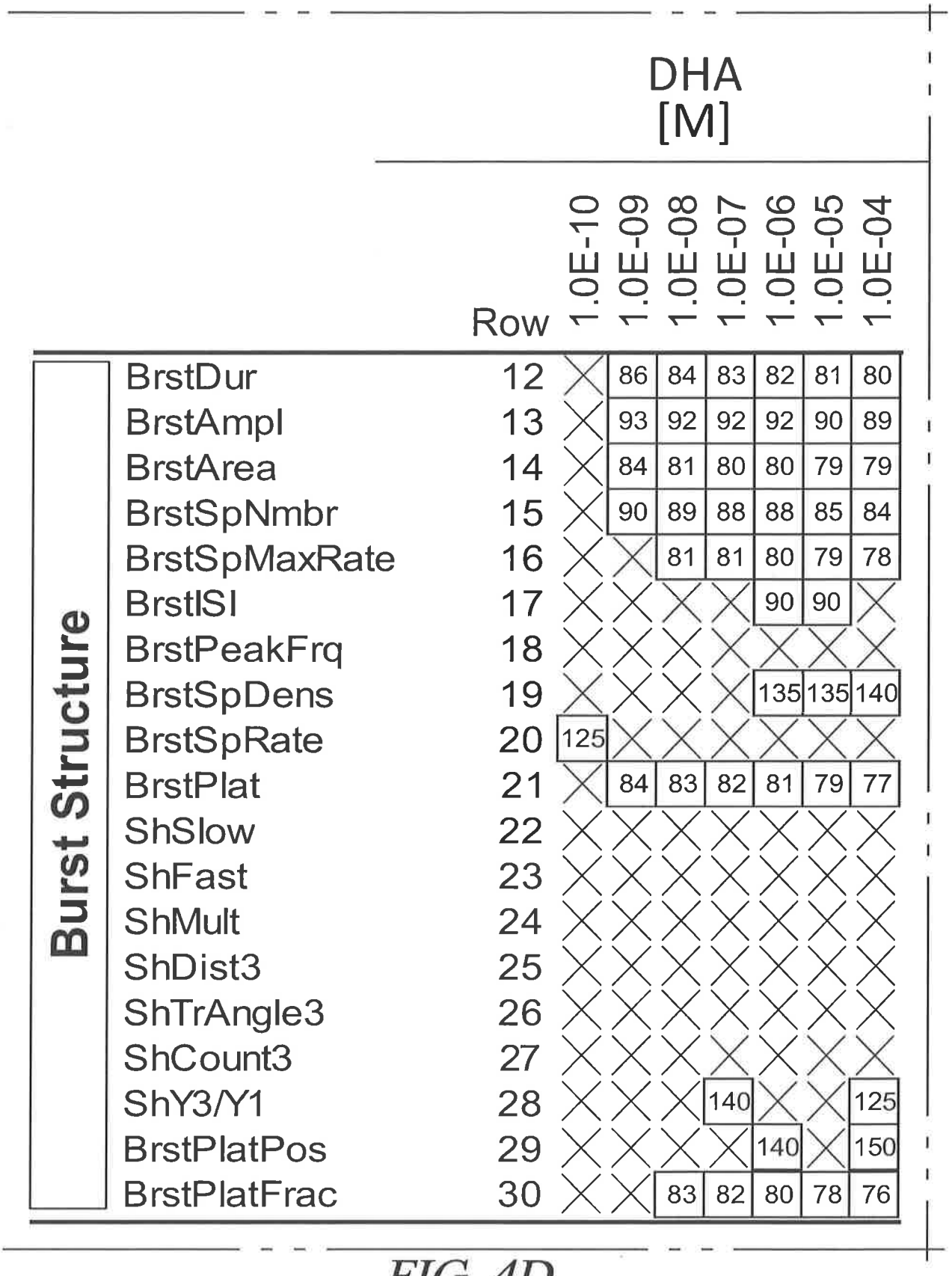

DHA
[M]
1.0E-10
1.0E-09
1.0E-08
1.0E-07
1.0E-06
1.0E-05
1.0E-04
Row
Burst Structure
BrstDur 12 86 84 83 82 81 80
BrstAmpl 13 93 92 92 92 90 89
BrstArea 14 84 81 80 80 79 79
BrstSpNmbr 15 90 89 88 88 85 84
BrstSpMaxRate 16 81 81 80 79 78
BrstISI 17 90 90
BrstPeakFrq 18
BrstSpDens 19 135 135 140
BrstSpRate 20 125
BrstPlat 21 84 83 82 81 79 77
ShSlow 22
ShFast 23
ShMult 24
ShDist3 25
ShTrAngle3 26
ShCount3 27
ShY3/Y1 28 140 125
BrstPlatPos 29 140 150
BrstPlatFrac 30 83 82 80 78 76

FIG. 4D

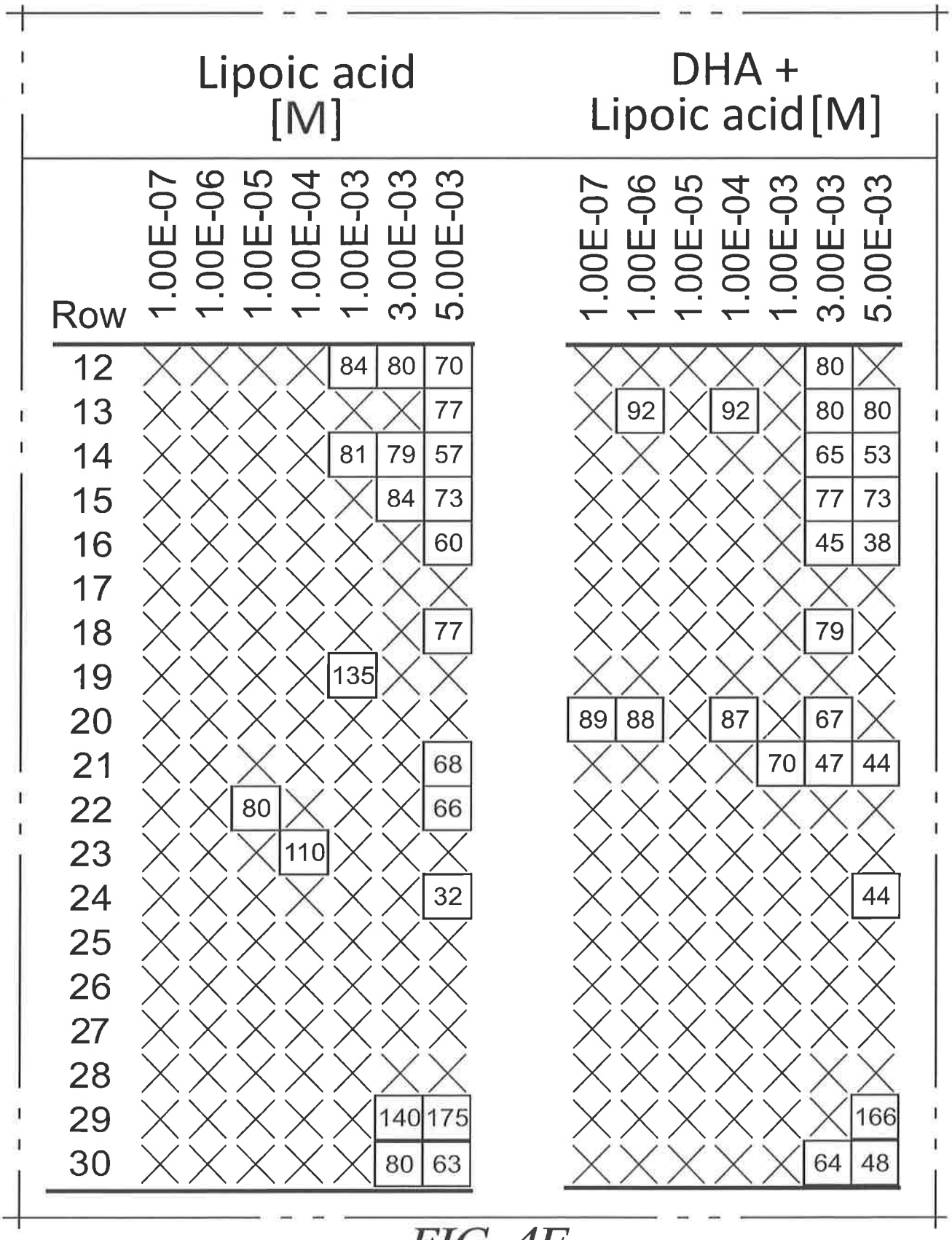

Lipoic acid [M]
DHA + Lipoic acid [M]
Row
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
3.00E-03
5.00E-03
12 84 80 70
13 77
14 81 79 57
15 84 73
16 60
17
18 77
19 135
20
21 68
22 80 66
23 110
24 32
25
26
27
28
29 140 175
30 80 63
12 80
13 92 92 80 80
14 65 53
15 77 73
16 45 38
17
18 79
19
20 89 88 87 67
21 70 47 44
22
23
24 44
25
26
27
28
29 166
30 64 48

FIG. 4E

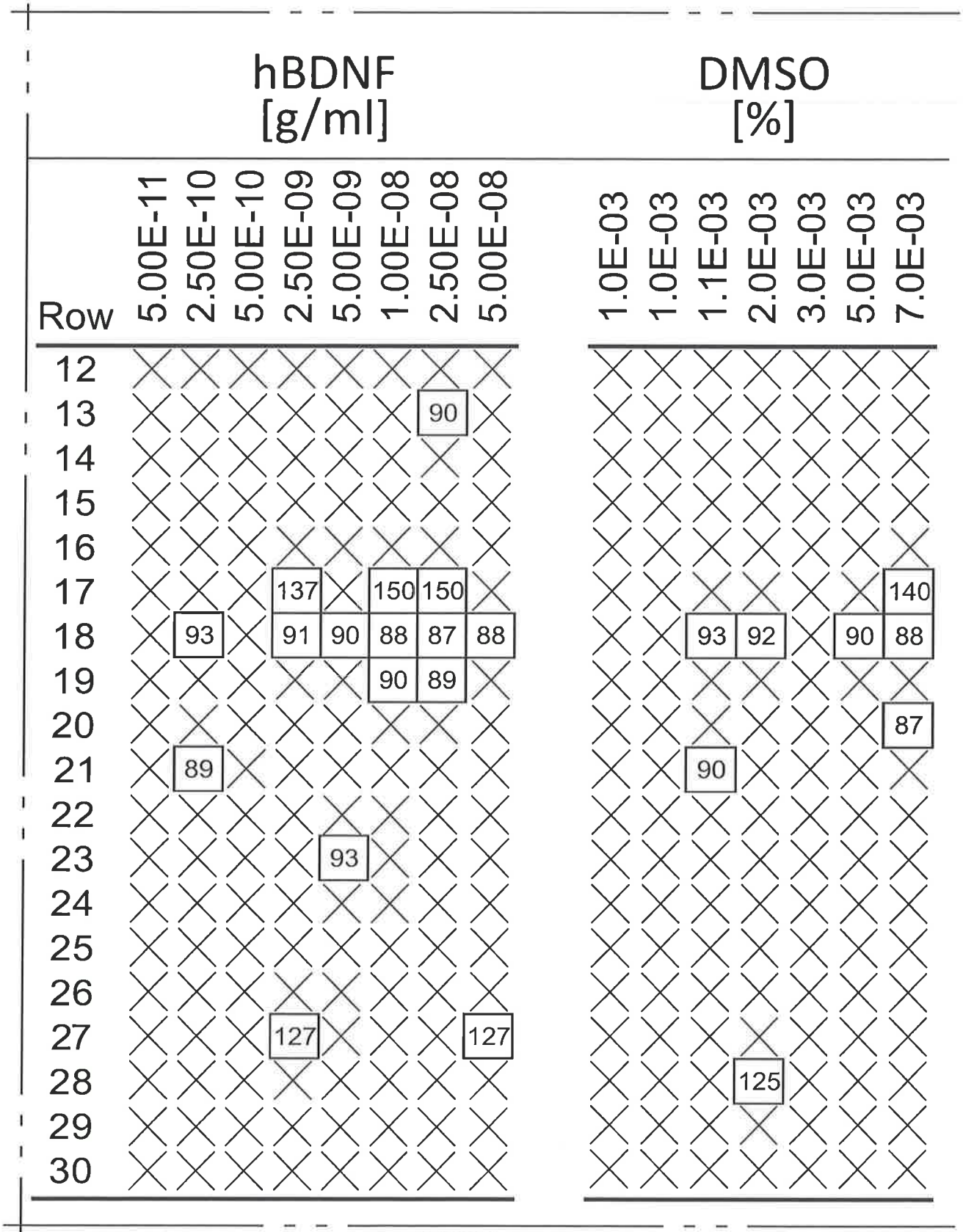

hBDNF
[g/ml]
DMSO
[%]
Row
5.00E-11
2.50E-10
5.00E-10
2.50E-09
5.00E-09
1.00E-08
2.50E-08
5.00E-08
1.0E-03
1.0E-03
1.1E-03
2.0E-03
3.0E-03
5.0E-03
7.0E-03
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
90
137
150
150
140
93
91
90
88
87
88
93
92
90
88
90
89
87
89
90
93
127
127
125

FIG. 4F

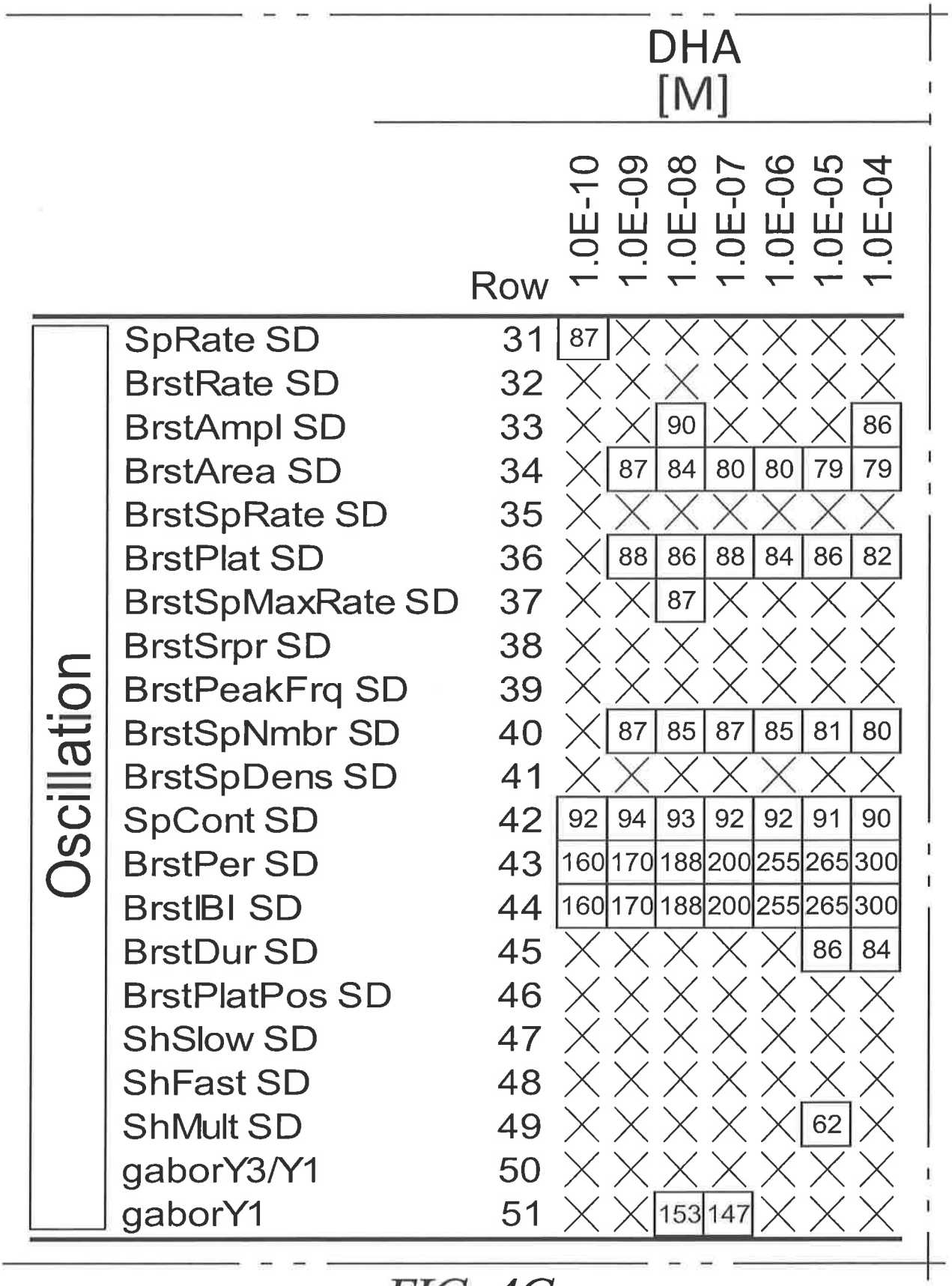

DHA [M]
1.0E-10
1.0E-09
1.0E-08
1.0E-07
1.0E-06
1.0E-05
1.0E-04
Row
Oscillation
SpRate SD 31 87
BrstRate SD 32
BrstAmpl SD 33 90 86
BrstArea SD 34 87 84 80 80 79 79
BrstSpRate SD 35
BrstPlat SD 36 88 86 88 84 86 82
BrstSpMaxRate SD 37 87
BrstSrpr SD 38
BrstPeakFrq SD 39
BrstSpNmbr SD 40 87 85 87 85 81 80
BrstSpDens SD 41
SpCont SD 42 92 94 93 92 92 91 90
BrstPer SD 43 160 170 188 200 255 265 300
BrstIBI SD 44 160 170 188 200 255 265 300
BrstDur SD 45 86 84
BrstPlatPos SD 46
ShSlow SD 47
ShFast SD 48
ShMult SD 49 62
gaborY3/Y1 50
gaborY1 51 153 147

FIG. 4G

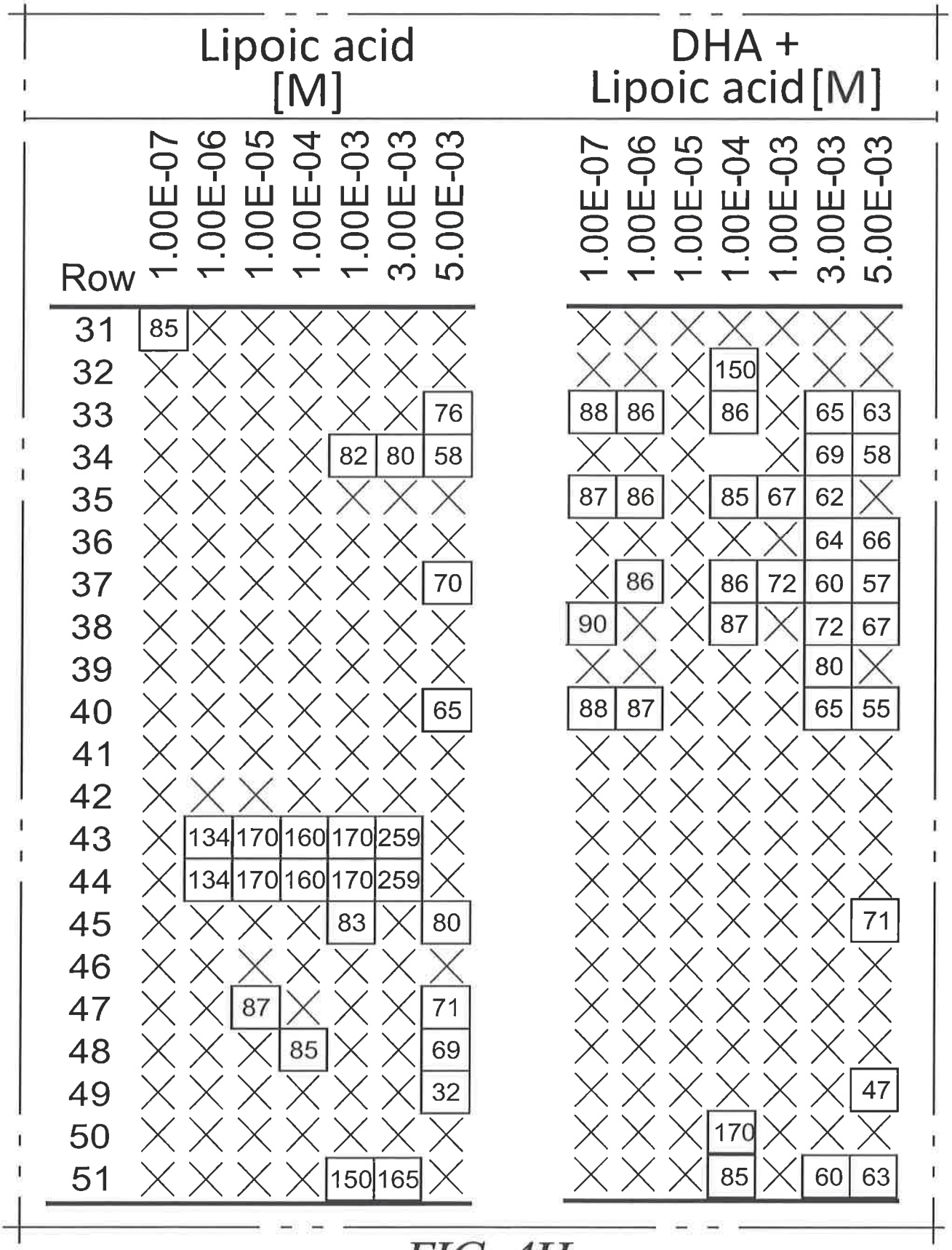

Lipoic acid [M]
DHA + Lipoic acid [M]
Row
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
3.00E-03
5.00E-03
31 85
33 76
34 82 80 58
37 70
40 65
43 134 170 160 170 259
44 134 170 160 170 259
45 83 80
47 87 71
48 85 69
49 32
51 150 165
32 150
33 88 86 86 65 63
34 69 58
35 87 86 85 67 62
36 64 66
37 86 86 72 60 57
38 90 87 72 67
39 80
40 88 87 65 55
45 71
49 47
50 170
51 85 60 63

FIG. 4H

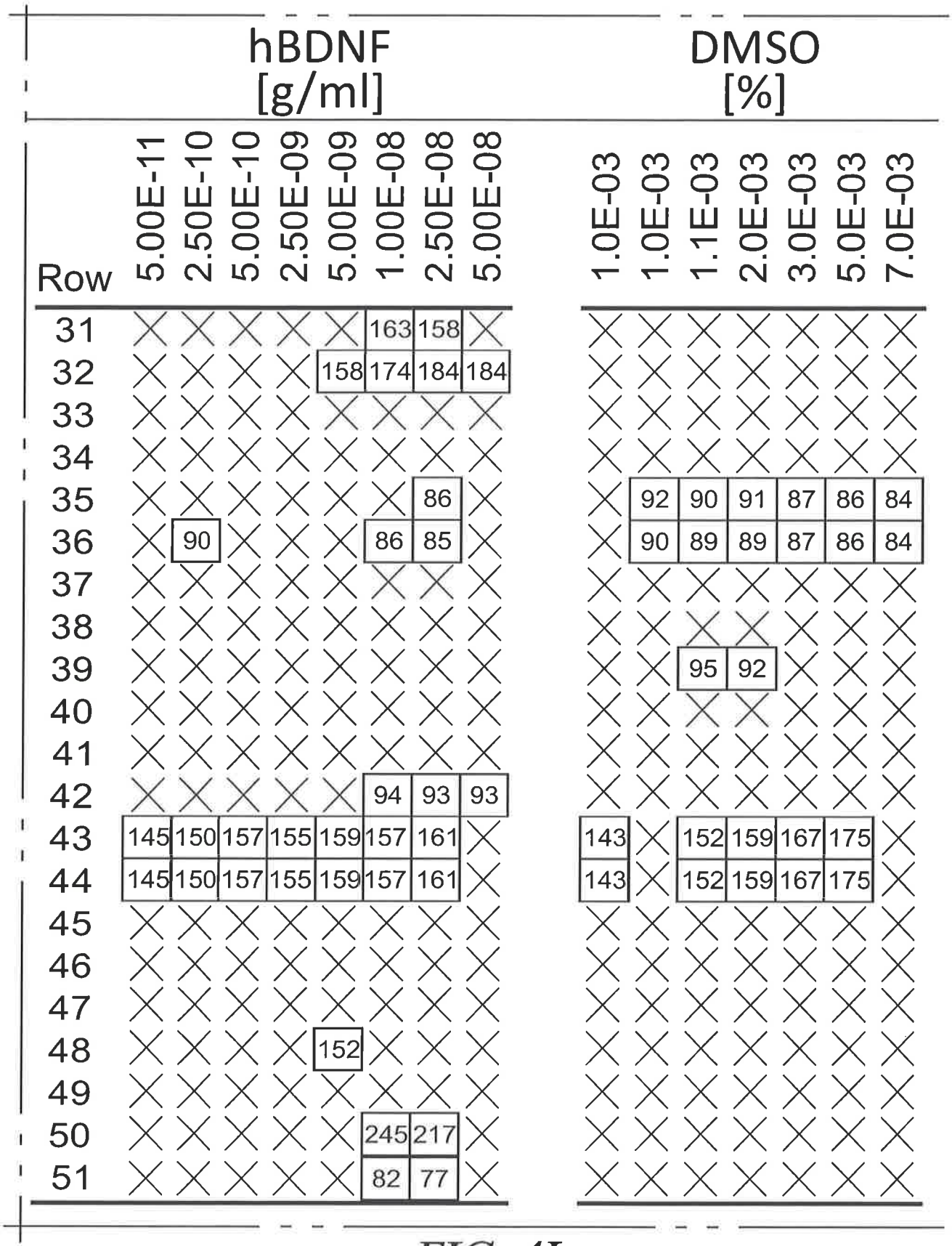

hBDNF [g/ml]
DMSO [%]
Row
5.00E-11
2.50E-10
5.00E-10
2.50E-09
5.00E-09
1.00E-08
2.50E-08
5.00E-08
1.0E-03
1.0E-03
1.1E-03
2.0E-03
3.0E-03
5.0E-03
7.0E-03
31 163 158
32 158 174 184 184
35 86
36 90 86 85
35 92 90 91 87 86 84
36 90 89 89 87 86 84
39 95 92
42 94 93 93
43 145 150 157 155 159 157 161
44 145 150 157 155 159 157 161
43 143 152 159 167 175
44 143 152 159 167 175
48 152
50 245 217
51 82 77

FIG. 4I

		Row	DHA [M] 1.0E-10	1.0E-09	1.0E-08	1.0E-07	1.0E-06	1.0E-05	1.0E-04
Synchronicity	SynShare	52	X	93	X	90	89	88	86
	SynAll	53	X	X	X	X	X	X	X
	SimplexSpSimplex	54	86	84	82	80	79	78	71
	BrstRate CVnet	55	X	159	167	175	180	190	200
	BrstPercSpinBrst CVnet	56	X	148	160	170	175	175	200
	BrstPeakFrq CVnet	57	135	140	150	155	157	160	170
	BrstArea CVnet	58	135	X	X	X	X	135	X
	EvPrd SD	59	X	165	180	187	205	215	312
	SpRate CVnet	60	X	X	X	X	X	X	X

FIG. 4J

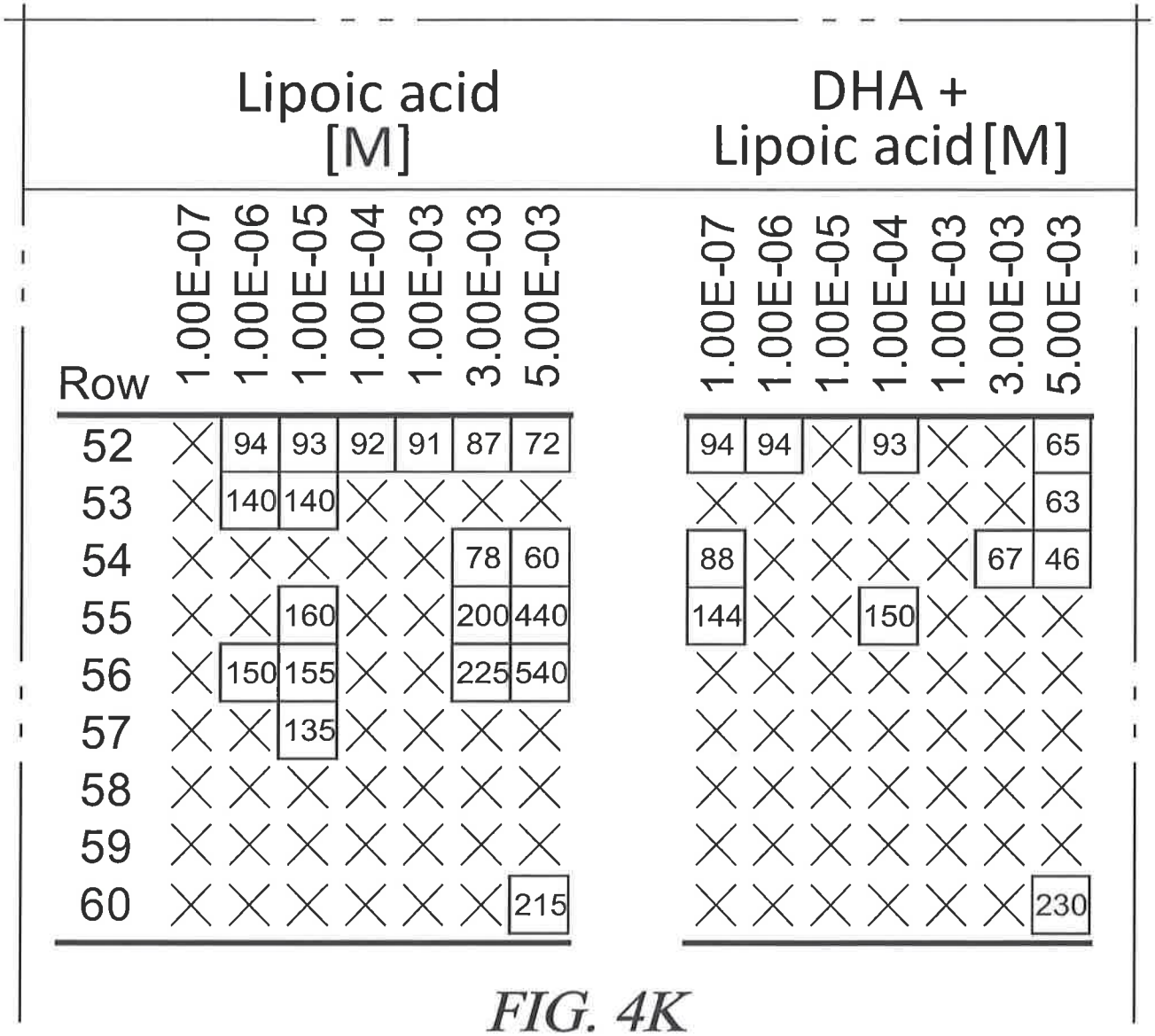

Lipoic acid [M]
DHA + Lipoic acid [M]
Row
1.00E-07
1.00E-06
1.00E-05
1.00E-04
1.00E-03
3.00E-03
5.00E-03
52 X 94 93 92 91 87 72
53 X 140 140 X X X X
54 X X X X X 78 60
55 X X 160 X X 200 440
56 X 150 155 X X 225 540
57 X X 135 X X X X
58 X X X X X X X
59 X X X X X X X
60 X X X X X X 215
94 94 X 93 X X 65
X X X X X X 63
88 X X X X 67 46
144 X X 150 X X X
X X X X X X X
X X X X X X X
X X X X X X X
X X X X X X X
X X X X X X 230

FIG. 4K

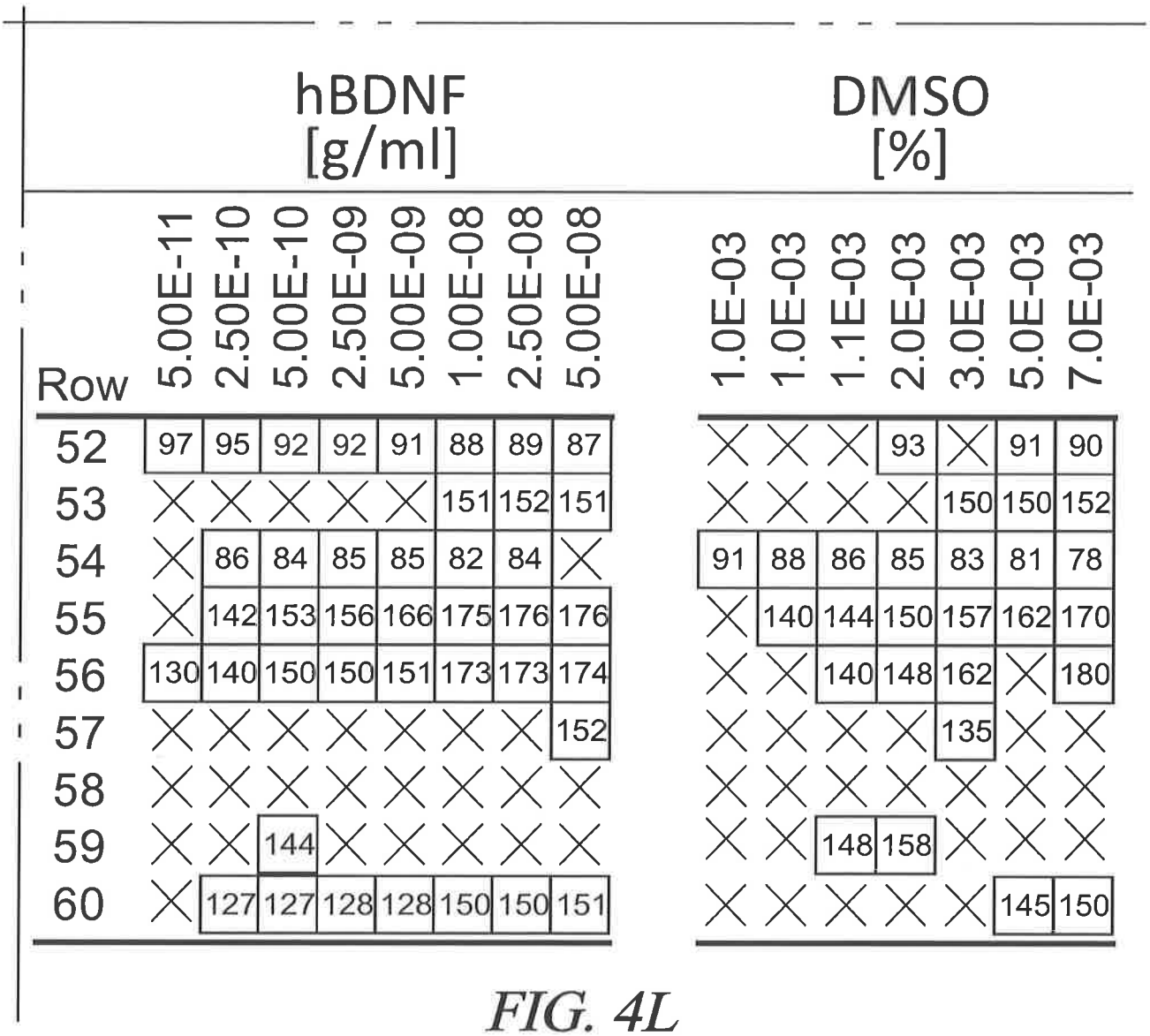

hBDNF [g/ml]
DMSO [%]
Row
5.00E-11
2.50E-10
5.00E-10
2.50E-09
5.00E-09
1.00E-08
2.50E-08
5.00E-08
1.0E-03
1.0E-03
1.1E-03
2.0E-03
3.0E-03
5.0E-03
7.0E-03
52 97 95 92 92 91 88 89 87 X X X 93 X 91 90
53 X X X X X 151 152 151 X X X X 150 150 152
54 X 86 84 85 85 82 84 X 91 88 86 85 83 81 78
55 X 142 153 156 166 175 176 176 X 140 144 150 157 162 170
56 130 140 150 150 151 173 173 174 X X 140 148 162 X 180
57 X X X X X X X 152 X X X X 135 X X
58 X X X X X X X X X X X X X X X
59 X X 144 X X X X X X X 148 158 X X X
60 X 127 127 128 128 150 150 151 X X X X X 145 150

FIG. 4L

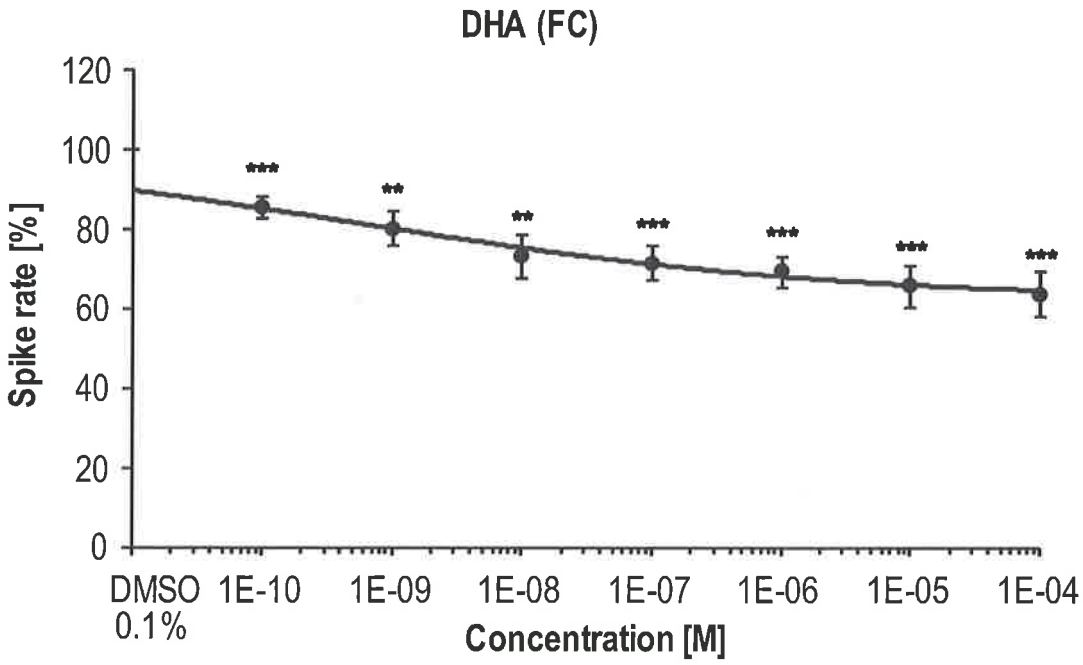

DHA (FC)
Spike rate [%]
120
100
80
60
40
20
0
***
**
**
***
***
***
***
DMSO 0.1%
1E-10
1E-09
1E-08
1E-07
1E-06
1E-05
1E-04
Concentration [M]

FIG. 5

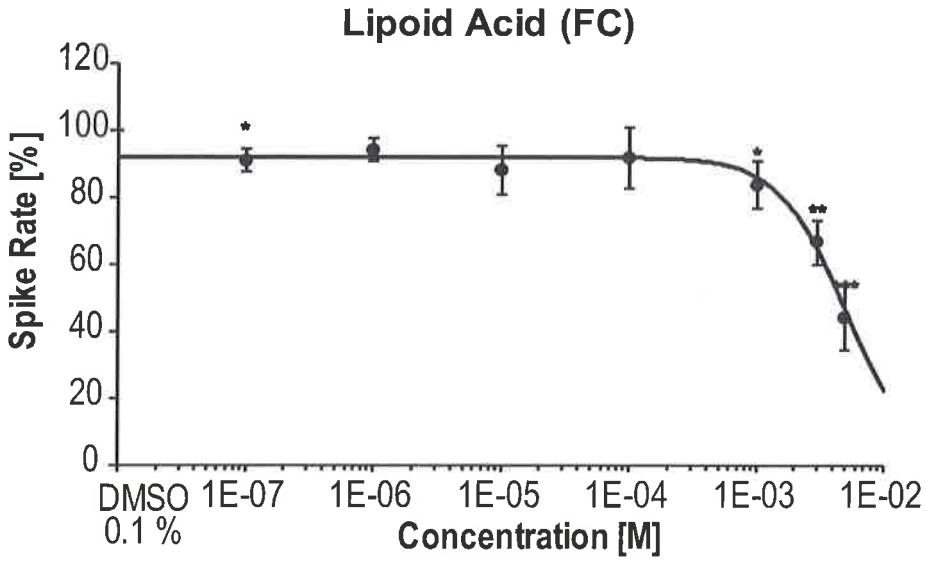

Lipoid Acid (FC)
Spike Rate [%]
120
100
80
60
40
20
0
*
*
**
**
DMSO 0.1 %
1E-07
1E-06
1E-05
1E-04
1E-03
1E-02
Concentration [M]

FIG. 6

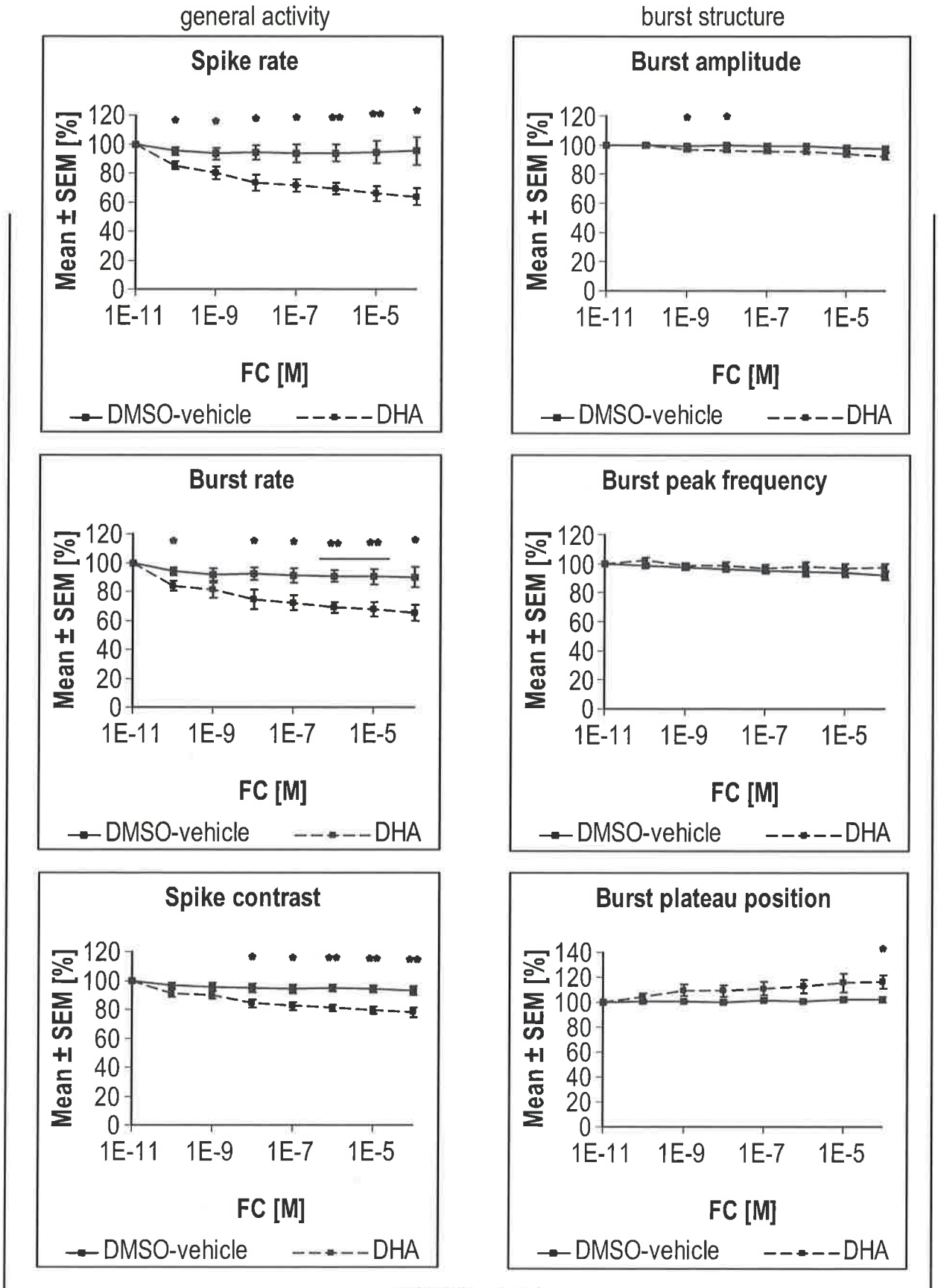

general activity
burst structure
Spike rate
Burst amplitude
Burst rate
Burst peak frequency
Spike contrast
Burst plateau position
Mean ± SEM [%]
FC [M]
1E-11
1E-9
1E-7
1E-5
DMSO-vehicle
DHA

FIG. 7A

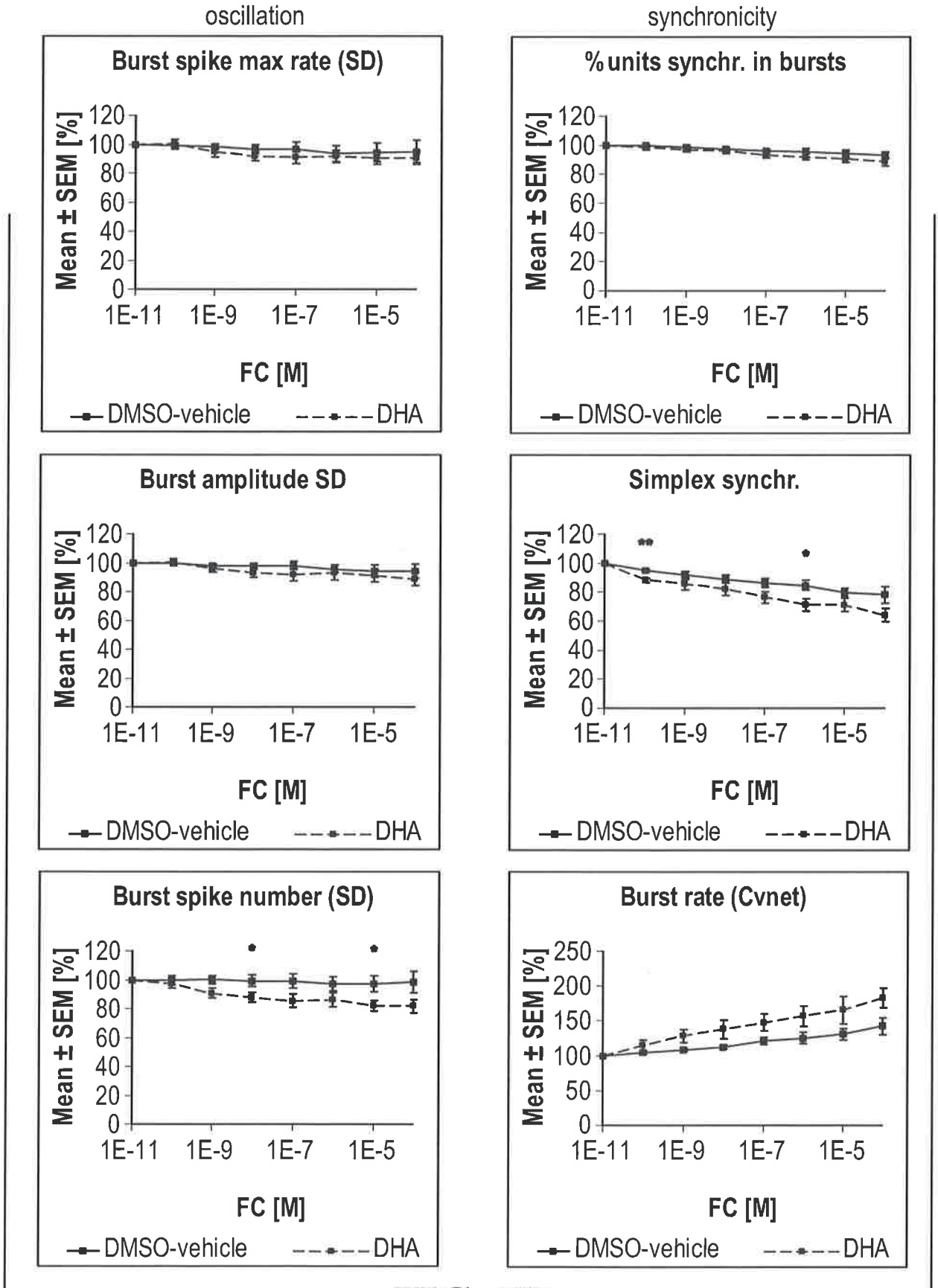

oscillation
synchronicity
Burst spike max rate (SD)
%units synchr. in bursts
Burst amplitude SD
Simplex synchr.
Burst spike number (SD)
Burst rate (Cvnet)
Mean ± SEM [%]
FC [M]
1E-11
1E-9
1E-7
1E-5
DMSO-vehicle
DHA

FIG. 7B

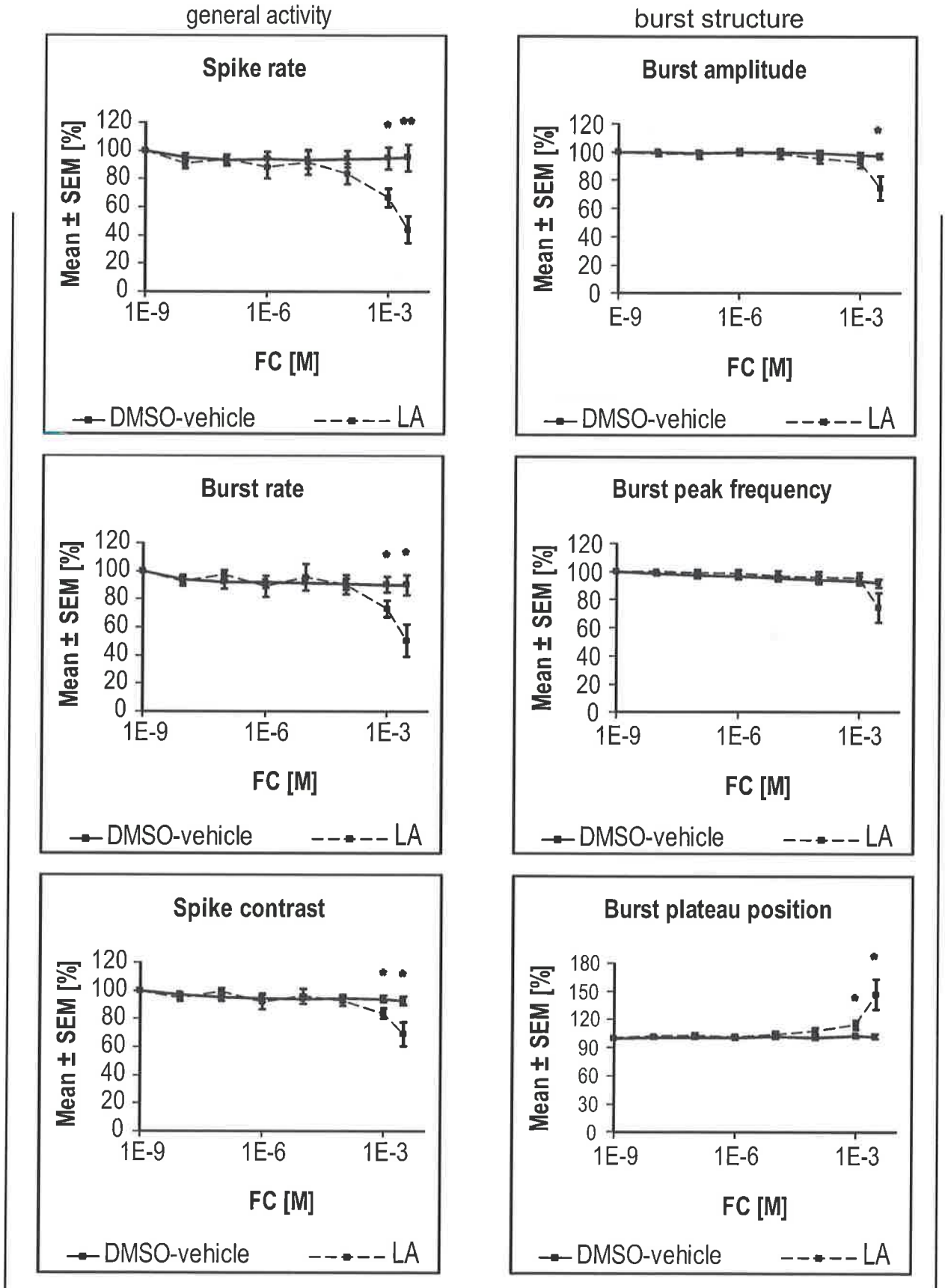

general activity
burst structure
Spike rate
Burst amplitude
Burst rate
Burst peak frequency
Spike contrast
Burst plateau position
Mean ± SEM [%]
FC [M]
1E-9
1E-6
1E-3
E-9
DMSO-vehicle
LA

FIG. 8A

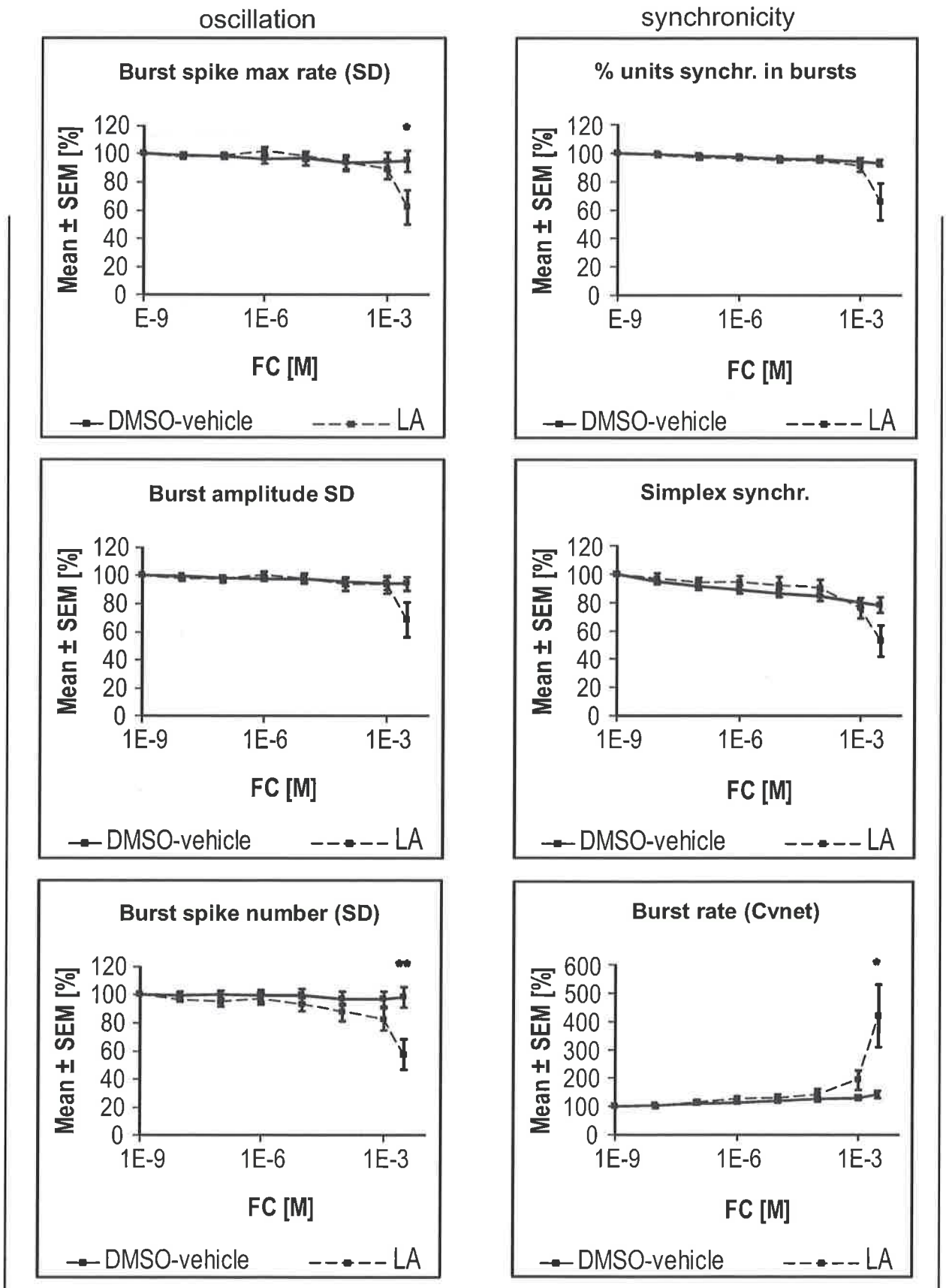

oscillation
synchronicity
Burst spike max rate (SD)
% units synchr. in bursts
Burst amplitude SD
Simplex synchr.
Burst spike number (SD)
Burst rate (Cvnet)
Mean ± SEM [%]
FC [M]
E-9
1E-6
1E-3
DMSO-vehicle
LA

FIG. 8B

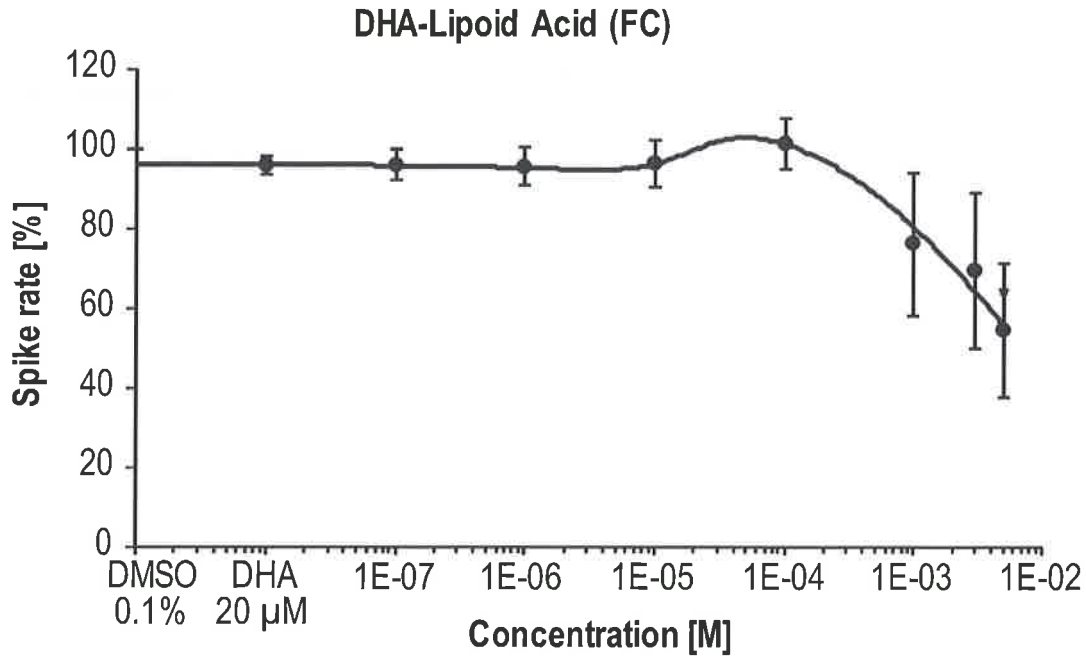

DHA-Lipoid Acid (FC)
Spike rate [%]
120
100
80
60
40
20
0
DMSO 0.1%
DHA 20 µM
1E-07
1E-06
1E-05
1E-04
1E-03
1E-02
Concentration [M]

FIG. 9

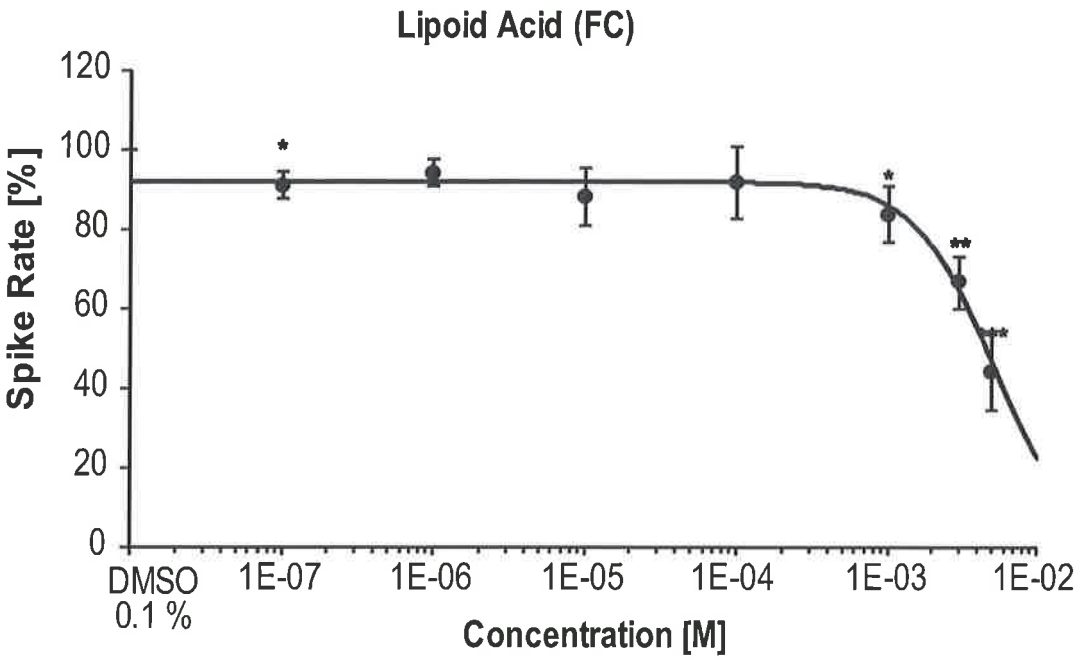

Lipoid Acid (FC)
Spike Rate [%]
120
100
80
60
40
20
0
*
*
**
**
DMSO 0.1 %
1E-07
1E-06
1E-05
1E-04
1E-03
1E-02
Concentration [M]

FIG. 10

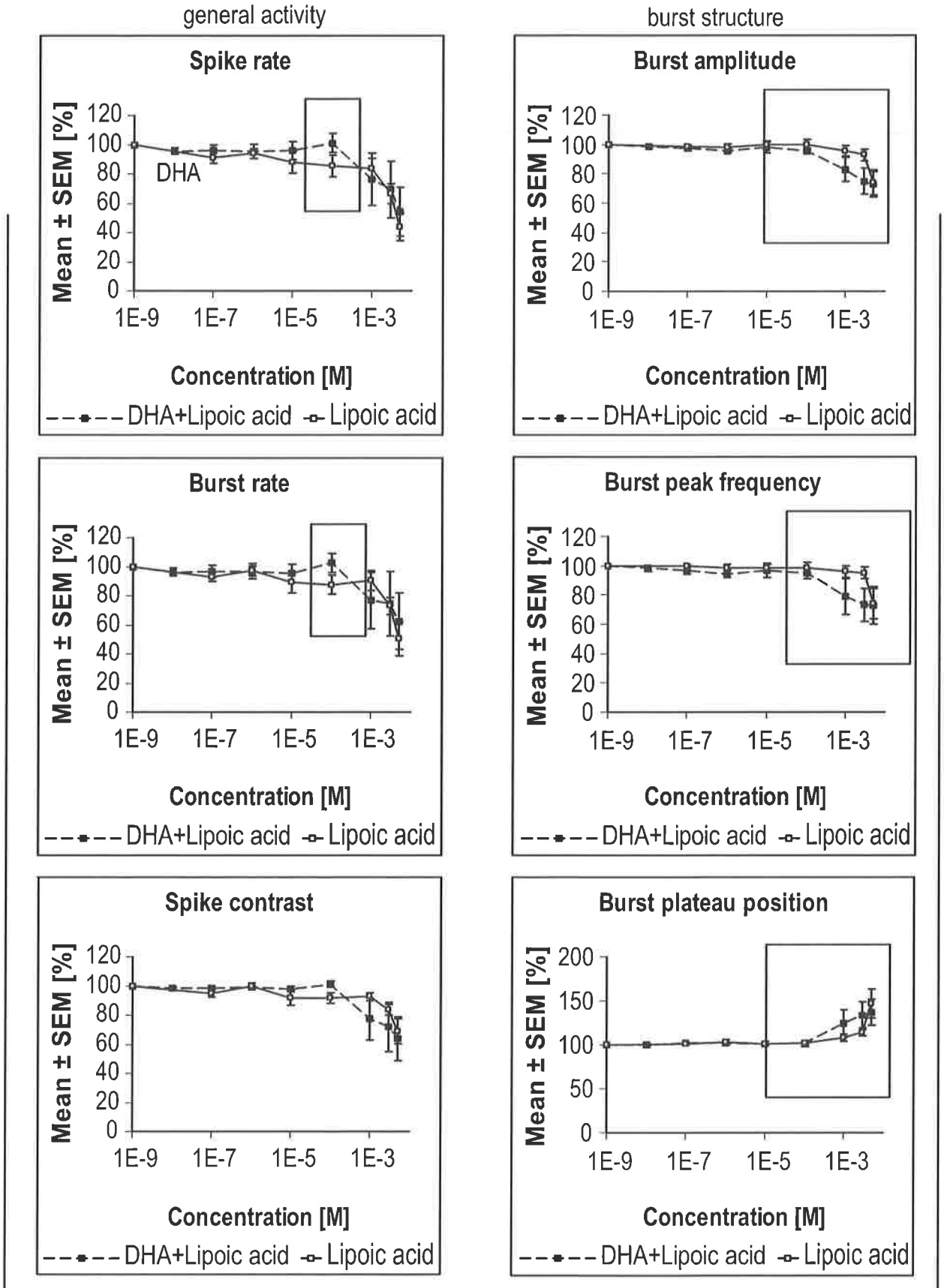

general activity
burst structure
Spike rate
Burst amplitude
Burst rate
Burst peak frequency
Spike contrast
Burst plateau position
Mean ± SEM [%]
Concentration [M]
DHA
DHA+Lipoic acid
Lipoic acid
1E-9
1E-7
1E-5
1E-3

FIG. 11A

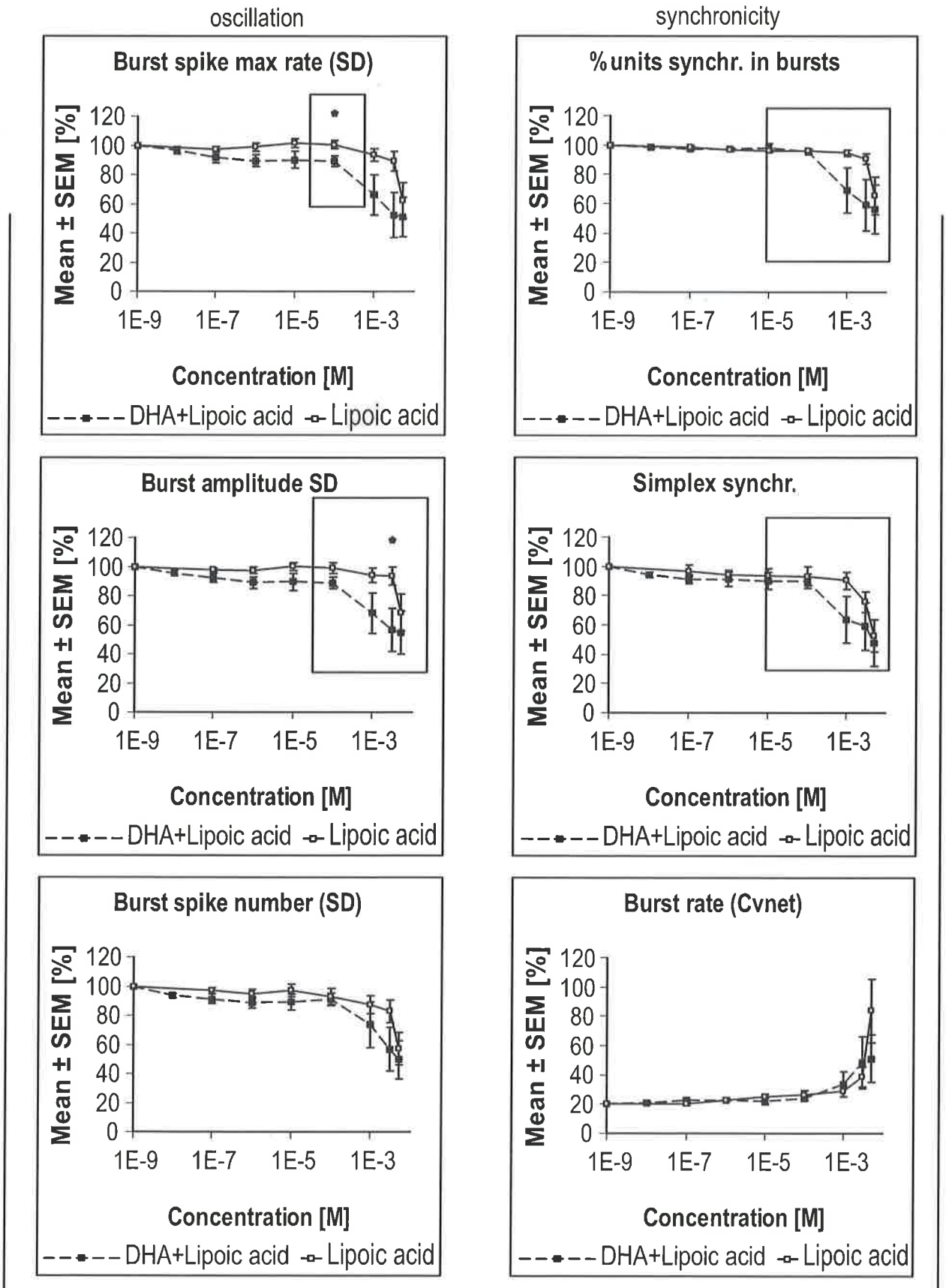

oscillation
synchronicity
Burst spike max rate (SD)
%units synchr. in bursts
Burst amplitude SD
Simplex synchr.
Burst spike number (SD)
Burst rate (Cvnet)
Mean ± SEM [%]
120
100
80
60
40
20
0
1E-9
1E-7
1E-5
1E-3
Concentration [M]
DHA+Lipoic acid
Lipoic acid

FIG. 11B

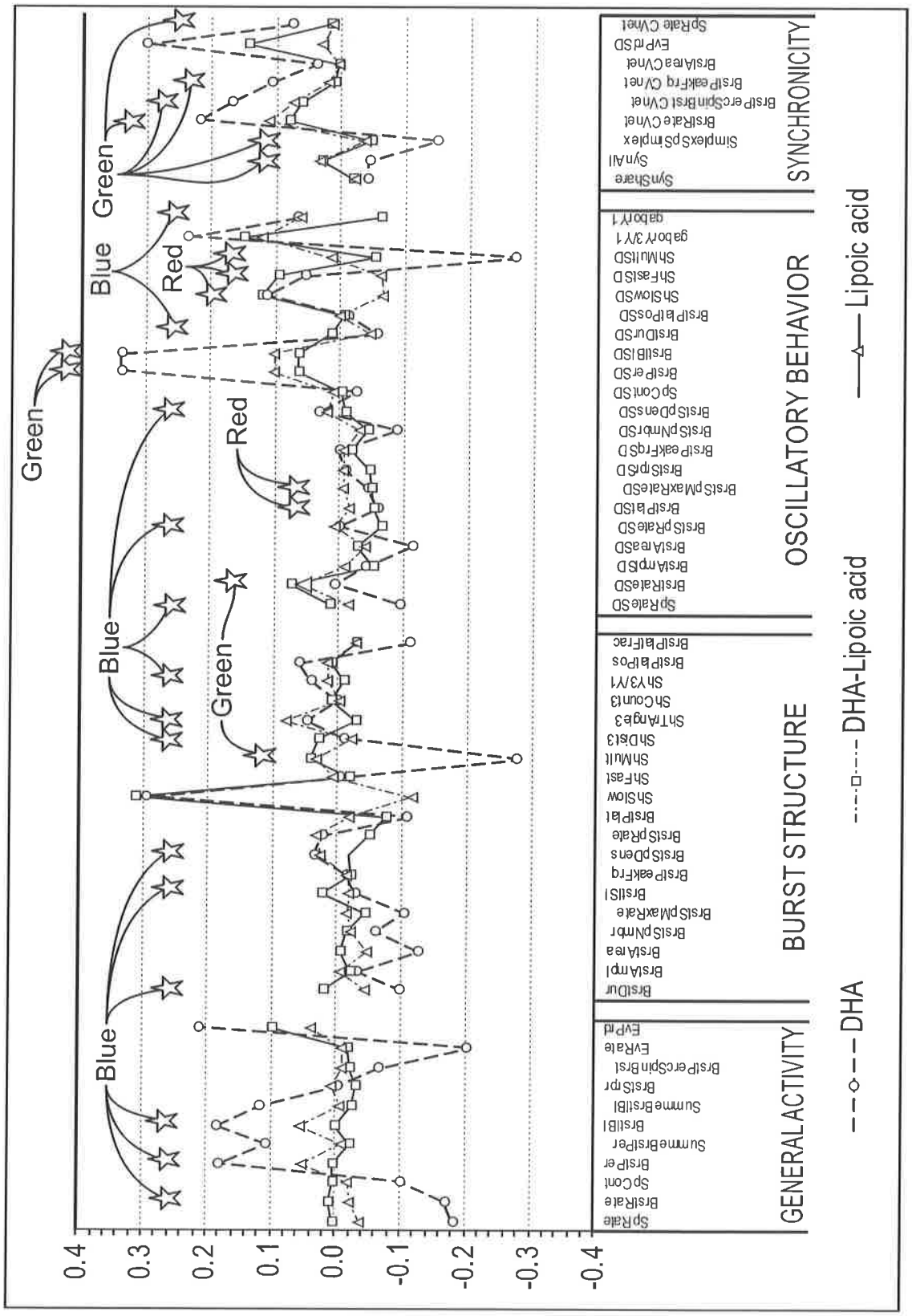

Green
Blue
Green
Blue
Red
Green
Blue
Red
Green
Blue
0.4
0.3
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4
SpRate
BrstRate
SpCont
BrstPer
SummeBrstPer
BrstBl
SummeBrstBl
BrstSpr
BrstPercSpinBrst
EvRate
EvPrd
GENERALACTIVITY
BrstDur
BrstAmpl
BrstArea
BrstSpNmbr
BrstSpMaxRate
BrstISI
BrstPeakFrq
BrstSpDens
BrstSpRate
BrstPkl
ShSlow
ShFast
ShMult
ShDist3
ShTrAngle3
ShCount3
Sh Y3/Y1
BrstPkPos
BrstPkFrac
BURST STRUCTURE
SpRateSD
BrstRateSD
BrstAmpSD
BrstAreaSD
BrstSpRateSD
BrstPklSD
BrstSpMaxRateSD
BrstSpISD
BrstPeakFrqSD
BrstSpNmbrSD
BrstSpDensSD
SpContSD
BrstPerSD
BrstBlSD
BrstDurSD
BrstPkPosSD
ShSlowSD
ShFastSD
ShMultSD
gabor Y3/Y1
gabor Y1
OSCILLATORY BEHAVIOR
SynShare
SynAll
SimplexSpSimplex
BrstRateCVnet
BrstPercSpinBrstCVnet
BrstPeakFrqCVnet
BrstAreaCVnet
EvPrdSD
SpRateCVnet
SYNCHRONICITY
DHA
DHA-Lipoic acid
Lipoic acid

FIG. 12A

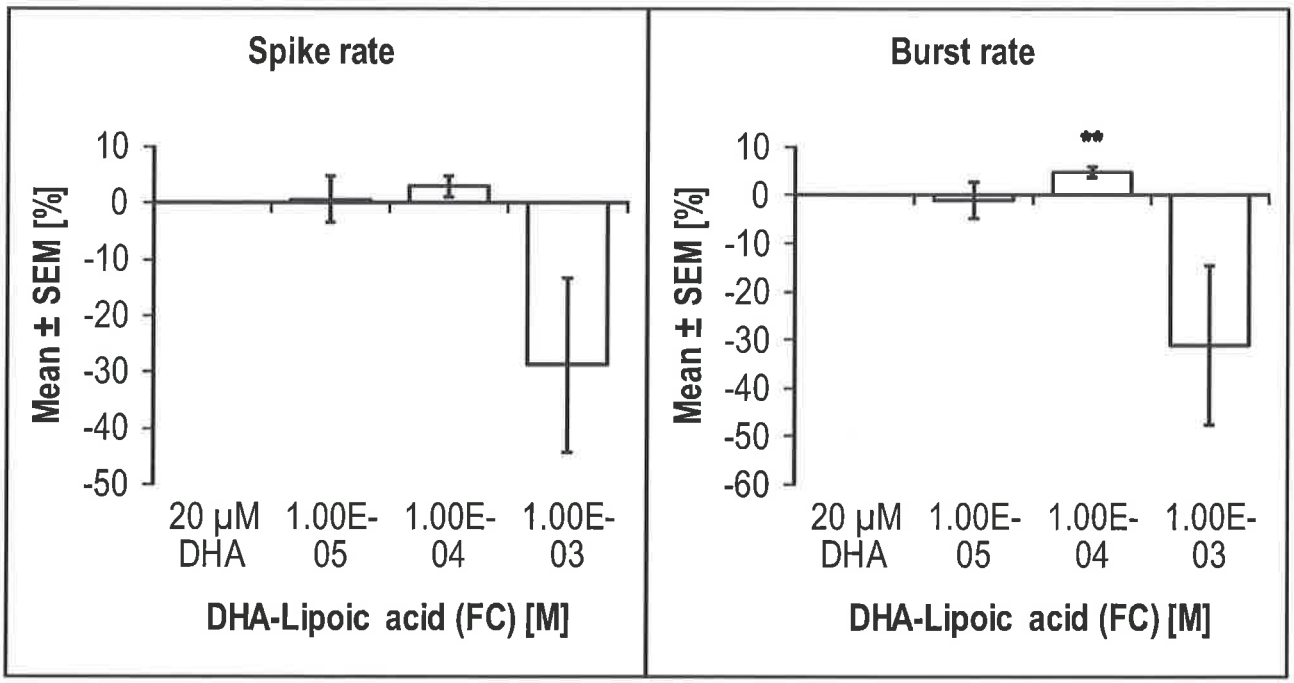

Spike rate
Mean ± SEM [%]
10
0
-10
-20
-30
-40
-50
20 µM DHA
1.00E-05
1.00E-04
1.00E-03
DHA-Lipoic acid (FC) [M]
Burst rate
Mean ± SEM [%]
**
10
0
-10
-20
-30
-40
-50
-60
20 µM DHA
1.00E-05
1.00E-04
1.00E-03
DHA-Lipoic acid (FC) [M]

FIG. 12B

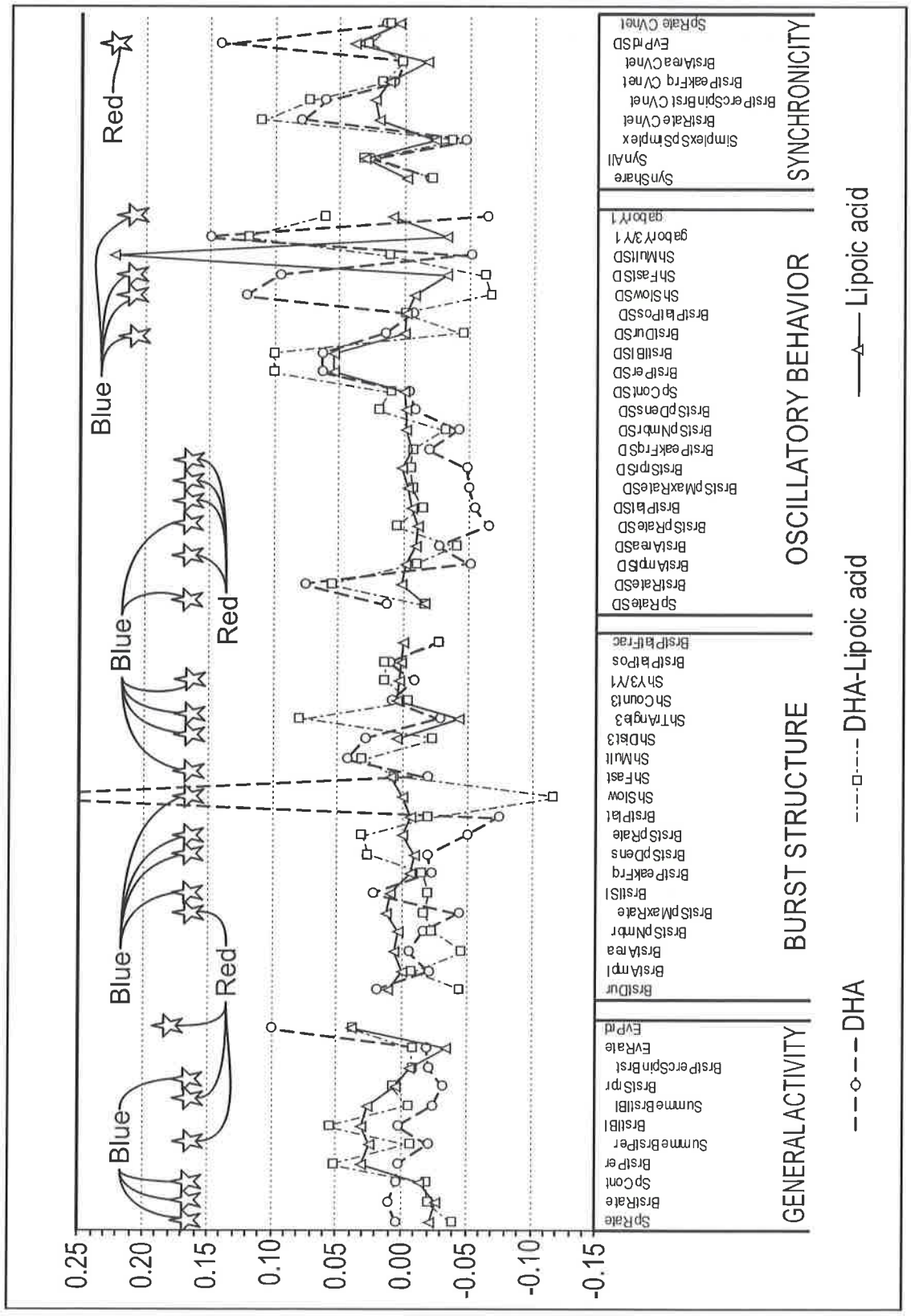

0.25
0.20
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
Blue
Red
Blue
Red
Blue
Red
Blue
Red
SpRate
BrstRate
SpCont
BrstPer
SummeBrstPer
BrstIBI
SummeBrstIBI
BrstSpr
BrstPerCSpnBrst
EvRate
EvPrd
BrstDur
BrstAmpl
BrstArea
BrstSpNmbr
BrstSpMaxRate
BrstSI
BrstPeakFrq
BrstSpDens
BrstSpRate
BrstPBal
ShSlow
ShFast
ShMult
ShDbl3
ShTrAngb3
ShCount3
Sh3/Y1
BrstPkPos
BrstPkFrac
SpRateSD
BrstRateSD
BrstAmpSD
BrstAreaSD
BrstSpRateSD
BrstPBalSD
BrstSpMaxRateSD
BrstSpISD
BrstPeakFrqSD
BrstSpNmbrSD
BrstSpDensSD
SpContSD
BrstPerSD
BrstIBISD
BrstDurSD
BrstPkPosSD
ShSlowSD
ShFastSD
ShMultSD
gabor3/Y1
gabor/Y1
SyncShare
SynAll
SimplexSPSimplex
BrstRateCVnet
BrstPercSpnBrstCVnet
BrstPeakFrqCVnet
BrstAreaCVnet
EvPrdSD
SpRateCVnet
GENERALACTIVITY
BURST STRUCTURE
OSCILLATORY BEHAVIOR
SYNCHRONICITY
DHA
DHA-Lipoic acid
Lipoic acid

FIG. 12C

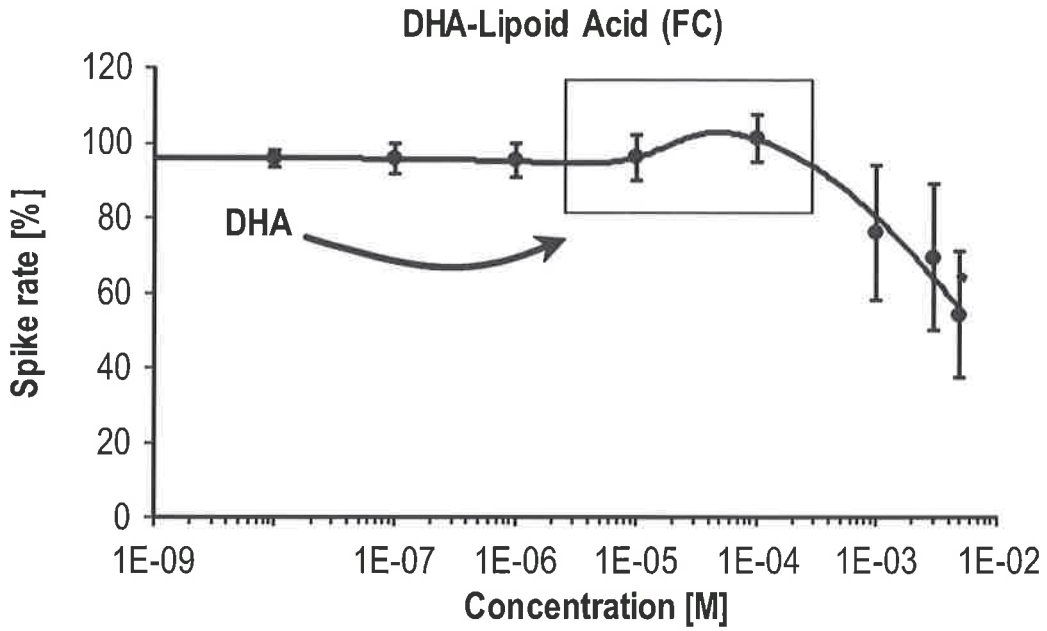


FIG. 13A

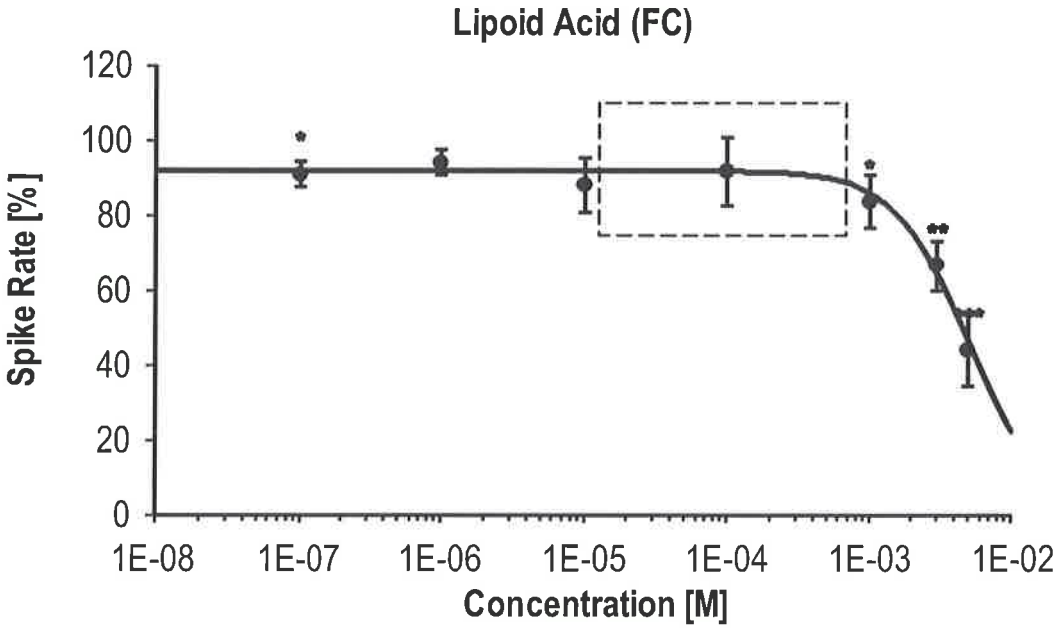


FIG. 13B

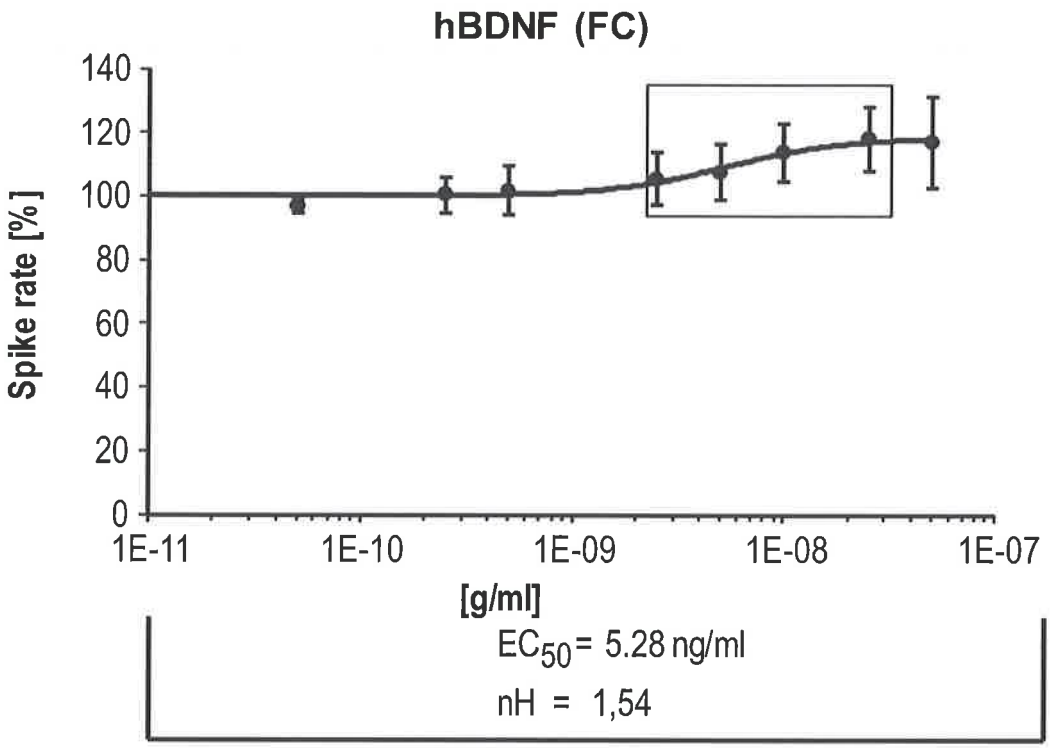


FIG. 13C

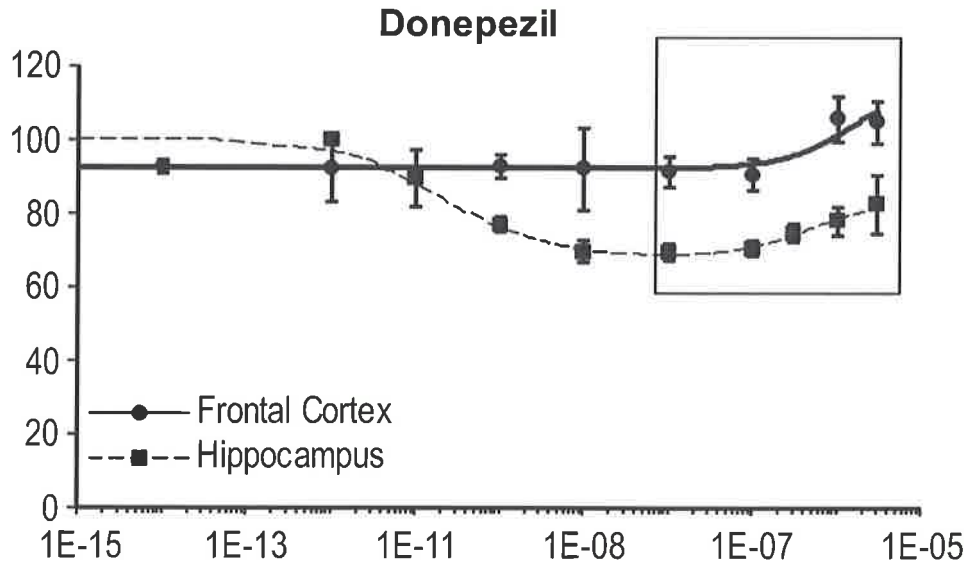


FIG. 13D

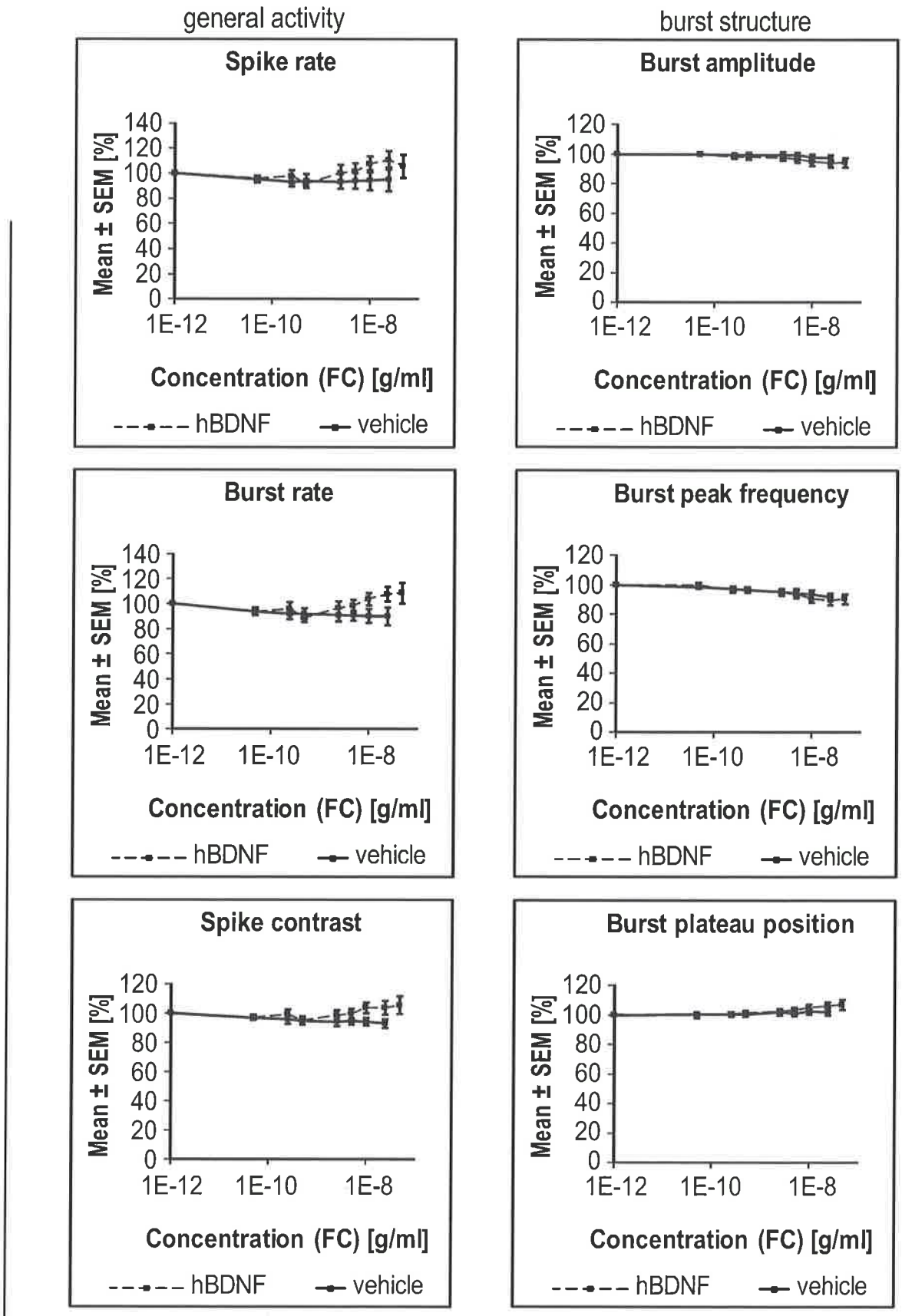

general activity
burst structure
Spike rate
Burst amplitude
Burst rate
Burst peak frequency
Spike contrast
Burst plateau position
Mean ± SEM [%]
Concentration (FC) [g/ml]
1E-12
1E-10
1E-8
hBDNF
vehicle

FIG. 14A

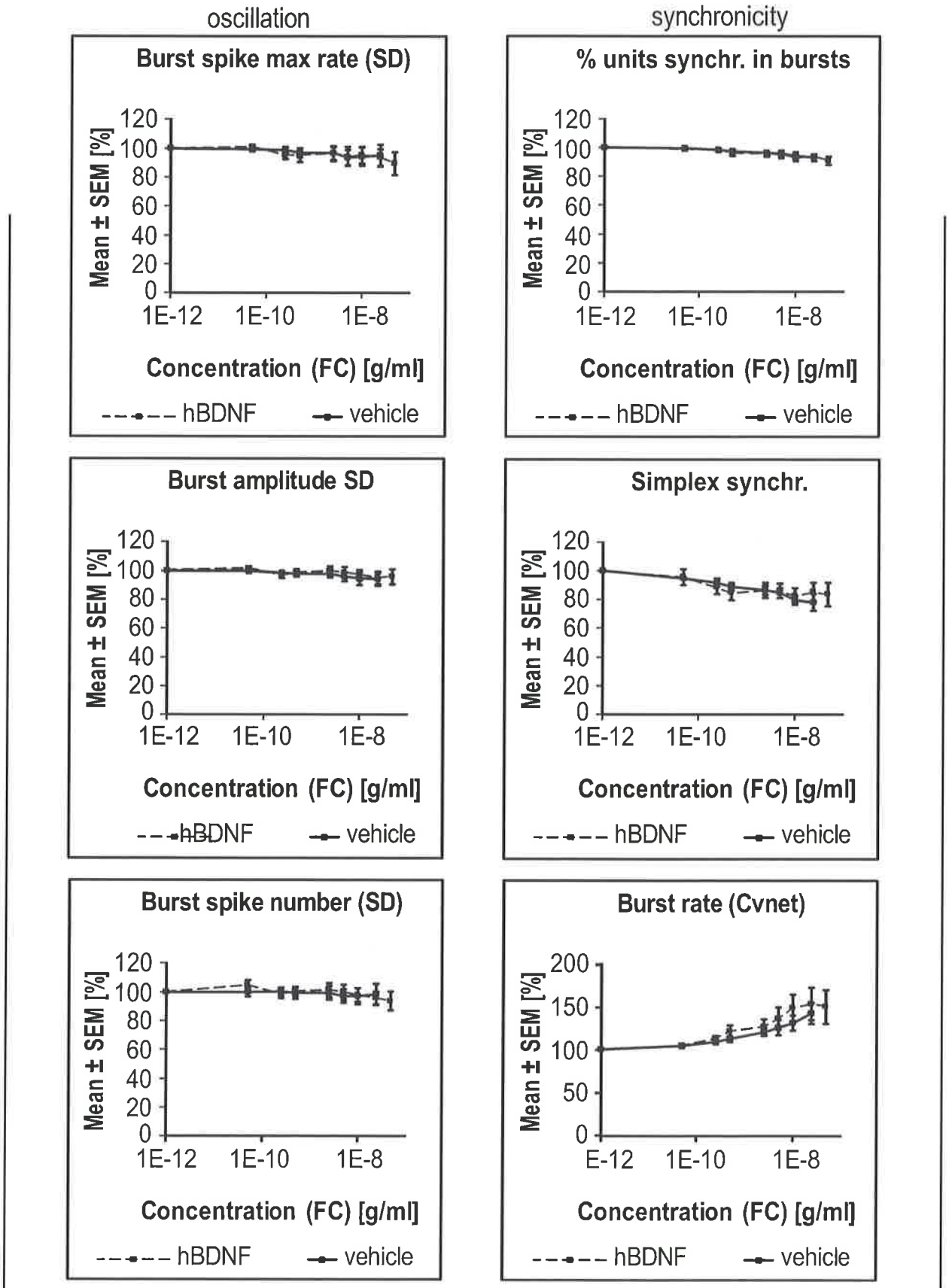

oscillation
synchronicity
Burst spike max rate (SD)
% units synchr. in bursts
Burst amplitude SD
Simplex synchr.
Burst spike number (SD)
Burst rate (Cvnet)
Mean ± SEM [%]
120
100
80
60
40
20
0
200
150
50
1E-12
1E-10
1E-8
E-12
Concentration (FC) [g/ml]
hBDNF
vehicle

FIG. 14B

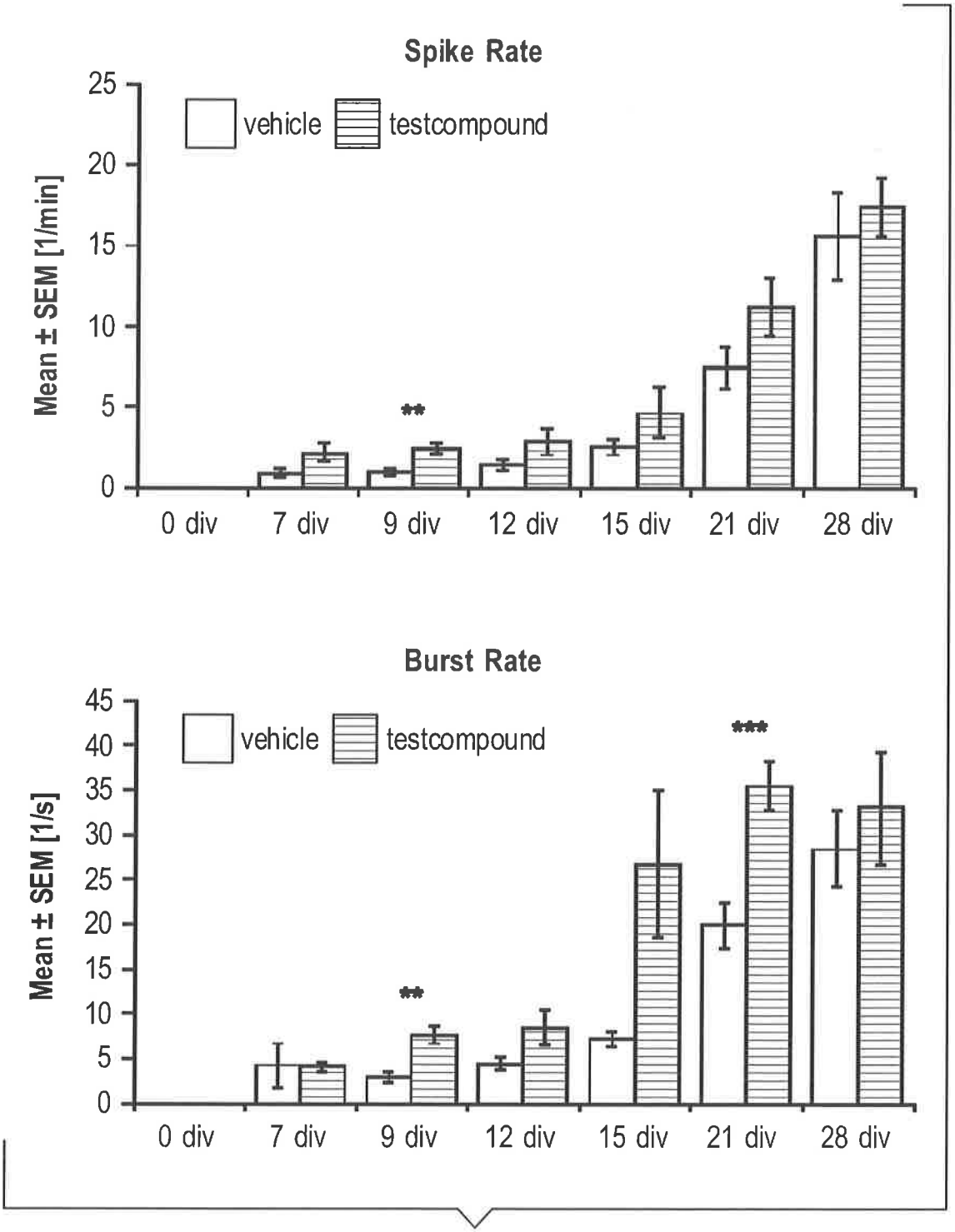

Spike Rate
vehicle
testcompound
Mean ± SEM [1/min]
25
20
15
10
5
0
**
0 div
7 div
9 div
12 div
15 div
21 div
28 div
Burst Rate
vehicle
testcompound
Mean ± SEM [1/s]
45
40
35
30
25
20
15
10
5
0
**
***
0 div
7 div
9 div
12 div
15 div
21 div
28 div

FIG. 15