

RESULTS

I- Index of response :

1- Experiment I (10 days) :

The results of this experiment were collectively presented in Table 6.

- a- Control samples : The transformed cell percentage ranged from 22 to 26.6% with a mean value of 24.28% and a standard deviation of ± 1.5623 .
- b- Indomethacin samples : The transformed cell percentage ranged from 21.4 to 26.6% with a mean value of 23.96% and a standard deviation of ± 1.7489 .
- c- Piroxicam samples : The transformed cell percentage ranged from 21.8 to 26% with a mean value of 23.8% and a standard deviation of ± 1.9171 .
- d- Diclofenac samples: The transformed cell percentage ranged from 22 to 26.8% with a mean value of 24.44% and a standard deviation of ± 1.7074 .

2- Experiment II (20 days) :

The results of this experiment were collectively presented in Table 7 :

- a- Control samples: the transformed cell percentage ranged from 21 to 26.8% with a mean value of 23.96% and a standard deviation of ± 2.0336 .

Table (6): Showing the percentage of transformed cells in the examined 500 cells/rat in experiment I.

Animal No.	Control group	Indomethacin group	Piroxicam group	Diclofenac group	Table value at P < 0.05
1	22	22.8	24.6	25.2	2.878
2	24.2	25	26	26.2	
3	23.4	23	23	22	
4	23.8	26	21.8	23.2	
5	26.6	24.6	22.2	25.8	
6	24	21.4	25.8	24.2	
7	24.8	23	25	25.6	
8	25.8	25.2	24.6	23	
9	26	22	22	22.4	
10	22.2	26.6	23	26.8	
Mean	24.28	23.96	23.8	24.44	
± S.D	1.5623	1.7489	1.9171	1.7074	
t value		0.4525	0.6900	0.2245	

Table (7): Showing the percentage of transformed cells in the examined 500 cells/rat in experiment II.

Animal No.	Control group	Indomethacin group	Piroxicam group	Diclofenac group	Table value at P <0.05
1	21.8	25.6	24.4	24.2	2.878
2	24.4	21.2	23	20	
3	23.4	22	25.6	22.6	
4	21	23.8	21.6	26.6	
5	25	22.8	21.2	22.2	
6	26.8	25	20.4	25	
7	23	19.8	22	24.6	
8	25.8	20.4	19.8	23	
9	22	26	23.6	20.6	
10	26.4	23.4	22	24	
Mean	23.96	22.98	22.96	23.28	
± S.D	2.0336	2.1470	2.1602	2.0221	
t value		1.047	1.1332	0.7522	

- b- Indomethacin samples : The transformed cell percentage ranged from 19.8 to 26% with a mean value of 22.98% and a standard deviation of ± 2.1470 .
- c- Piroxicam samples : The transformed cell percentage ranged from 19.8 to 25.6% with a mean value of 22.96% and a standard deviation of ± 2.1602 .
- d- Diclofenac samples : The transformed cell percentage ranged from 20 to 26.6% with a mean value of 23.28% and a standard deviation of ± 2.0221 .

3- Experiment III (30 days) :

The results of this experiment were collectively presented in Table 8.

- a- Control samples : The transformed cell percentage ranged from 21 to 26.4% with a mean value of 23.66% and a standard deviation of ± 1.5762 .
- b- Indomethacin samples : The transformed cell percentage ranged from 19.2 to 25.4% with a mean value of 22.2% and a standard deviation of ± 1.9067 .
- c- Piroxicam samples : The transformed cell percentage ranged from 18 to 24.8 with a mean value of 21.94% and a standard deviation of ± 2.1338 .
- d- Diclofenac samples : The transformed cell percentage

Table (8): Showing the percentage of transformed cells in the examined 500 cells/rat in experiment III.

Animal No.	Control group	Indomethacin group	Piroxicam group	Diclofenac group	Table value at P < 0.05
1	22.6	19.2	20	22.4	2.878
2	24.8	21.6	23.2	24.2	
3	21	23	20.6	25.2	
4	23.2	24.6	23.4	22.4	
5	24.2	22	22	20.6	
6	22.8	20	24.8	23.6	
7	26.4	25.4	21	20	
8	24	22.8	24.6	20.2	
9	22.4	21	18	22	
10	25.2	22.4	21.8	26	
Mean	23.66	22.2	21.94	22.66	
± S.D	1.5762	1.9067	2.1338	2.0773	
t value		1.871	2.052	1.292	

ranged from 20 to 25.2% with a mean value of 22.66% and a standard deviation of ± 2.0773 .

4- Experiment IV (45 days) :

The results of this experiment were collectively presented in Table 9 :

- a- Control samples : The transformed cell percentage ranged from 21.4 to 27.2% with a mean value of 24.36% and a standard deviation of ± 1.8808 .
- b- Indomethacin samples : The transformed cell percentage ranged from 18 to 22.8% with a mean value of 20.78% and a standard deviation of ± 1.6357 .
- c- Piroxicam samples : The transformed cell percentage ranged from 18.4 to 23.6% with a mean value of 21.22% and a standard deviation of ± 1.6179 .
- d- Diclofenac samples: The transformed cell percentage ranged from 19 to 25% with a mean value of 21.68% and a standard deviation of ± 1.9078 .

5- Experiment V (60 days) :

The results of this experiment were collectively presented in Table 10 :

- a- Control samples : The transformed cell percentage ranged from 21 to 26.4% with a mean value of 24.06% and a standard deviation of ± 1.8055 .

Table (9): Showing the percentage of transformed cells in the examined 500 cells/rat in experiment IV.

Animal No.	Control group	Indomethacin group	Piroxicam group	Diclofenac group	Table value at P <0.05
1	23.8	22.8	20.8	22.4	2.878
2	25	20	18.4	25	
3	26.8	22.6	22	19.8	
4	21.4	18	23.6	20.6	
5	23	22	22.4	22.8	
6	25.4	20.4	19	19	
7	23.8	21.6	22	23.4	
8	22.2	19	20.4	20.8	
9	25	22	21.6	23	
10	27.2	19.6	20	20	
Mean	24.36	20.78	21.22	21.68	
± S.D	1.8808	1.6357	1.6179	1.9078	
t value		4.554*	3.785*	3.176*	

N.B. * indicates significantly higher value than control one at P <0.05.

Table (10): Showing the percentage of transformed cells in the examined 500 cells/rat in experiment V.

Animal No.	Control group	Indomethacin group	Piroxicam group	Diclofenac group	Table value at P <0.001
1	24	19.6	17	19.8	3.922
2	21	15	17.8	21.4	
3	24.6	19	19.4	14	
4	26	15.6	15	17.8	
5	23.2	20	22.6	17.6	
6	26.4	15.8	16.4	22	
7	24.8	16.4	20	17.4	
8	21.8	21	19.6	20	
9	23	17	16	19.4	
10	25.8	20.2	18.8	17	
Mean	24.06	17.96	18.26	18.64	
± S.D	1.8055	2.2125	2.2671	2.3626	
t value		6.963*	6.444*	5.8029*	

N.B. * indicates a highly significant value than control one at P <0.001.

- b- Indomethacin samples : The transformed cell percentage ranged from 15 to 21% with a mean value of 17.96 and a standard deviation of ± 2.2125 .
- c- Piroxicam samples : The transformed cell percentage ranged from 15 to 22.6% with a mean value of 18.26% and a standard deviation of ± 2.2671 .
- d- Diclofenac samples: The transformed cell percentage ranged from 14 to 22% with a mean value of 18.64% and a standard deviation of ± 2.3626 .

The results of the index of response are illustrated in Fig. 3.

II- Chromosomal study :

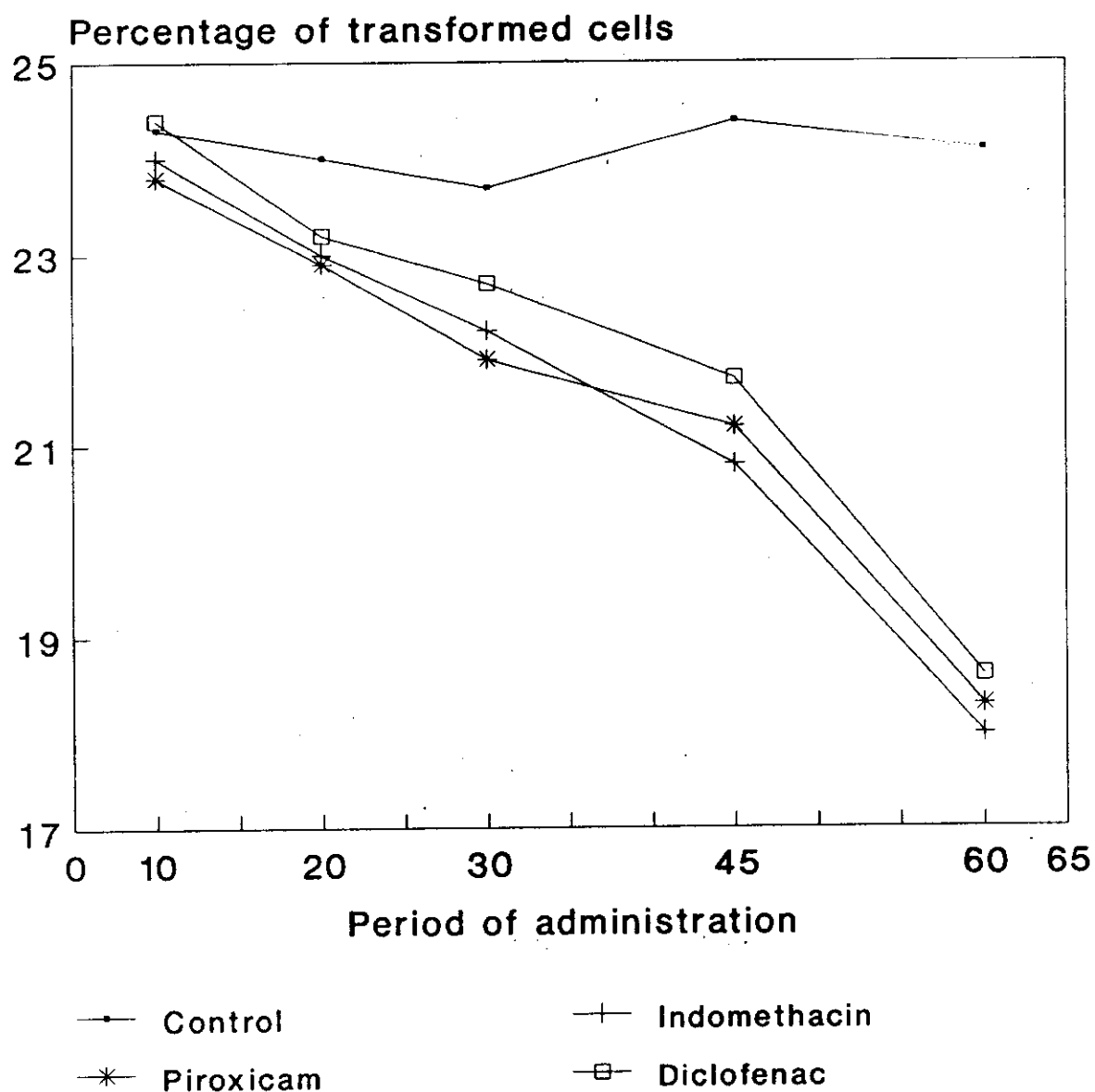
The chromosomal pattern of albino rat samples prepared from bone marrow revealed that the chromosomal complement of rat consisted of 42 chromosomes. They could be classified into three groups according to the centromere position: viz, subtelocentric (No. 1,3,11-13), telocentric (No. 2,4-10,X,Y) and meta- and submetacentric (No. 14-20) chromosomes (Fig.4). The chromosomal anomalies encountered in the present study were in the form of gaps (Fig. 5), breaks (Fig. 6), ring chromosomes (Fig. 7), hypodiploidy (Fig. 8), hyperdiploidy (Fig. 9) and polyploidy (Fig. 10).

1- Experiment I :

The results of this experiment were collectively presented in Tables 11 and 12.

- a- Control samples : The total examined metaphases were 50 for each rat and the percentage of chromosomal aberrations

Fig. (3)



A graphic representation of the transformed cells percentage after the different periods of administration in the three tested drugs in comparison with the control

Fig. (4): Karyotype of a normal male rat prepared from bone marrow (Giemsa Stain, Obj. 100X, Proj. 10X).

Fig. (5): A photomicrograph of a male rat bone marrow metaphase spread showing a gap (arrow).
(Giemsa Stain, Obj. 100X, Proj. 10X).

Fig. (6): A photomicrograph of a male rat bone marrow metaphase spread showing a break (arrow).
(Giemsa Stain, Obj. 100X, Proj. 10X).

Fig. (7): A photomicrograph of a male rat bone marrow metaphase spread showing a ring formation (arrow).
(Giemsa Stain, Obj. 100X, Proj. 10X).

Fig. (8): A photomicrograph of a female rat bone marrow metaphase spread showing hypodiploidy (41 chromosomes). (Giemsa Stain, Obj. 100X, Proj. 10X).

Table (11): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. I.

Animal No.	Control group					Indomethacin group											
	Structural A.				Numerical A.				Structural A.				Numerical A.				
	G.	B.	R.	Total	Aneuploidy			Poly.	G.	B.	R.	Total	Aneuploidy			Poly.	
					Hypo.	Hyper.	Total						Hypo.	Hyper.	Total		
1					1			1							1	1	1
2		1		1				1				1				1	1
3								1								1	1
4							1									1	1
5			1	1											1		
6								2									1
7							1							1		1	
8		1		1				1									1
9								1		1							1
10								1						1		1	
Total		2	1	3		2	3	8	1	1		2	2	2	4	7	

G : Gap
B : Break
R : Ring

Table (12): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. I.

Animal No.	Piroxicam group					Diclofenac group											
	Structural A.				Numerical A.			Structural A.				Numerical A.					
	G.	B.	R.	Total	Aneuploidy			Poly.	G.	B.	R.	Total	Aneuploidy			Poly.	
					Hypo.	Hyper.	Total						Hypo.	Hyper.	Total		
1					1												2
2								1									1
3								1						1			
4			1	1								1					1
5								2			1						1
6								1									
7																1	1
8		1		1			1			1					1		1
9																	
10					1												1
Total		1	1	2	2	1	3	7		1	1	2	1		2	3	8

G : Gap
B : Break
R : Ring

Table (13): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. II.

Animal No.	Control group					Indomethacin group											
	Structural A.				Numerical A.			Structural A.				Numerical A.					
	G.	B.	R.	Total	Aneuploidy			Poly	G.	B.	R.	Total	Aneuploidy			Poly.	
					Hypo.	Hyper.	Total						Hypo.	Hyper.	Total		
1							1									2	
2		1		1		1							1	1	2		
3							1									1	
4							1				1					1	
5					1									1			
6			1	1			1						1			1	
7						1				1						1	
8							1									1	
9	1			1												1	
10					1		1				1					1	
Total	1	1	1	3	2	2	7	4	2	1	1	2	3	1	2	3	9

G : Gap
B : Break
R : Ring

Table (14): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. II.

Animal No.	Piroxicam group					Diclofenac group									
	Structural A.			Numerical A.		Structural A.			Numerical A.						
	G.	B.	R.	Total	Aneuploidy		Poly.	G.	B.	R.	Total	Aneuploidy		Poly.	
					Hypo.	Hyper.						Hypo.	Hyper.		Total
1							1								1
2						1							1		1
3	1			1			1			1					
4							1								1
5					1										
6		1		1						1					
7							1			1					2
8		1		1								1		1	1
9									1						
10							1						1		1
Total	1	2		3			8		1	2	3		2	4	7

G : Gap
B : Break
R : Ring

3- Experiment III :

The results of this experiment were collectively presented in Tables 15 and 16.

- a- Control samples: The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 0.4%, 0.8% and 1.6% respectively.
- b- Indomethacin samples: The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 0.8%, 1% and 2.2% respectively.
- c- Piroxicam samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 0.8%, 1% and 2% respectively.
- d- Diclofenac samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 0.6%, 1% and 1.8% respectively.

4- Experiment IV :

The results of this experiment were collectively presented in Tables 17 and 18.

- a- Control samples: The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 0.4, 0.6% and 1.6% respectively.
- b- Indomethacin samples: The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 1.4%, 1.8% and 3% respectively.
- c- Piroxicam samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 1.6%, 1.8% and 2.8% respectively.

Table (15): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. III.

Animal No.	Control group						Indomethacin group								
	Structural A.			Numerical A.			Structural A.			Numerical A.					
	G.	B.	R.	Total	Aneuploidy		Poly.	G.	B.	R.	Total	Aneuploidy		Poly.	
					Hypo	Hyper.						Total	Hypo.		Hyper.
1					1			1				1			1
2			1	1			1								1
3							1	1							1
4					1		1					1			2
5		1		1								1			1
6							1								1
7							1	1		1					1
8							2					1			1
9							1			1					2
10							1					1			
Total		1	1	2	2	4	8		3	1	4	2	3	5	11

G : Gap
B : Break
R : Ring

Table (16): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. III.

Animal No.	Piroxicam group					Diclofenac group						
	Structural A.			Numerical A.		Structural A.				Numerical A.		
	G.	B.	R.	Total	Poly.	G.	B.	R.	Total	Aneuploidy		
										Hypo.	Hyper.	Total
1			1	1	1						1	1
2		1		1	1	1			1			1
3					1							1
4												1
5					2				1			1
6		1		1	1		1					
7					1						1	1
8					2			1	1			1
9			1		1							2
10				1	1						1	1
Total		2	2	4	10	1	1	1	3	2	3	5
												9

G : Gap
B : Break
R : Ring

Table (17): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. IV.

Animal No.	Control group					Indomethacin group						
	Structural A.				Numerical A.		Structural A.			Numerical A.		
	G.	B.	R.	Total	Aneuploidy		Poly.	G.	B.	R.	Total	Poly.
					Hypo.	Hyper.						
1							2					
2					1		1	1			1	2
3							1		1		1	1
4							1				1	2
5		1		1			1	1			1	2
6							1		1		1	1
7							1		1		1	2
8							1		1		1	1
9							1		1		1	1
10			1	1						1	1	2
Total		1	1	2	1	2	8	2	4	1	7	15

G : Gap
B : Break
R : Ring

Table (18): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. IV.

Animal No.	Piroxicam group						Diclofenac group								
	Structural A.			Numerical A.			Structural A.			Numerical A.					
	G.	B.	R.	Total	Aneuploidy		Poly.	G.	B.	R.	Total	Aneuploidy		Poly.	
					Hypo.	Hyper.						Hypo.	Hyper.		Total
1		1		1		1	2	1				1	1		2
2							2							1	
3		1		1	1		1				1				1
4	1			1			1		1						2
5		1		1			1					1			2
6		1		1	1		2						1		1
7					1	1	1		1					1	2
8				1	1		1						1		1
9		1		1			2			1					2
10			1	1	1		1		1			1	1		
Total	2	5	1	8	5	4	14	1	3	1	5	4	3	7	13

G : Gap
B : Break
R : Ring

d- Diclofenac samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 1%, 1.4% and 2.6% respectively.

5- Experiment V :

The results of this experiment were collectively presented in Tables 19 and 20.

a- Control samples: The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 0.4%, 0.6% and 1.8% respectively.

b- Indomethacin samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 1.8%, 2.6% and 3.8% respectively.

c- Piroxicam samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 2%, 2.2% and 3.6% respectively.

d- Diclofenac samples : The percentage of chromosomal aberrations per cell including structural anomalies, aneuploidy and polyploidy were 1.8%, 2.2% and 3.4% respectively.

Table (19): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. V.

Animal No.	Control group					Indomethacin group						
	Structural A.			Numerical A.		Structural A.			Numerical A.			
	G.	B.	R.	Total	Poly.	G.	B.	R.	Total	Aneuploidy		
										Hypo.	Hyper.	Total
1					1			1	1			1
2			1	1	1				1			1
3					2		1		1		1	1
4											1	1
5					1		1		1		1	1
6					1			1	1			1
7		1		1	1		2		2	1	1	2
8						1			1		1	1
9					1		1		1	1	1	2
10					1		1		1	1	1	2
Total		1	1	2	9	1	6	2	9	6	7	13
												19

G : Gap
B : Break
R : Ring

Table (20): Chromosome aberrations (A) in direct preparations of rat bone marrow in the examined 50 metaphases/rat in exp. V.

Animal No.	Piroxicam group					Diclofenac group						
	Structural A.			Numerical A.		Structural A.				Numerical A.		
	G.	B.	R.	Total	Poly.	G.	B.	R.	Total	Aneuploidy		
										Hypo.	Hyper.	Total
1		1		1	2						1	1
2			1	1	1		1		1	1		1
3	1			1	1		1		1	1	1	2
4					2					1		1
5		1		1	2	1			1		1	1
6		1		1	3		1		1		1	1
7			1	1	2		1		1		1	1
8		1		1	1		2		2	1		1
9		1		1	2			1	1	1		1
10	1	1		2	2		1		1	1		1
Total	2	6	2	10	18	1	7	1	9	6	5	11
												17

G : Gap
B : Break
R : Ring