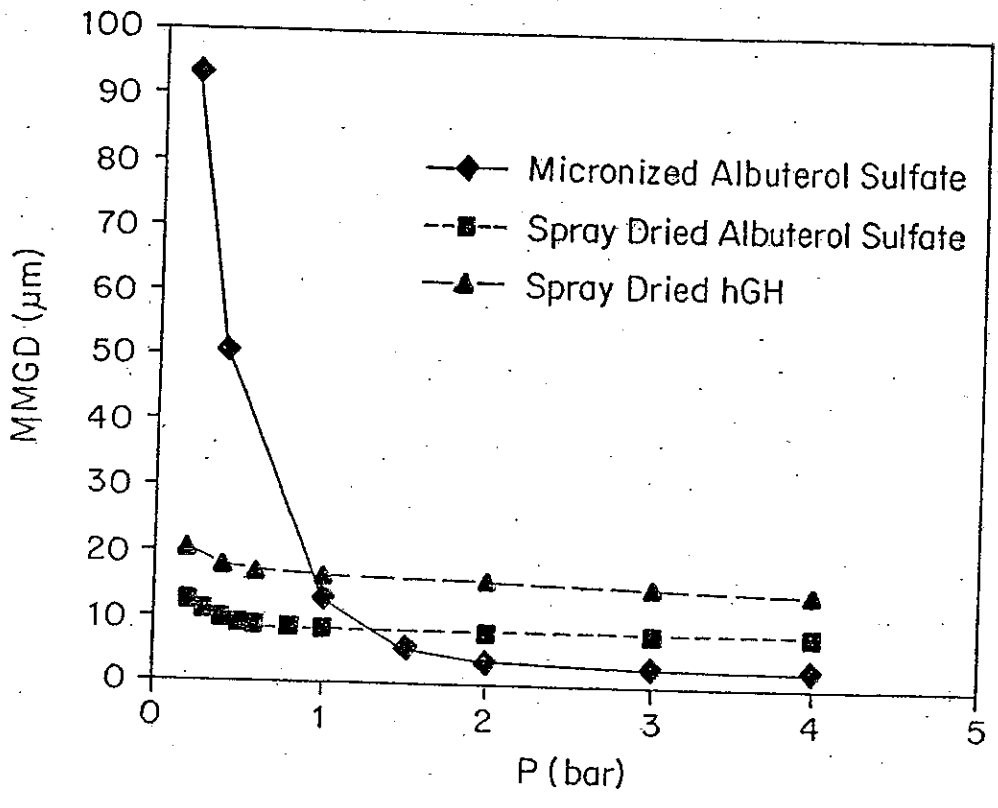

100
90
80
70
60
50
40
30
20
10
0
MMGD (μm)
0
1
2
3
4
5
P (bar)
Micronized Albuterol Sulfate
Spray Dried Albuterol Sulfate
Spray Dried hGH

FIG. 1

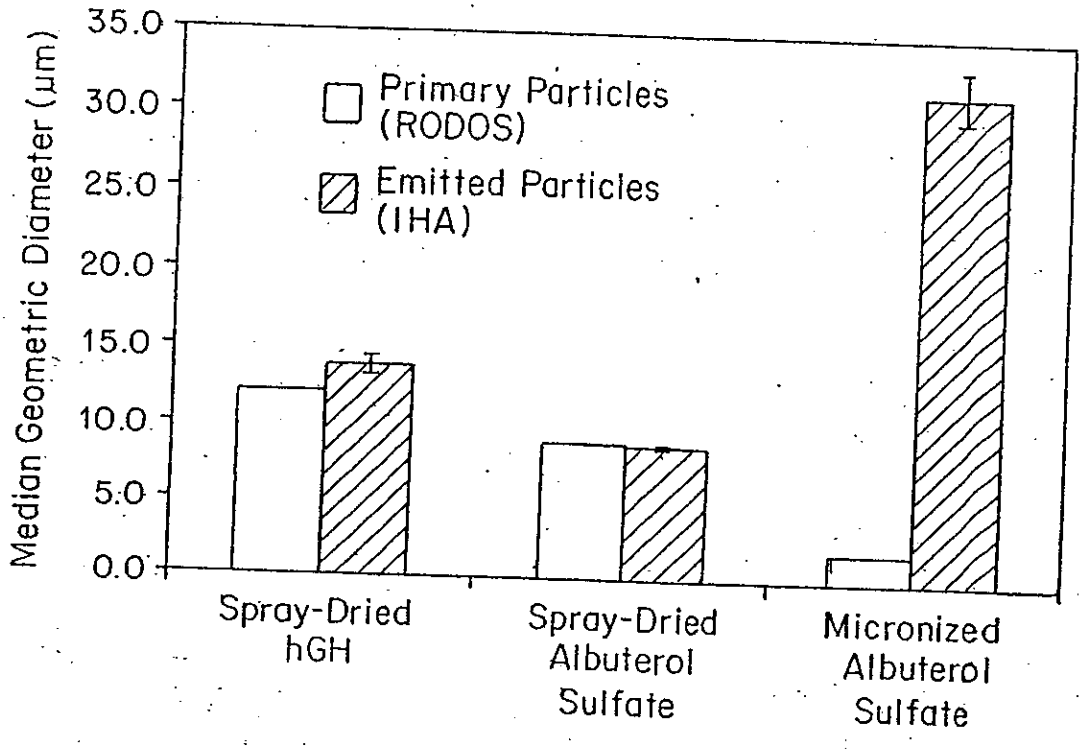

Median Geometric Diameter (µm)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Primary Particles (RODOS)
Emitted Particles (IHA)
Spray-Dried hGH
Spray-Dried Albuterol Sulfate
Micronized Albuterol Sulfate

FIG. 2A

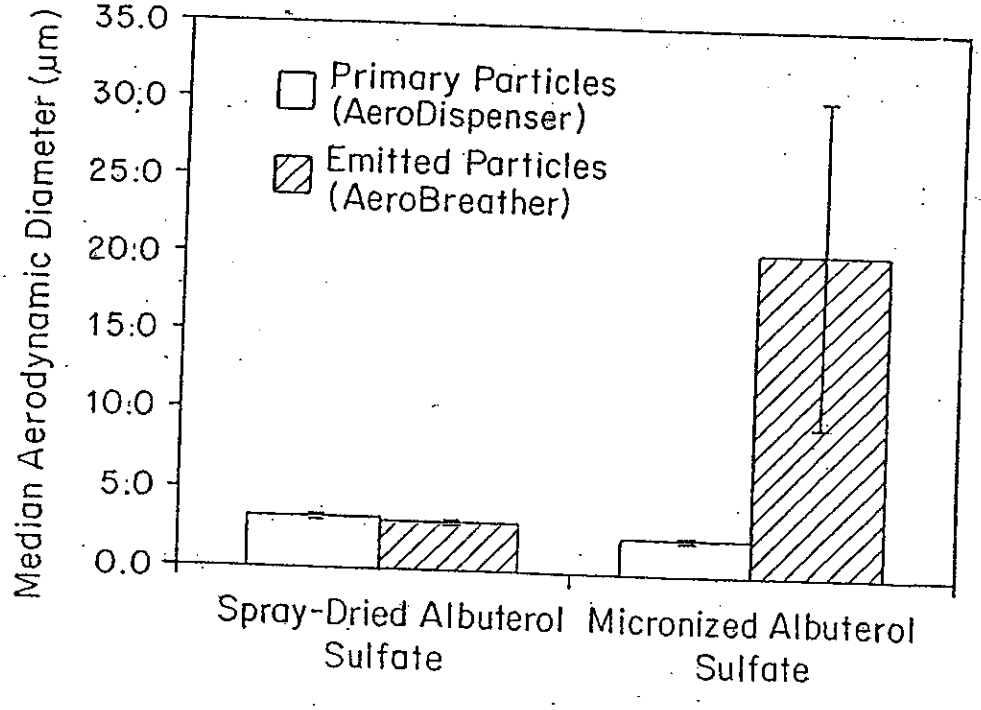

Median Aerodynamic Diameter (µm)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Primary Particles (AeroDispenser)
Emitted Particles (AeroBreather)
Spray-Dried Albuterol Sulfate
Micronized Albuterol Sulfate

FIG. 2B

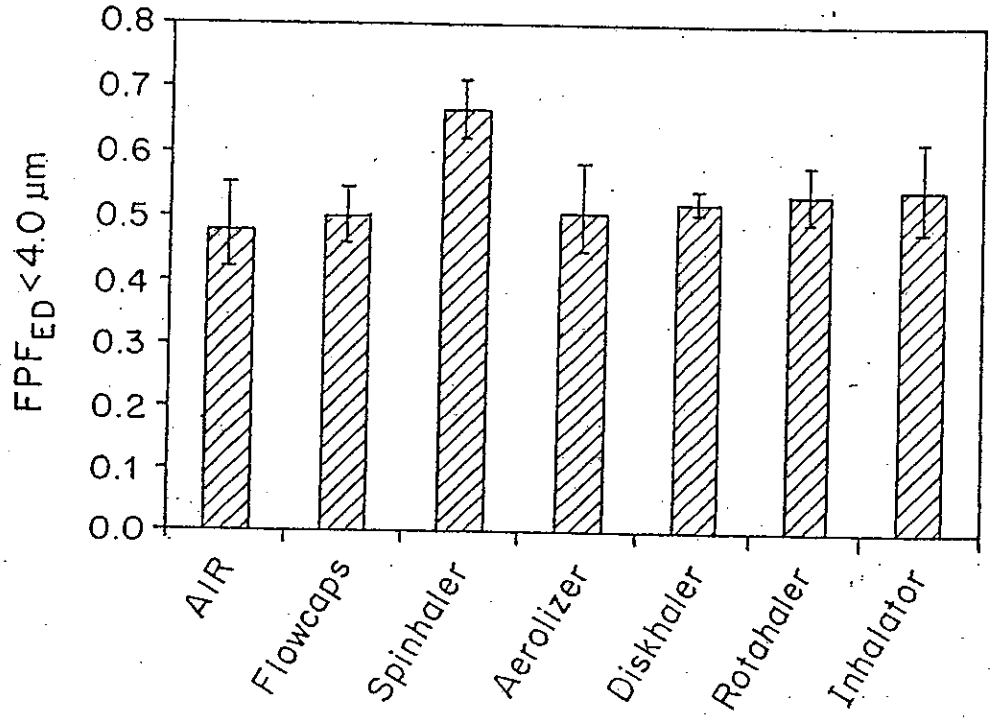

0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
FPF$_{ED}$<4.0 µm
AIR
Flowcaps
Spinhaler
Aerolizer
Diskhaler
Rotahaler
Inhalator

FIG. 3

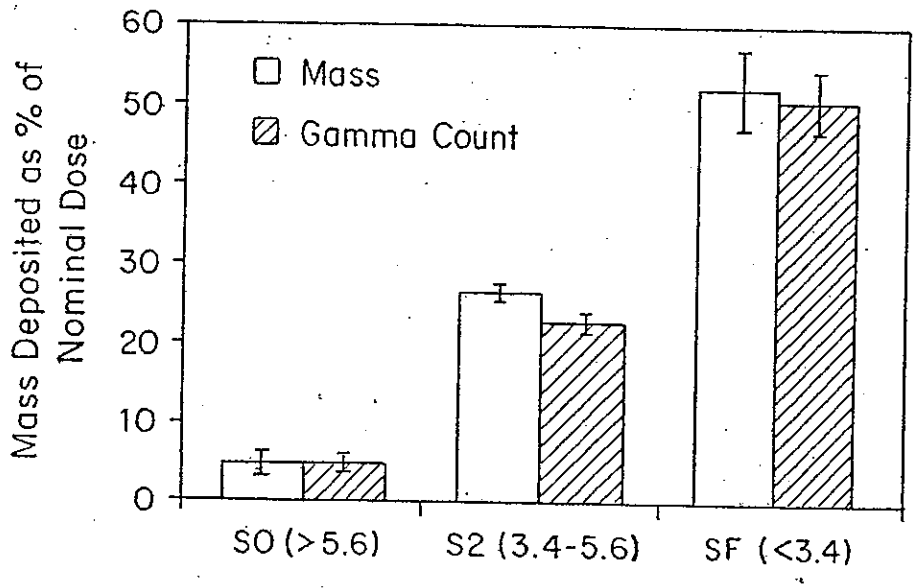

60
50
40
30
20
10
0
Mass Deposited as % of Nominal Dose
Mass
Gamma Count
S0 (>5.6)
S2 (3.4-5.6)
SF (<3.4)

FIG. 4

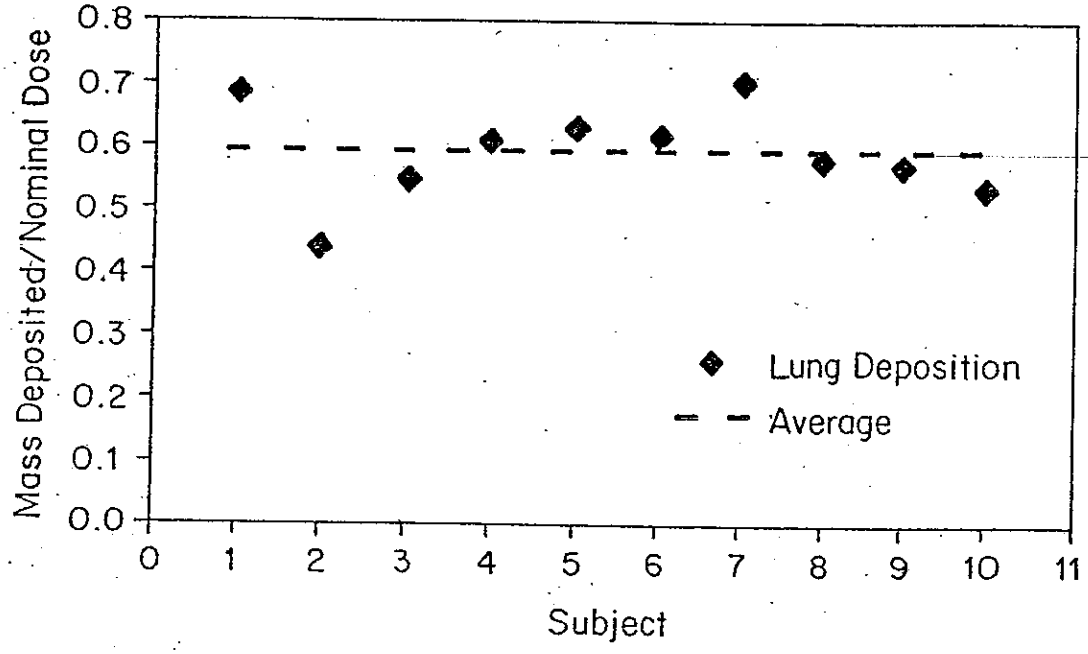

Mass Deposited/Nominal Dose
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
1
2
3
4
5
6
7
8
9
10
11
Subject
Lung Deposition
Average

FIG. 5

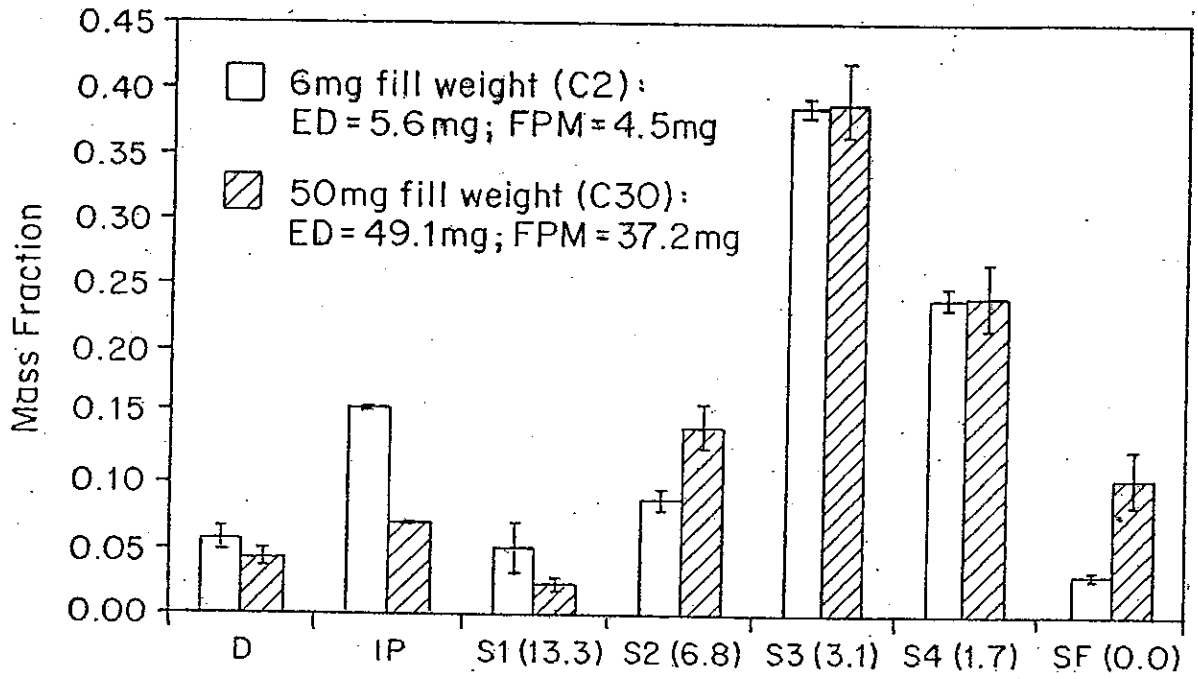

0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Mass Fraction
6mg fill weight (C2):
ED = 5.6mg; FPM = 4.5mg
50mg fill weight (C30):
ED = 49.1mg; FPM = 37.2mg
D
IP
S1 (13.3)
S2 (6.8)
S3 (3.1)
S4 (1.7)
SF (0.0)

FIG. 6

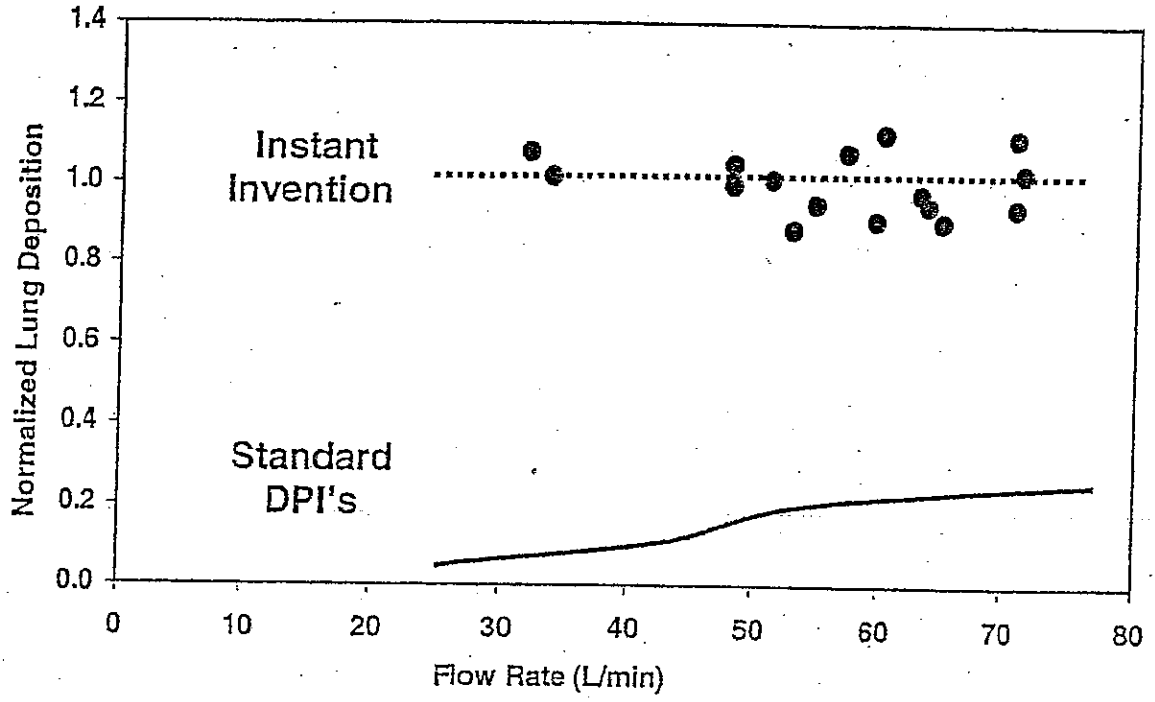

Normalized Lung Deposition
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Instant
Invention
Standard
DPI's
0
10
20
30
40
50
60
70
80
Flow Rate (L/min)

FIG. 7

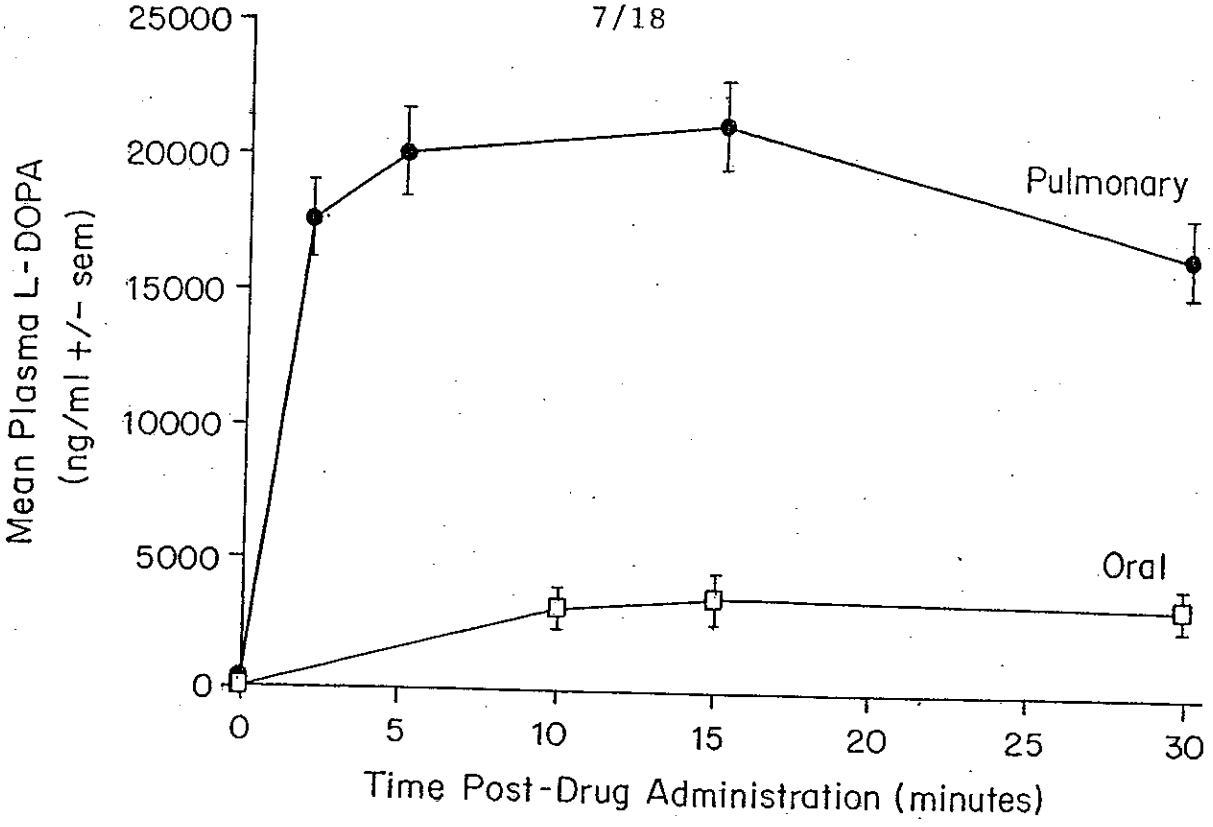

25000
20000
15000
10000
5000
0
Mean Plasma L-DOPA
(ng/ml +/- sem)
Pulmonary
Oral
0
5
10
15
20
25
30
Time Post-Drug Administration (minutes)

FIG. 8

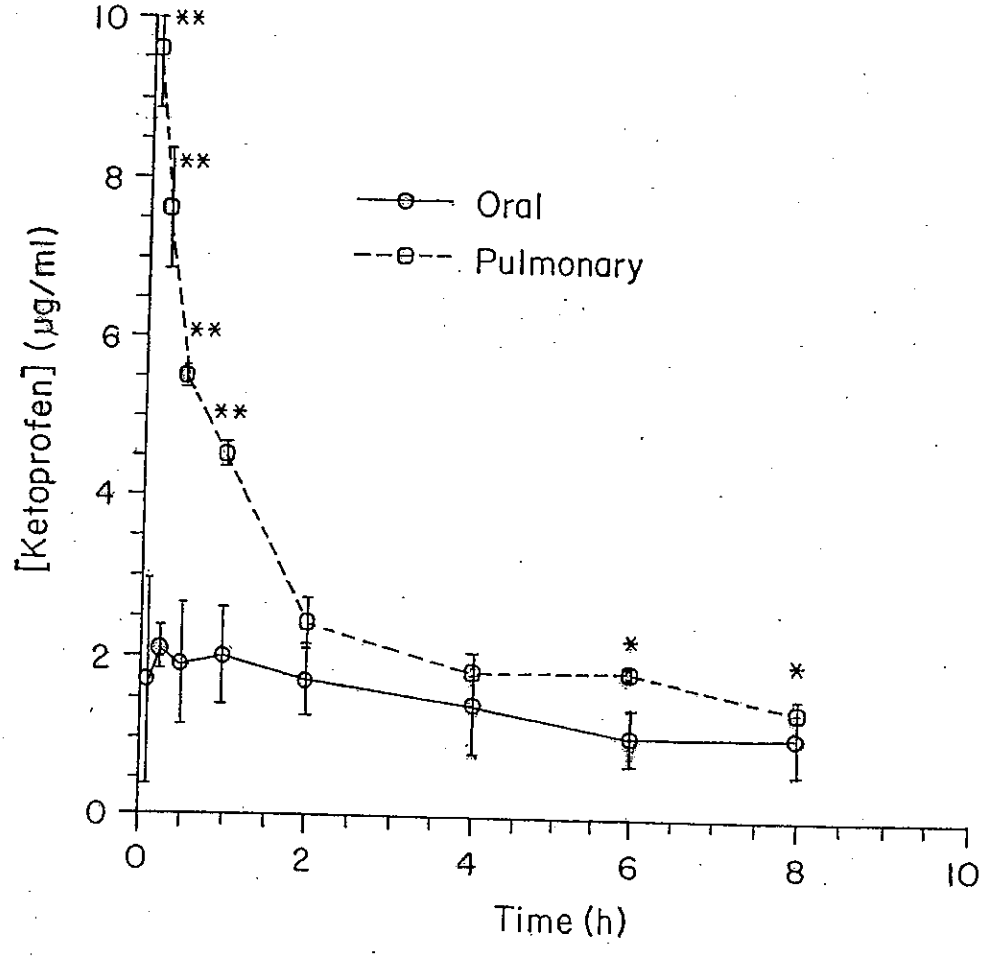

10
8
6
4
2
0
[Ketoprofen] (µg/ml)
**
**
**
**
Oral
Pulmonary
*
*
0
2
4
6
8
10
Time (h)

FIG. 9

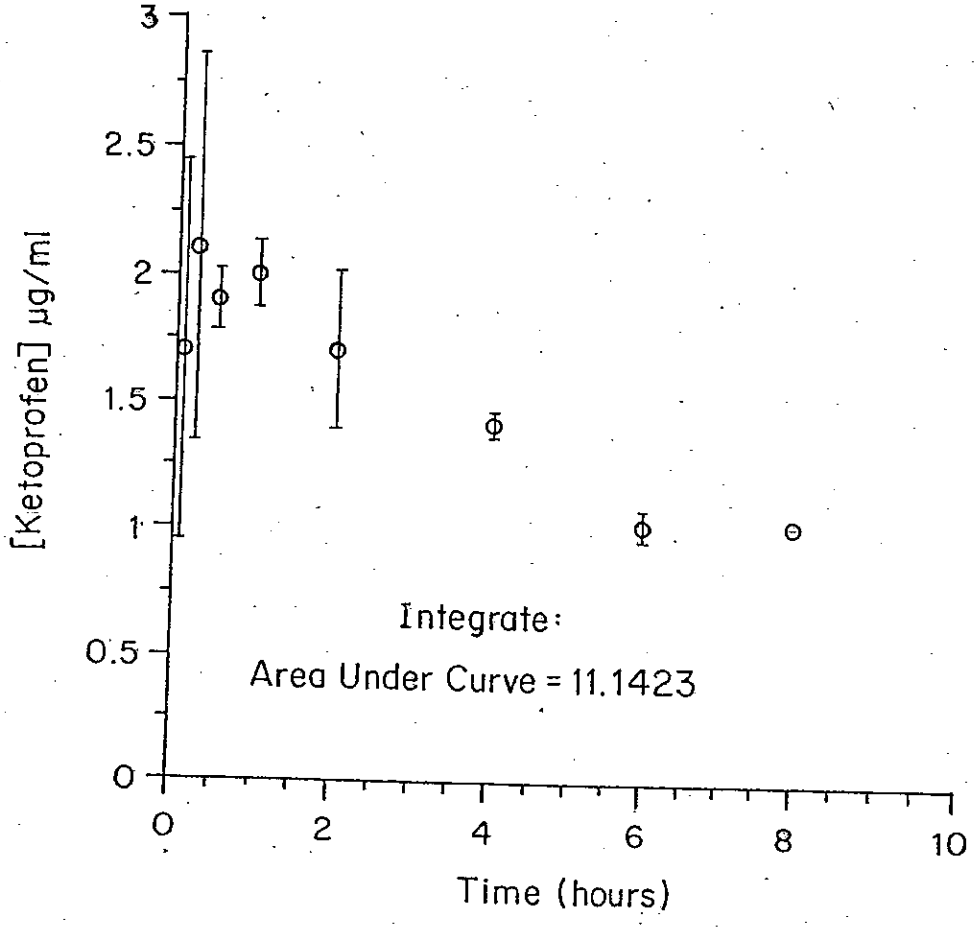

[Ketoprofen] µg/ml
3
2.5
2
1.5
1
0.5
0
0
2
4
6
8
10
Time (hours)
Integrate:
Area Under Curve = 11.1423

FIG. 10

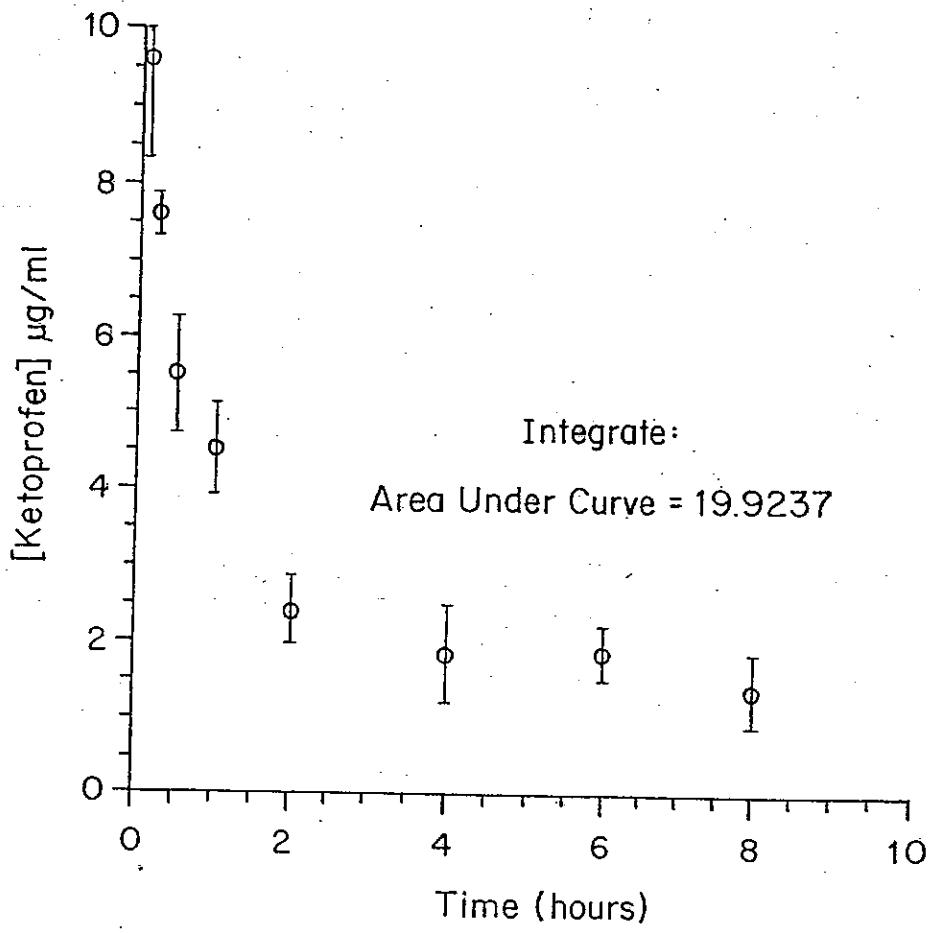

[Ketoprofen] µg/ml
10
8
6
4
2
0
0
2
4
6
8
10
Time (hours)
Integrate:
Area Under Curve = 19.9237

FIG. 11

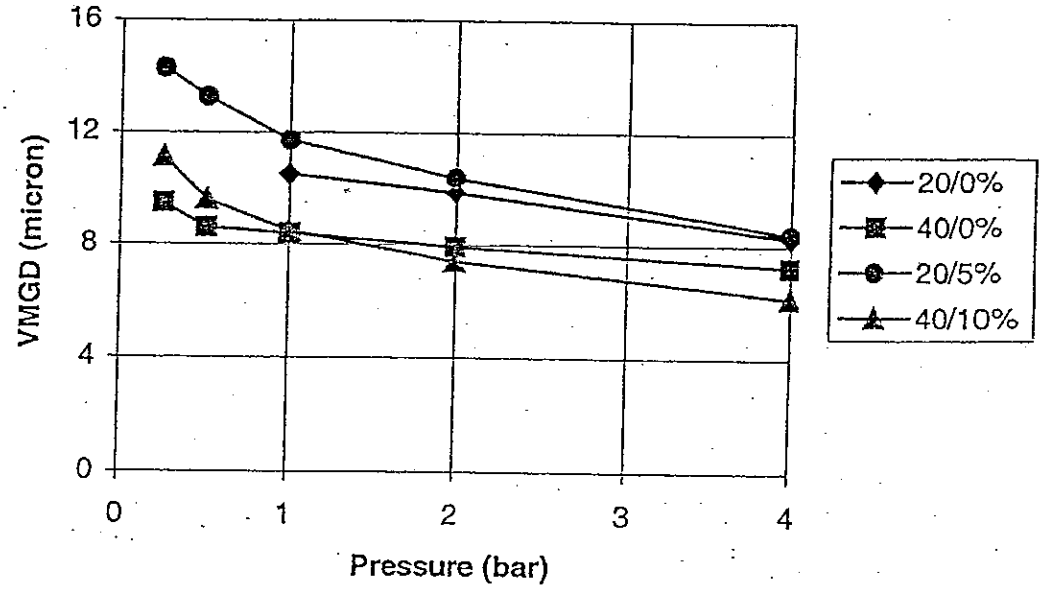


FIG. 12

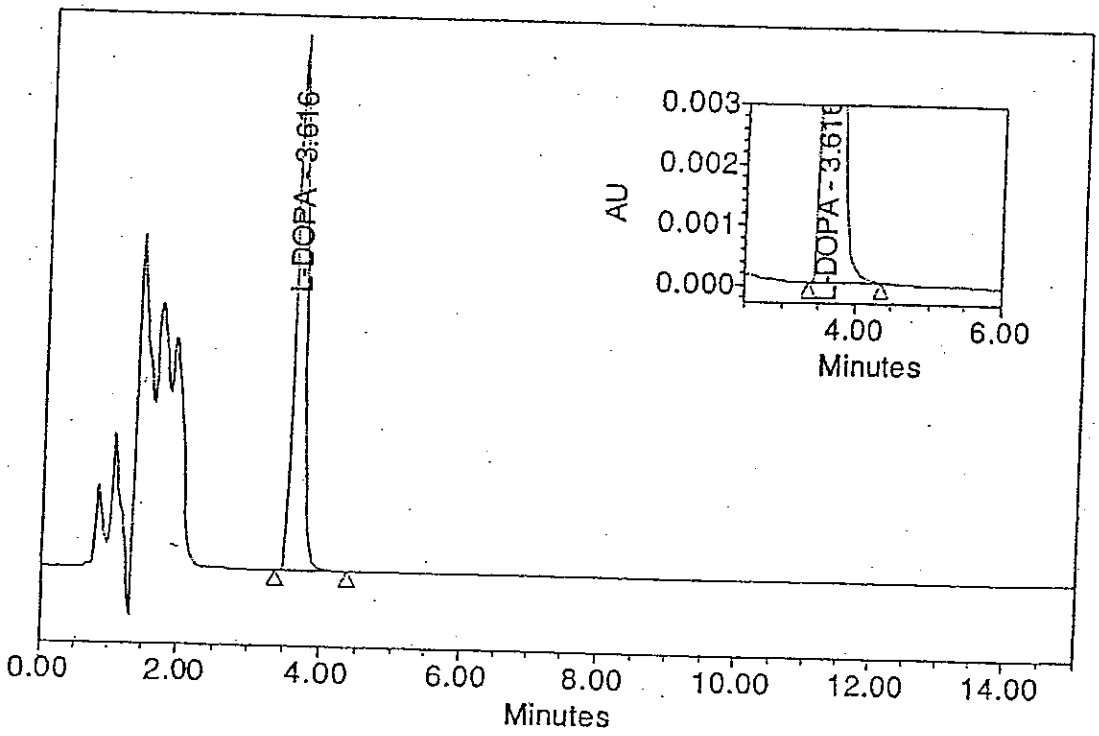


FIG. 13A

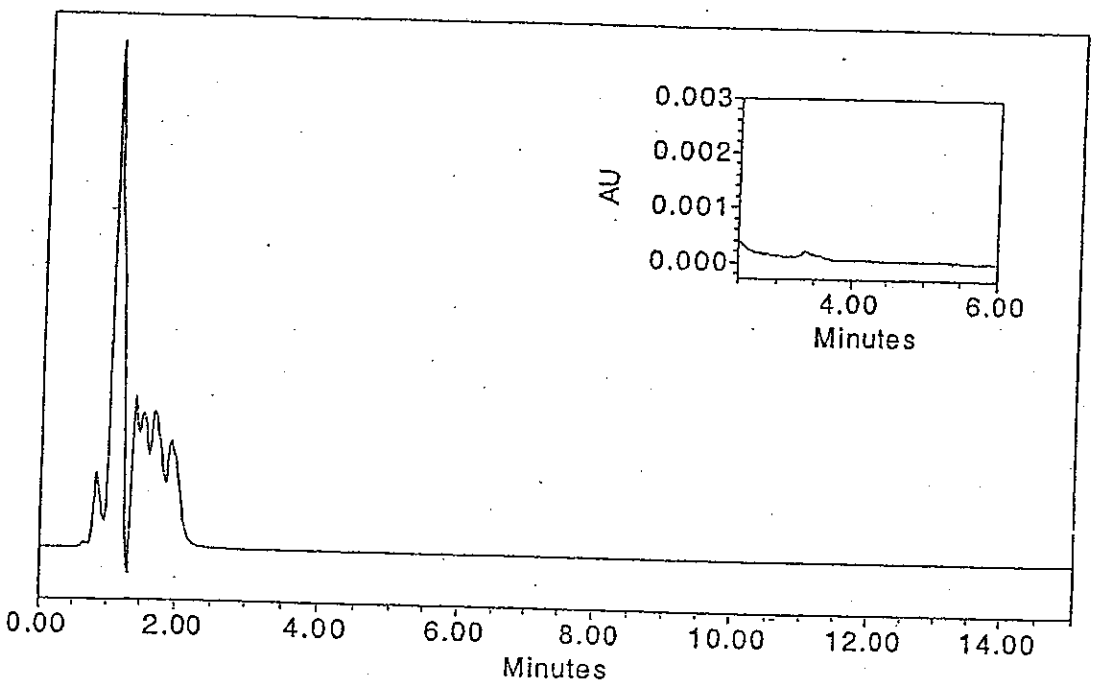


FIG. 13B

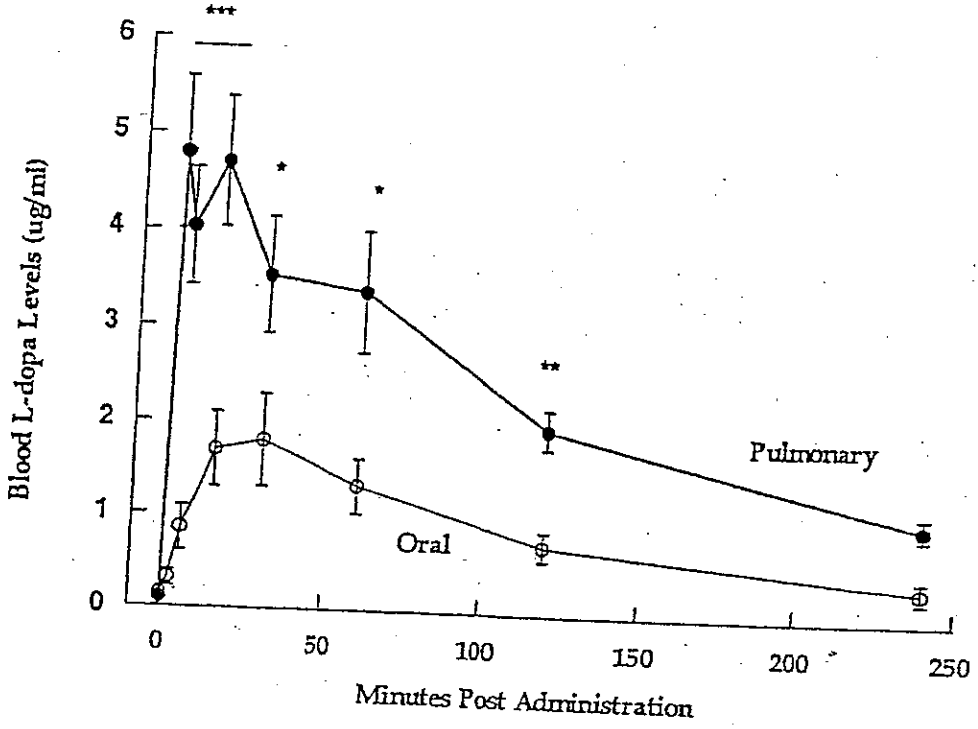


FIG. 14A

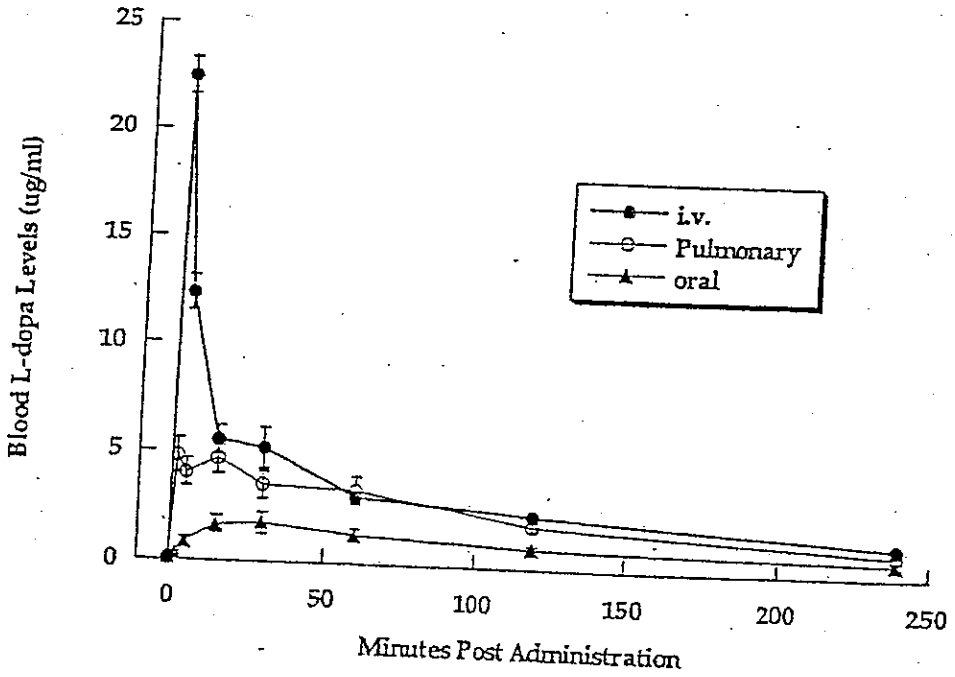


FIG. 14B

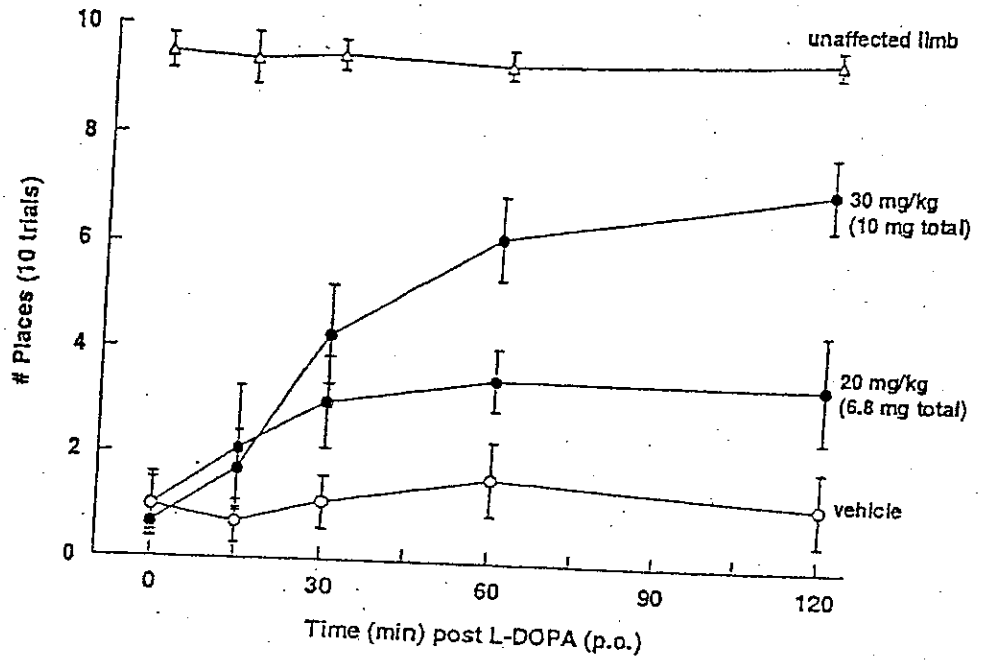


FIG. 15A

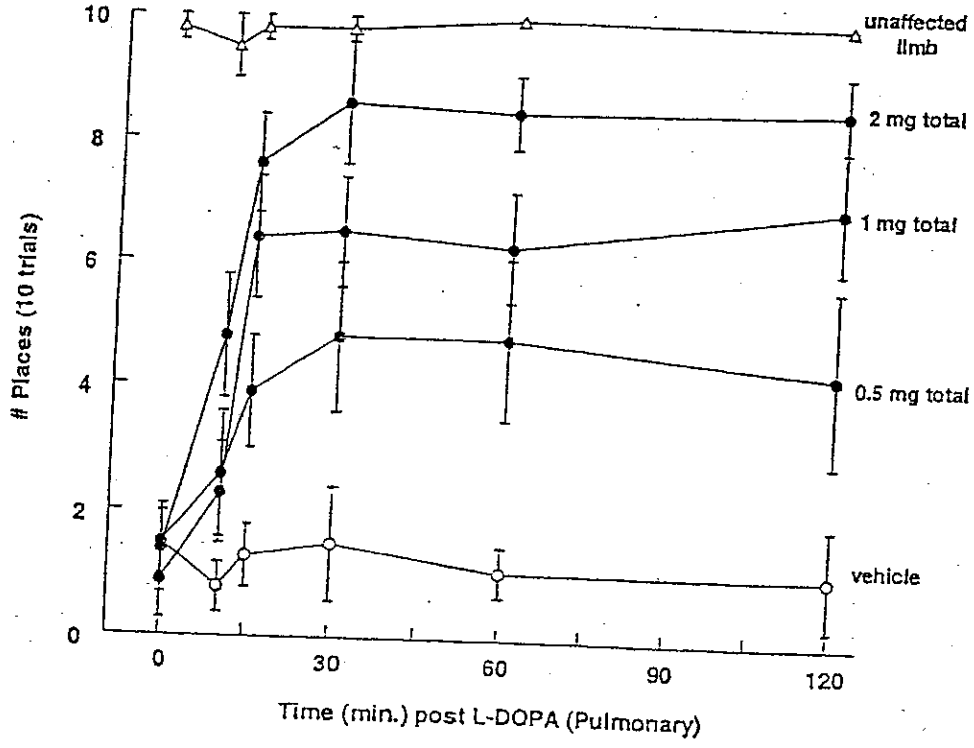


FIG. 15B

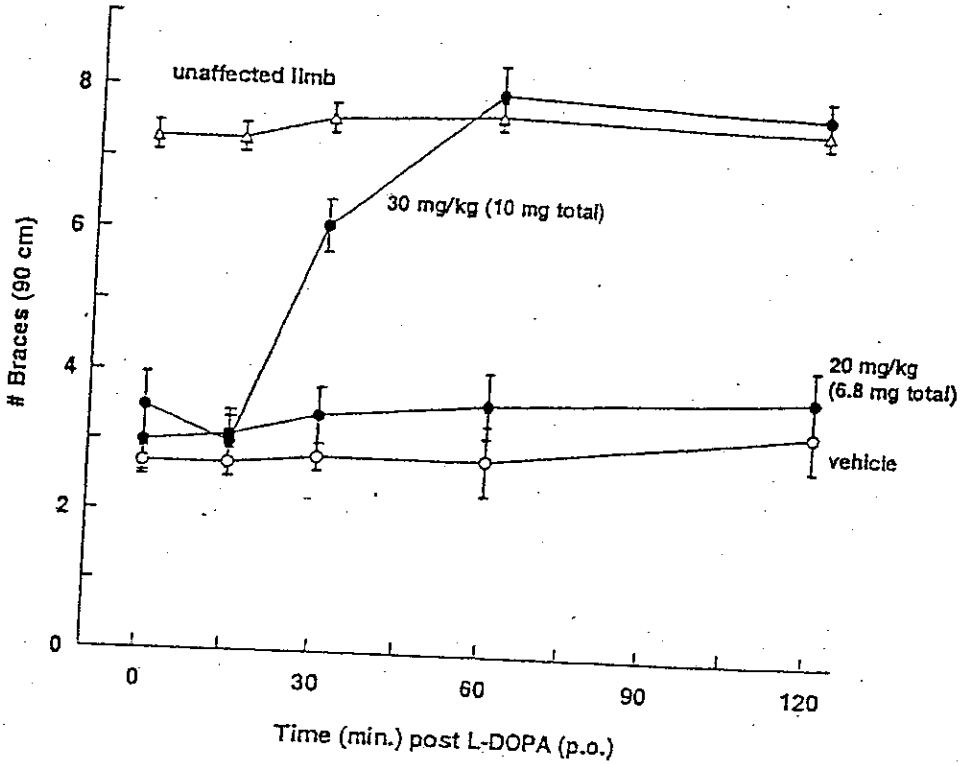


FIG. 16A

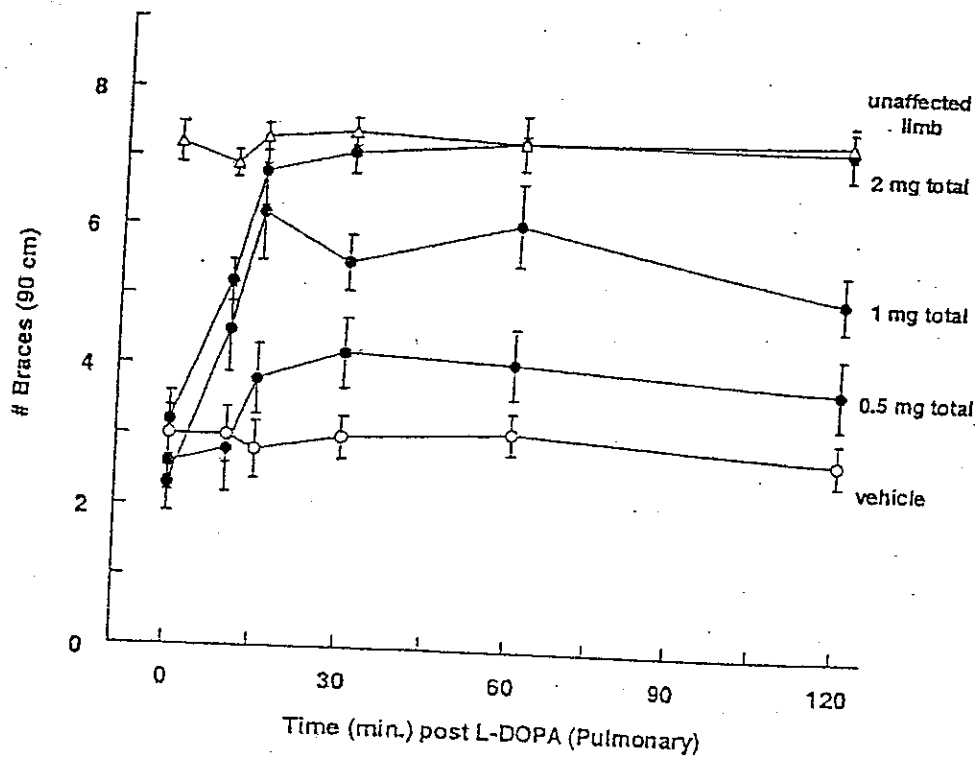


FIG. 16B

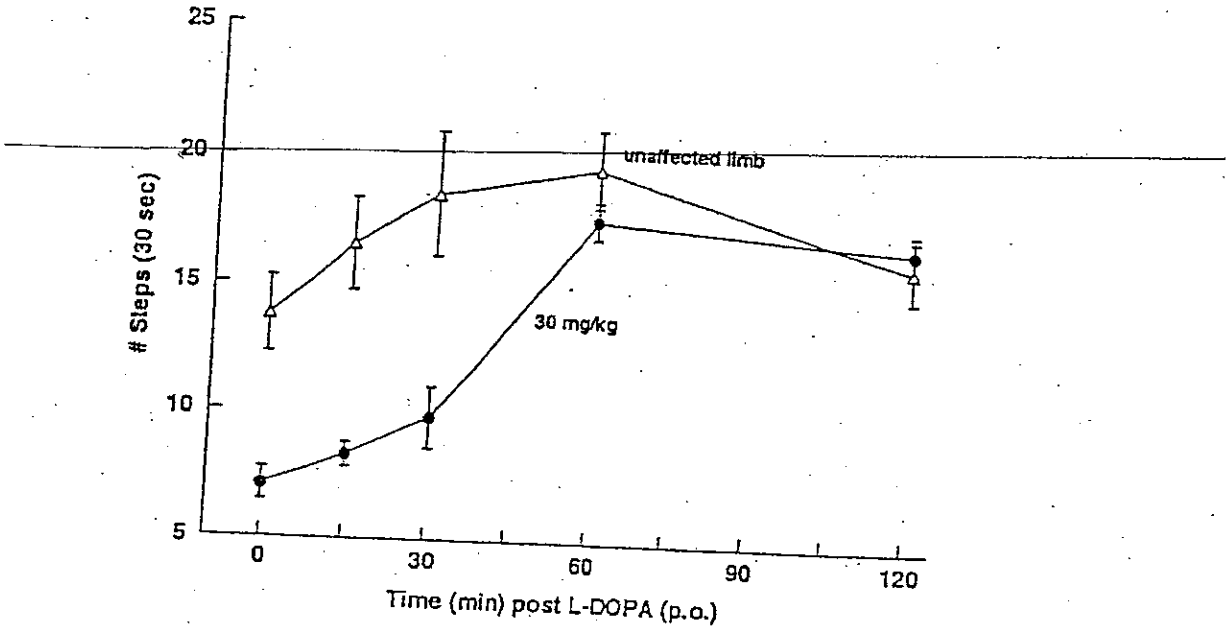


FIG. 17A

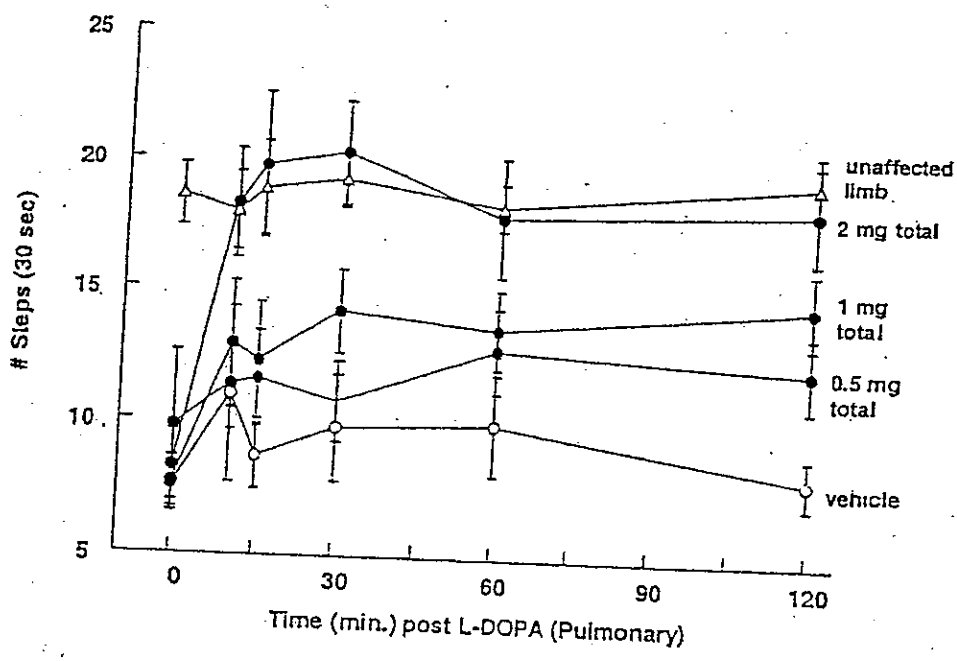


FIG. 17B

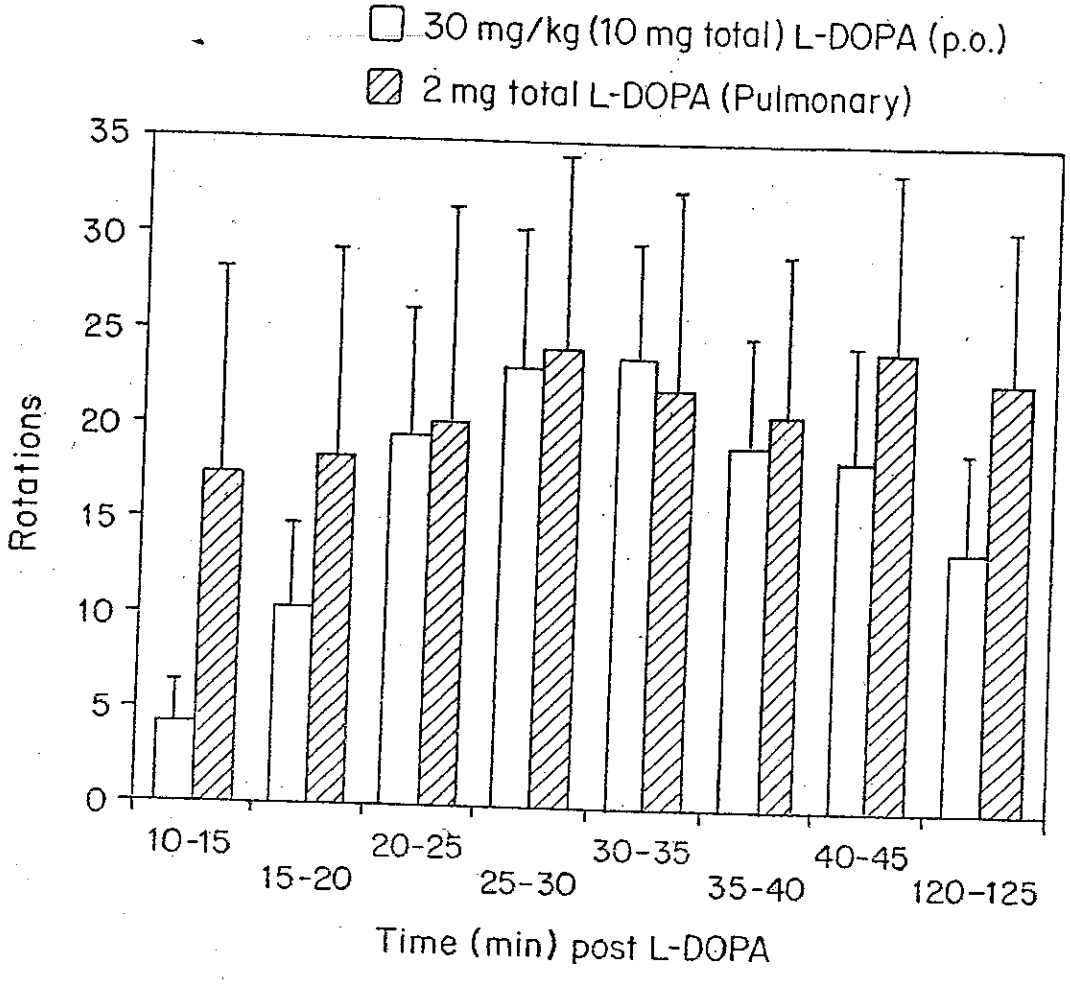

30 mg/kg (10 mg total) L-DOPA (p.o.)
2 mg total L-DOPA (Pulmonary)
Rotations
0
5
10
15
20
25
30
35
10-15
15-20
20-25
25-30
30-35
35-40
40-45
120-125
Time (min) post L-DOPA

FIG. 18

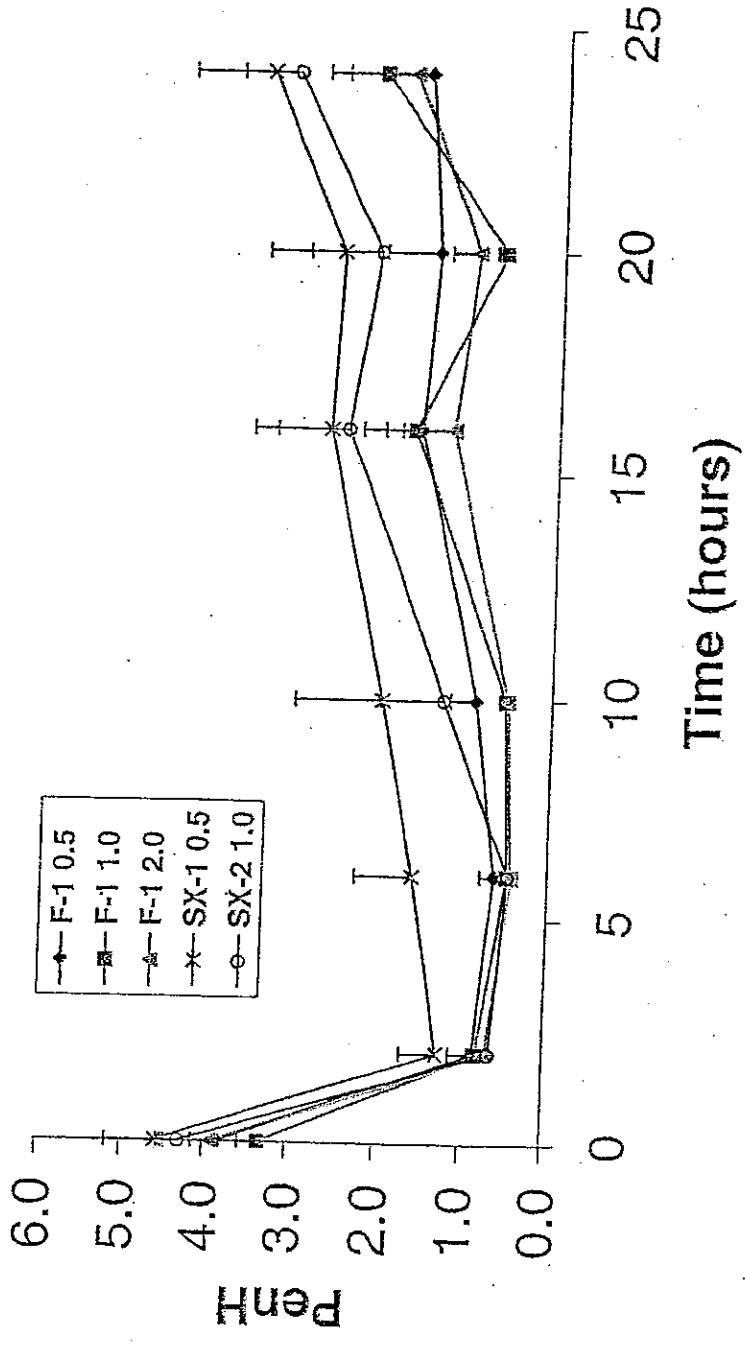

PenT
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5
10
15
20
25
Time (hours)
F-1 0.5
F-1 1.0
F-1 2.0
SX-1 0.5
SX-2 1.0

FIG. 19

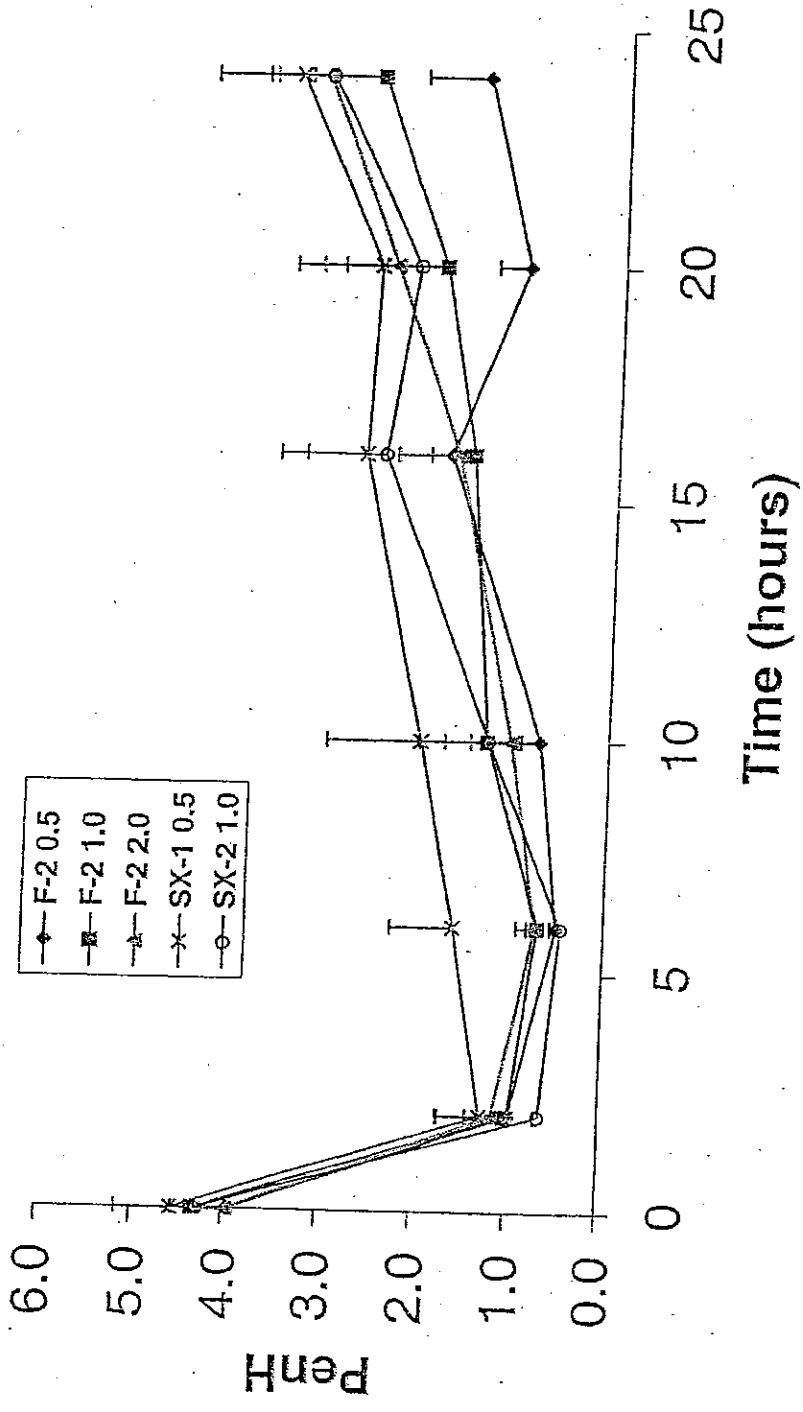

PenH
6.0
5.0
4.0
3.0
2.0
1.0
0.0
0
5
10
15
20
25
Time (hours)
F-2 0.5
F-2 1.0
F-2 2.0
SX-1 0.5
SX-2 1.0

FIG. 20