RESULTS

R E S U L T S

Phagocytosis and intracellular killing:

The rate of phagocytosis or intracellular killing was measured in vitro for a certain length of time and expressed as an index.

The phagocytic index for a given interval (Ft) was defined and calculated according to the formula Ft = log No - log Nt (Van Furth and Theda Van Swet 1973), in which No is the number of viable bacteria in the suspernatant fluid at the start of phagocytosis, and NT is the number of viable bacteria in the supernatant fluid at time t. Simlarly the killing index (Kt) was defined and calculated with the formula Kt = log No - log Nt, in which No is the number of viable intracellular bacteria at the start of the experiment on intracellular killing and Nt is the number of viable intracellular bacteria at time t.

The calculation of these indices is a valuable tool for comparison not only of the rate of ingestion or rate of intracellular killing of different bacteria by phagocytic cell but also of the rate of these processes in leukocytes of healthy individuals and patients with various infection or blood diseases.

The phagocytic and intracellular capacity were also assessed according to the formula.

$$\frac{\text{Mean number of bacteria at zero time - Mean number at t time}}{\text{Mean number at zero time}} \times 100$$

Accordingly the phagocytic and the intracellular rate and capacity were assessed to give an idea about the function of PMN's in healthy and groups infected with schistosoma.

Phagocytosis:

The results of the phagocytic test are shown in Tables (1,3) Figure (1) for the mice group, and in Tables (7,9,11) Figure (3) for the human group. The incubation of PMN leukocytes and Staphylococcus aureus (bacteria to cell ratio is 1:1) in medium containing serum gives the following results:

I. Mice Group:

Table (6) demonstrates a highly significant difference between the phagocytic index of the control and the infected group at 60 and 120 minutes. The t

value after 60 min. is 5.83 and the P value is less than 0.001 and after 120 min. the t is 10.382 and the P is less than 0.001.

II. Human Group:

Table (13) shows a significant difference after 60 min. between the phagocytic index of the control group and the early infected group, (the t value is 3.1 and the P value is less than 0.01), and a significant difference between the control group and the late infected group (the t value is 3.0 and P is less than 0.01). There is significant difference between the early and the late groups of bilharziasis in their phagocytic indices, (the t values is 1.35 and the P value is greater than 0.05).

A highly significant difference between the phagocytic index of the control and the group of early as well as Late schistosomiasis can be observed after 120 min. For early cases the t value is 4.3 and the P value is less than 0.001, and for the late cases the t value is 4.39 and P value is less than 0.001. No significant difference is shown between the early and late schistosomiasis (the t value is 1.2 and the P value is greater than 0.05).

Phagocytic capacity:

1. Mice group:

Table (5) Fig. (5) shows a highly significant difference between the phagocytic capacity of the control (43.7%) and the infected group (10.1%) after 60 min. Moreover there is a highly significant difference between the two groups after 120 min. (81.7%) for the control) and (23% for the infected group).

II. Human group:

Table (14) Fig.(7) shows a significant difference between the phagocytic capacity of the control (62.7%) and the early schistosomal infected groups (40.4%) after 60 min. as well as late schistosomal groups (49.4%).

It is also found that there is no significant difference between the early (40.4%) and late schistosomal groups (49.4%).

After 120 min., there is in significant difference between control (84.9%) and early schistosomal groups (67.3%).

Also insignificant difference between the control group (84.9%) and the late schistosomal group (74.9%) is found, with regard to the comparison between the early (67.3%) and late schistosomal groups (74.9%) there is also insignificant difference.

Intracellular killing:

The intracellular killing experiment depends on incubation of cells that have ingested bacteria and assay the rate of bacterial killing at different intervals.

Since the intracellular killing technique measures the survival of bacteria inside phagocytic cells; the shortest time for optimal phagocytosis must be determined first for the phagocytic cell and the tested strain of bacteria.

To determine the optimal ingestion time, bacteria and cells were incubated at 37° C in a ratio of 1:1, and a sample was taken for determination of the number of viable bacteria within the granulocytes at various intervals (i.e. 0, 60, 120 min.).

I. Mice group:

Table (5) Fig.(6) shows a decrease in the killing capacity of the control groups (47.8%) after 60 min., where as the killing capacity of the infected groups is (74%). After 120 min., no significant difference can be observed between the control group (93.3%) and the infected group (87.5%).

Table (6) shows insignificant difference between the killing index of the control and infected groups. After 60 min. (the t value is 1.96 and the P value is greater than 0.05), and after 120 min. (the t value is 0.26 and the P value is greater than 0.05).

II. Human group:

Table (13) shows a significant difference between the killing index of the control and the early schistosomal cases, after 60 min. the t value is 1.98 and the P value is less than (0.05). A highly significant difference between the control and the late schistosomal cases can be demonstrated, (the t value is 4.6 and the P value is less than 0.001). There is a significant difference between the early and late schistosomal cases, (the t value is 3.6 and the P value is less than 0.01).

After 120 min. a significant difference between the control and the early cases of schistosomiasis can observed (the t value is 2.0 and the P value is less than 0.01). A highly significant difference between the control and the late schistosomal cases can observed, (the t value is 7.06 and the P value is less than .001). Also a highly significant difference is found between the early and the late schistosomal cases, (the t value is 5.15 and the P values is 0.001).

Table (14) Fig.(8) shows the difference in the killing capacity between control and early cases, control and late cases and the early and late cases at a different intervals.

After 60 min. there is unexpected decrease in the killing capacity of the control group (27.5%) than that of the early cases (50.7%). Also there is no significant difference between the control (27.5%) and the late schistosomal (22.4%). A highly significant difference was found between the early (50,7%) and the late schistosomal cases (22.4%).

After 120 min. there is a significant difference between the killing capacity of the control group (88.9%)

and the early schistosomal cases (69.3%). There is also a highly significant difference between the control (88.9%) and the late cases (31.4%). A highly significant difference was found between the early cases (69.3%) and the late cases (31.14%).

Table 1: Results of the phagocytic tests in the mice control group.

No. of Exp.	The mean number and ± S.D. of viable bact. count in the *incubated mixture ($X10^7$/ml) at:			The mean and ± S.D. of the phagocytic index (F) at 60 min. and 120 min.	
	Zero time	One hour	2 hours	F.60 min.	F 120 min.
10	$\bar{X}$=6041.5 S.D= ±2382	$\bar{X}$=3402.3 S.D.= ±1732.5	$\bar{X}$=1108 S.D.= ±853	$\bar{X}$=0.2819 S.D.= ± 0.1352	$\bar{X}$=0.6186 S.D. = ± 0.1368

(Ft) Phagocytic Index $_t$ = $\log_{No}$ - $\log_{Nt}$

Phagocytic capacity t = $\frac{\text{Mean at zero time - Mean at t time}}{\text{Mean at zero time}}$ X 100

Phagocytic capacity after 60 min. = 43.7%

Phagocytic capacity after 120 min. = 31.7%

$\bar{X}$ = Mean

± S.D.

* Incubated mixture = one bacterium to one PMN's.

Table 2: Results of the intracellular killing tests in the mice control group.

	The mean number and ± S.D. of viable bacterial count in the incubated mixture (X 10^7/ml)at:			The mean and ± S.D. of the killing index (K) at 60 min. and 120 min.	
No. of Exp.	Zero time	One hour	2 hours	K60 min.	K 120 min.
10	$\bar{X}$=935	$\bar{X}$=487.9	$\bar{X}$=63.2	$\bar{X}$=0.4652	$\bar{X}$ = 2.0023
	S.D. ± =	S.D. ± =	S.D. ± =	S.D. ± =	S.D. ± =
	515.4	364	62.3	0.2961	0.8909

(Kt) Killing Index t = log No - Log Nt

$$\text{Killing capacity} = \frac{\text{Mean at zero time - Mean at t time}}{\text{Mean at zero time.}} \times 100$$

Killing capacity after min. = 47.8%

Killing capacity after 120 min.= 93.2%

$\bar{X}$ = Mean

± S.D.

Table 3: Results of the phagocytic tests in mice infected with S.mansoni

No. of Exp.	The mean number and ± S.D. of viable bact. count in the incubated mixture (X 10^7/ml) at: Zero time	One hour	2 Hours	The mean and ± S.D. of the phagocytic index (F) at 60 min. and 120 min. F 60 min.	F 120 min.
10	$\bar{X}$ = 1951.3	$\bar{X}$=1754.4	$\bar{X}$=1502.5	$\bar{X}$= 0.0486	$\bar{X}$ = 0995
	S.D. ± =	S.D. ± =	S.D. ± =	$\bar{S}$.D. ± =	$\bar{S}$.D. ± =
	937.7	818	591	0.0264	0.0649

Phagocytic capacity after 60 min. = 10.1%

Phagocytic capacity after 120 min. = 23 %

Table 4: Results of the intracellular killing tests in mice infected with S.mansoni.

	The mean and ± S.D. of viable bacterical count in the incubated mixture (X 10^7/ml) at:			The mean and ± S.D. of the killing index (K) at 60 min. and 120 min.	
No. of Exp.	Zero time	One hour	2 hour	K 60 min.	K 120 min
10	$\bar{X}$ = 445.1	$\bar{X}$=115.7	$\bar{X}$ = 55.8	$\bar{X}$ = 0.8771	$\bar{X}$ = 1.907
	S.D. ±	S.D. ±	S.D.±	S.D.±	S.D.±
	284	76.2	62.6	0.616	0.7257

Killing capacity after 60 min. = 74 %
Killing capacity after 120 min. = 87.5%

Table 5: A comparison between the phagocytic and the killing capacity of PMN's of different groups of mice.

Group	F. capacity after 60 min.	F. capacity after 120 min.	K.capacity after 60 min.	K. capacity after 120 min.
1. Control Group.	43.7 %	81.7 %	47.8 %	93.2%
2. Infected Group	10.1 %	23 %	74 %	87.5%

Table 6: A comparison between the phagocytic and the bactericidal indices of* infected and control groups of mice.

Group	F60 min.	F120min.	K60min.	K120 min.
1. Control Group.	$\bar{X}$ = 0.2819 ± .1352	$\bar{X}$ 0.6186 ± .1368	$\bar{X}$ = 0.4652 ± 0.2961	$\bar{X}$ = 2.0023 ± 0.8908
2. Infected Group	0.0486 ± .0264	0.0995 ± .0649	0.8771 ± 0.616	1.907 ± 0.7257
Value of t	5.83	10.382	1.96	t = 0.26
Value of P	0.001(H.Sig.)	0.001(H.Sig.)	0.05(Insig.)	0.05(Insig.)

$\bar{X}$ = Mean
± = S.D.
* Infected with S.mansoni
F = phagocytic index
K = Killing index.

Table 7: Results of the phagocytic tests in human control group.

	The mean number and S.D. ± of the viable bact. count in the incubated mixture (X 10^7/ml) at:			The mean and S.D. ± of the phagocytic index (F) at 60 min. and 120 min.	
No. of Exp.	Zero time	One hour	2 hours	F 60 min.	F 120 min.
30	$\bar{X}$ = 8156	$\bar{X}$ = 3044	$\bar{X}$ = 1234	$\bar{X}$ = 0.58	$\bar{X}$ = 1.132
	S.D. ±	S.D. ±	S.D. ±	S.D. ±	S.D. ±
	5075	3395	2059	35	0.467

Phagocytic capacity after 60 min. = 62.7%
Phagocytic capacity after 120 min. = 84.9%

Table 8: Results of .the intracellular killing tests in human control group.

No. of Exp.	The mean number and ± S.D. of the viable bact. count in the incubated mixture (X 10^7/ml) at: Zero time	One hour	2 hours	The mean and S.D. ± of the killing index (K) at 60 min. and 120 min. K 60 min.	K 120 min.
	$\bar{X}$ = 848.2 ± 775	$\bar{X}$=233.7 ± 192	$\bar{X}$ = 94 ± 51.9	$\bar{X}$ = 0.472 ± 0.265	$\bar{X}$ = 0.869 ± 297

Killing capacity after 60 min. = 27.5%
Killing capacity after 120 min. = 88.9%

Table 9: Results of the phagocytic tests in early cases of human Schistosomiasis (Group II).

	The mean number and S.D. ± of the viable bact. count in the incubated mixture (X 10^7/ml) at:			The mean and S.D. ± of the phagocytic index (F) at 60 min. and 120 min.	
No. of Exp.	Zero time	One hour	2 hours	F 60 min.	F 120 min.
20	$\bar{X}$ = 3805 ± 2394	$\bar{X}$ = 2267 ± 1408	$\bar{X}$ = 1243 ± 673	$\bar{X}$ = 0.217 ± 0.064	$\bar{X}$ = 0.458 ± 0.092

Phagocytic capacity after 60 min. = 40.4%

Phagocytic capacity after 120 min. = 67.3%

Table 10: Results of the intracellular killing in early cases of human Schistosomiasis.

	The mean number and S.D. ± of the viable bact. count in the incubated mixture (X 10^7/ml) at:			The mean and S.D. ± of the killing index (K) at 60 min. and 120 min.	
No. of cases.	Zero time	One hour	2 hours	K 60 min. $\bar{X}$ S.D. ±	K 120 min. $\bar{X}$ S.D. ±
20	$\bar{X}$ = 1098.5 ± = 634	$\bar{X}$ = 541 ± 316.8	$\bar{X}$ = 337 ± 264	$\bar{X}$ = 0.288 ± 0.116	$\bar{X}$ = 0.563 ± 0.141

Killing capacity after 60 min. = 50.7 %

Killing capacity after 120 min.= 69.3%

Table 11: Results of the phagocytic tests in late Cases of human Schistosomiasis (Group III)

	The mean number and S.D. ± of the viable bact. count in the incubated mixture (X 10^7/ml) at:			The mean and S.D. ± of the phagocytic index (F) at 60 min. and 120 min.	
No. of cases	Zero time	One hour	2 hours	F 60 min.	F 120 min.
20	$\bar{X}$ = 3077 ± 1814	$\bar{X}$ = 1558.3 ± 916.2	$\bar{X}$ = 771.3 ± 258.3	$\bar{X}$ = 0.279 ± 0.130	$\bar{X}$ = 0.541 ± 0.187

Phagocytic capacity after 60 min. = 49.4%

Phagocytic capacity after 120 min. = 74.9%

Table 12: Results of intracellular killing tests in late cases of human Schistosomiasis (Group III)

No. of cases	The mean and S.D. ± of the viable bact. count in the incubated mixture (X 10^7/ml) at:			The mean and S.D. ± of the killing index (K) at at 60 min. and 120 min.	
	Zero time	One hour	2 hours	K 60 min.	K 120 min.
20	$\bar{X}$ = 4236 ± 2440	$\bar{X}$ = 3286.6 ± 2091.7	$\bar{X}$ = 2912 ± 2320	$\bar{X}$ = 0.123 ± 0.098	$\bar{X}$ 0.269 ± 0.135

Killing capacity after 60 min . = 22.4%

Killing capacity after 120 min. = 31.4%

Table 13: A comparison between the phagocytic and the bactericidal indices of PMNLs of normal human control and different stages of human Schistosomiasis.

No.of cases	Groups	F 60	F 120	K 60	K 120
30	Healthy human control	0.58±.35	1.132±.467	.472±.265	.869±.297
20	Early stage of bilharziasis	0.217±.064	.458±.092	.288±.116	.563±.141
	A	t= 3.1	t = 4.3	t = 1.98	t = 2.0
		P <.01 Sig.	P <.001	P <.05	P <.01
20	Late stage of bilharziasis	.279±0.13	.541±.187	.123±.098	.269±.135
	B	t= 3.0	t = 4.39	t = 4.6	t = 7.06
		P <.01	P <.001	P <.001	P <.001
	C	t= 1.35	t = 1.2	t = 3.6	t = 5.15
		P >.05	P >.05	P <.01	P <.001
		Insig.	Insig.	Sig.	H.Sig.

A = Comparison between control group and early cases of bilharziasis.

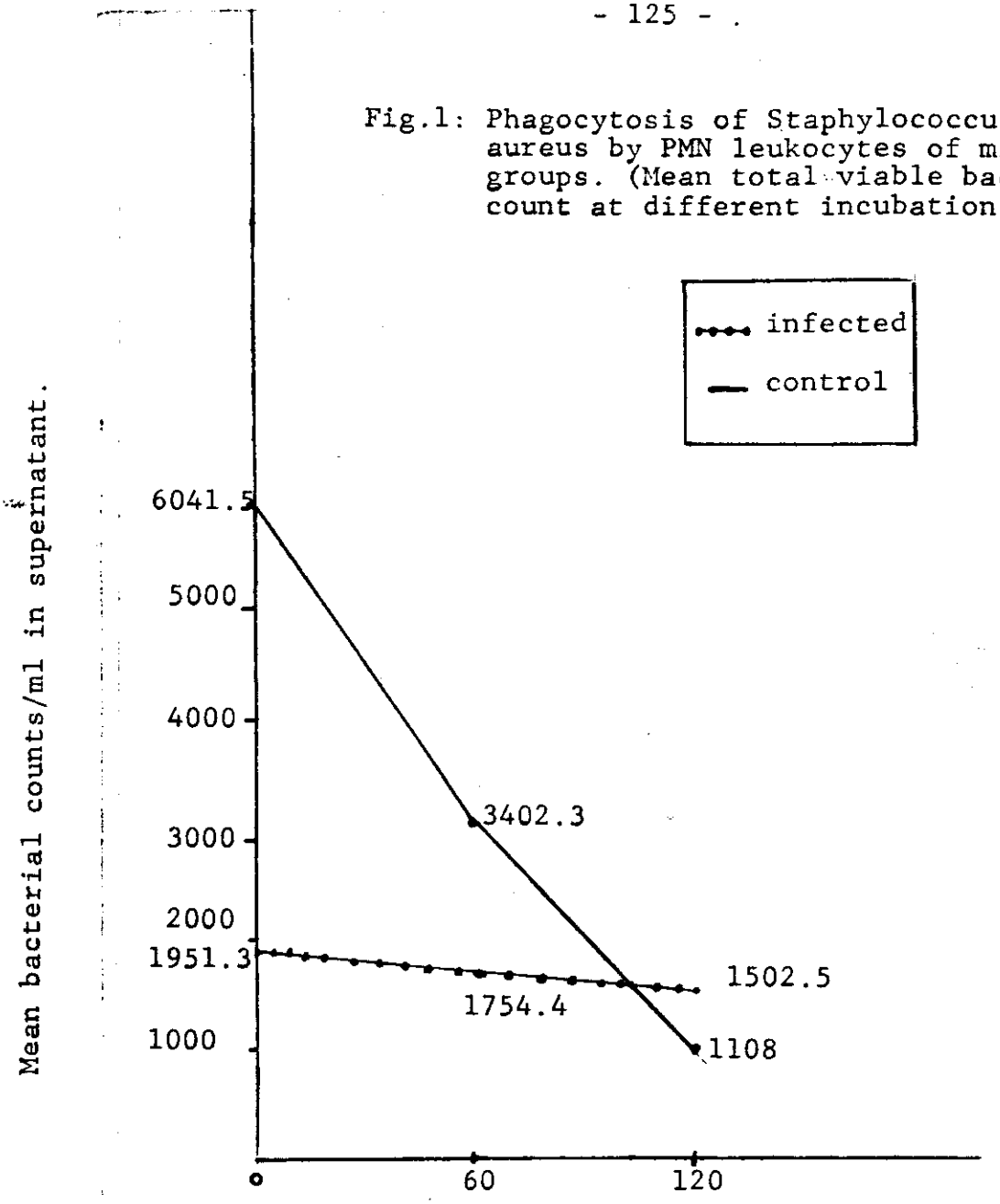
B = Comparison between control group and late cases of bilharziasis.

C = Comparison between early and late cases of bilharziasis.

Table 14: A comparison between the phagocytic and the bactericidal capacitv of PMN's of human control and different stages of human Schistosomiasis.

No. of cases	Group	F.capacity % after 60min.	F. capacity % after 120min.	K. capacity% after 60 min.	K.capacity % after 120 min.
30	Control group	62.7 %	84.9 %	27.5 %	88.9 %
20	Early stages	40.4 %	67.3 %	50.7 %	69.3 %
20	Late stages	49.4 %	74.9 %	22.4 %	31.4 %

Fig.1: Phagocytosis of Staphylococcus aureus by PMN leukocytes of mice groups. (Mean total viable bacterial count at different incubation times).



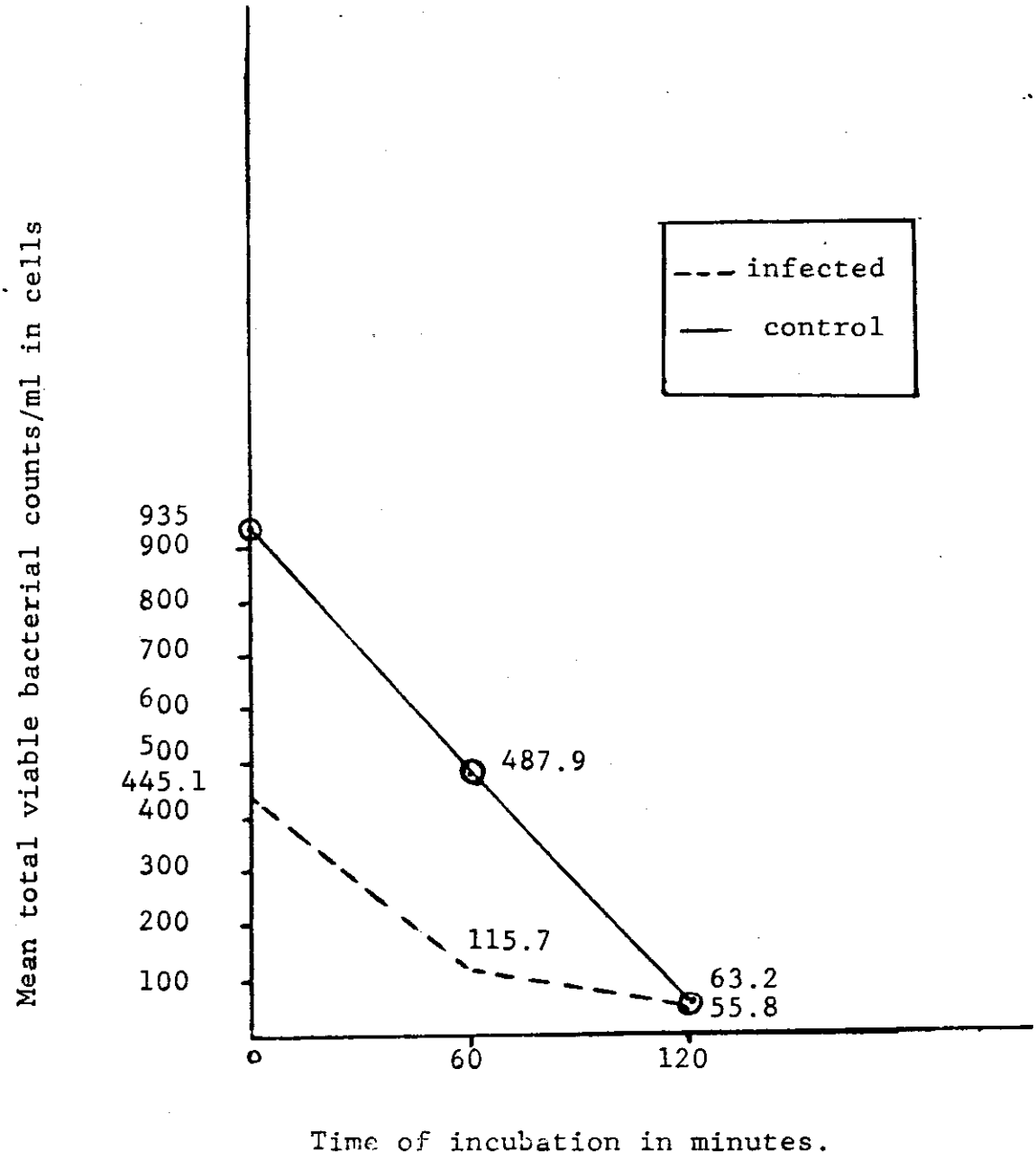


Fig.2: Intracellular killing of Staphylococcus aureus by PMN leukocytes of mice groups. (Mean viable bacterial counts at different incubation times).

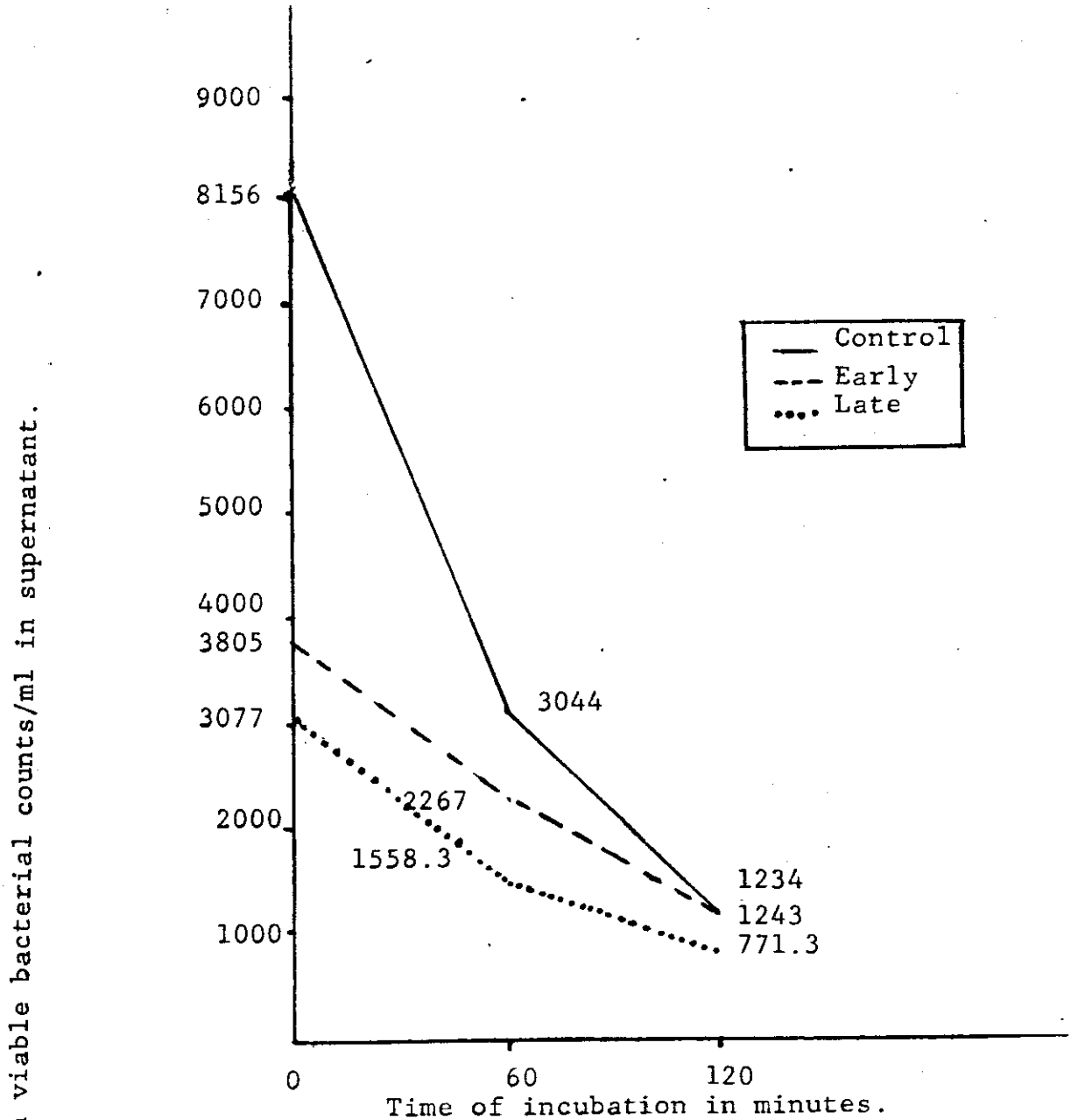


Fig.3: Phagocytosis of Staphylococcus aureus by PMN leukocytes of different human groups. (Mean total viable bacterial counts at different incubation times).

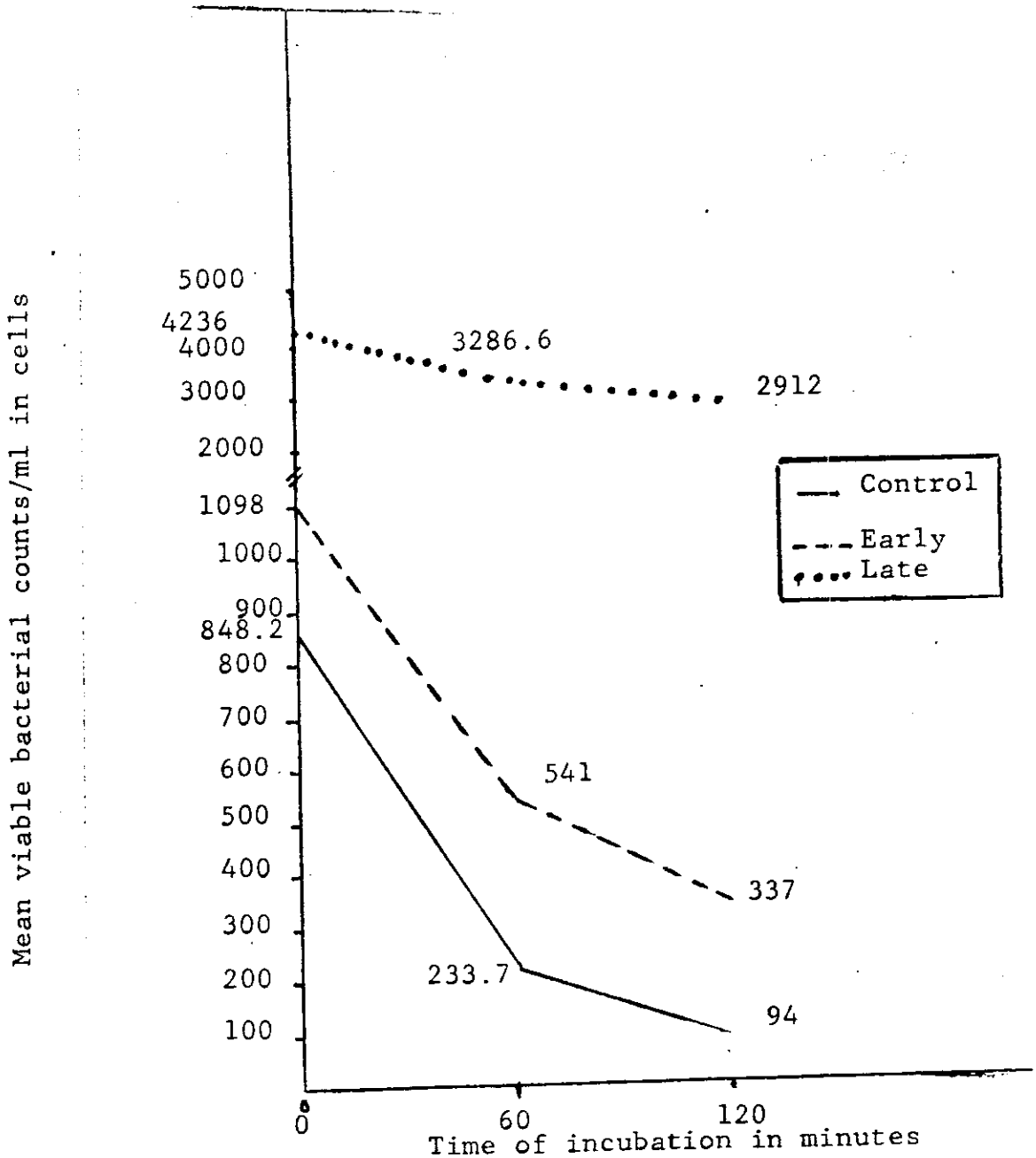


Fig.4: Intracellular killing of Staphylococcus aureus by PMN of different human groups.
(Mean total viable bacterial counts at different incubation times).

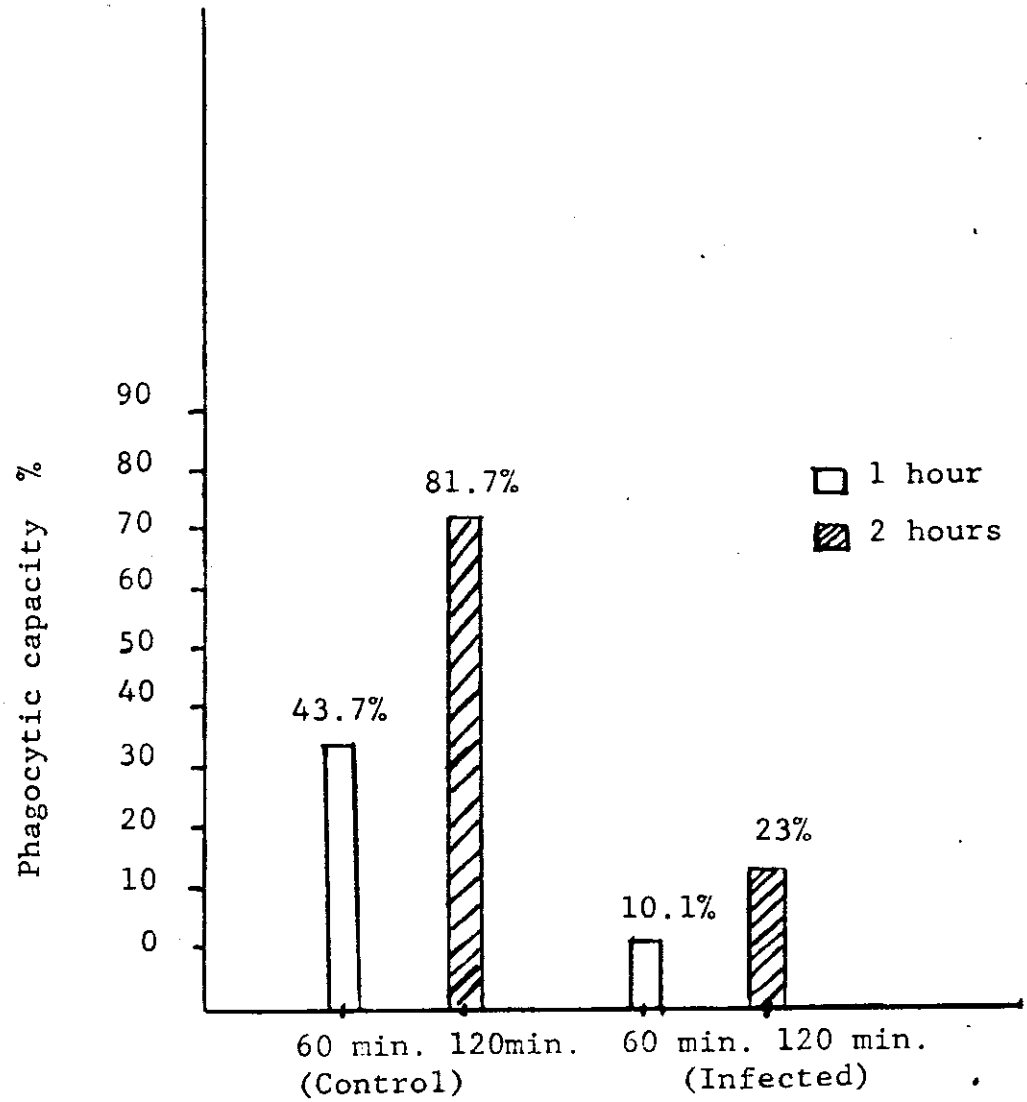


Fig.5: Phagocytic capacity of the mice group at different incubation times.

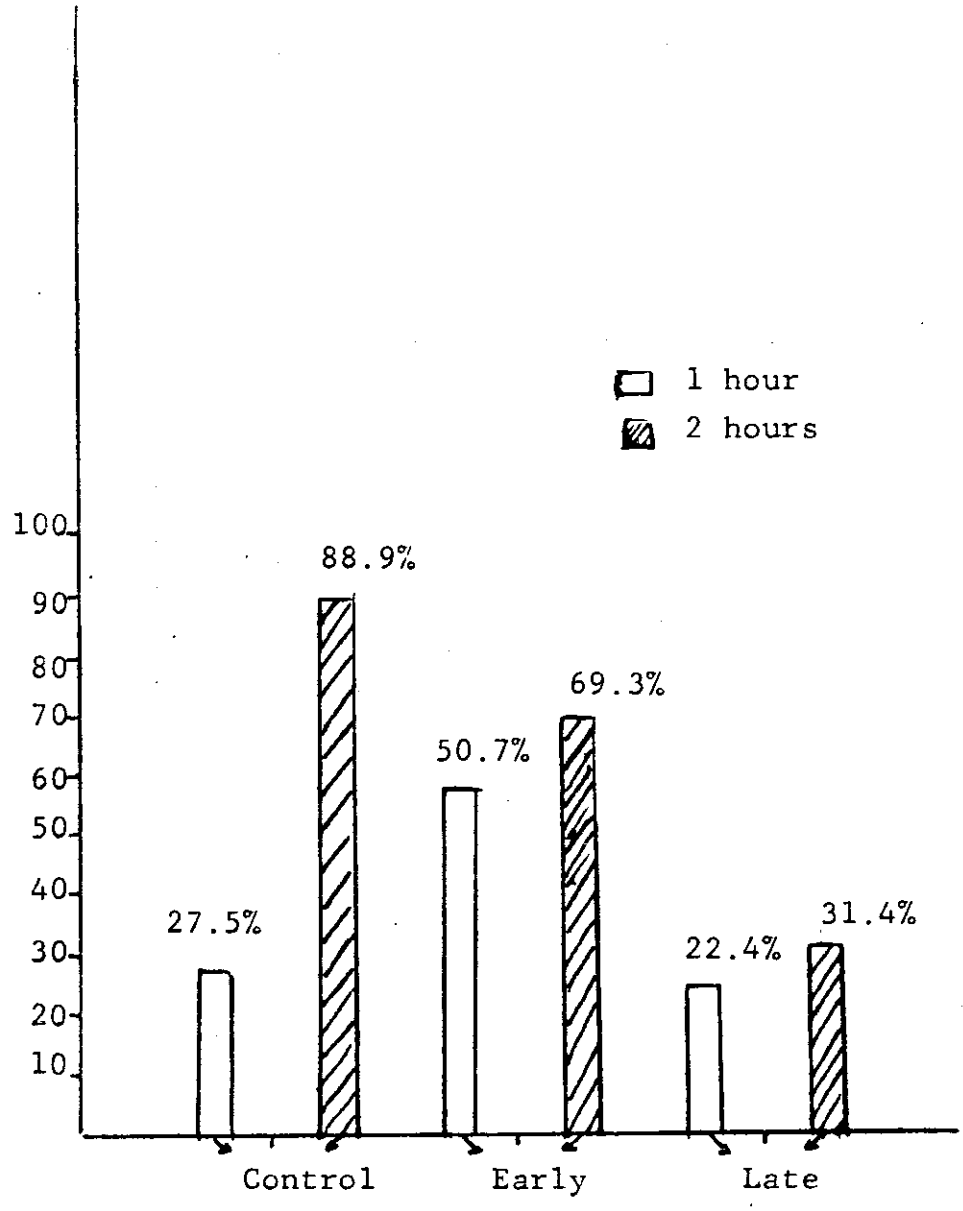


Fig.8: Bactericidal capacity of human groups at different incubation times.

RESULTS OF PLAQUE FORMING CELL RESPONSE

I. Mice Group:

Figure (1) shows that the highest value of the mean plaque forming cell response is in group $IIIA_1$. The lowest value is in group $IIIA_2$.

There is a significant difference between the control group (GI) and all other groups except $IIIA_1$ and the $IIIB_1$ where there is a highly significant difference (the P value is less than 0.001).

A highly significant difference is found between group III A_1 and group III A_2 (The P value is less than 0.001). Also there is a highly significant difference between group III A_1 and group III A_3 (The P value is less than 0.001).

Figure (2) shows that the highest value of the mean plaque forming cell response is in mice injected with sheep RBCs 5 days before dissection (Group II Non infected group) followed by the group $IIIB_2$ (infected for 9-12 weeks) and injected with SRBCs, 5 days before dissection. The lowest value of the mean plaque forming

cell responses is in mice infected with S.mansoni for 9-12 weeks and injected with SRBCs 10 days before dissection (Group III B_3).

A highly significant difference between group II and $IIIA_1$ can also be observed (the P value is less than 0.001).

Also a highly significant difference between group $IIIA_4$ and $IIIA_5$, (the P value is less than 0.001), as well as between group III B_1 and $IIIB_2$ (the P value is less than 0.001) or between $IIIB_1$ and $IIIB_3$ (the P value is less than 0.001).

So on statistical analysis, the differences in the PFC response between the group II of mice injected with Sheep RBCs (5 days before dissection) and the other groups found to be highly significant, (the P value is less than 0.001).

Table (9) shows the mean and stander deviation of the number of plaque forming cells of different groups of mice. The highest value was found in group II followed by group $IIIB_2$ then group $IIIA_1$; group $IIIA_4$, group $IIIB_1$, group $IIIB_5$, group $IIIA_3$, group $IIIA_2$, group $IIIB_2$, then lastly group I.

II. Human Group:

Table (13), Figure (3) shows that there is a marked significant difference between the control group and the two other schistosomal groups (early and late). Also there is a marked significant difference between early and late cases (the t value is 6.77 and P value is less than 0.001).

R E S U L T S

Table 1: The plaque forming cell response in 25 control mice (neither injected with SRBCs nor infected with cercariae (Group I).

Exp. No.	The mean No. of PFC response/10^6 spleen lymphocytes in the individual mouse tested $\pm$ S.D.
1	Zero
2	1
3	Zero
4	4
5	2
6	Zero
7	Zero
8	2
9	1
10	Zero

The mean No. of PFC/10^6 spleen lymphocytes of the whole group was $\bar{X}$ = 1 and S.D. $\pm$ = 1.3/10^6 spleen lymphocytes.

Table 2: The plaque forming cell response in 25 mice injected with SRBCs and dissected 5 days later (Group II).

Exp.No.	The mean No. of PFC response/10^6 spleen lymphocytes in the individual mouse tested $\pm$S.D.
1	435
2	579
3	724
4	789
5	888
6	770
7	1080
8	1232
9	200
10	500

The mean No of PFC/10^6 spleen lymphocytes of the whole group was $\bar{X}$ = 724.7 and $\pm$ S.D. = $\pm$ 303.2/10^6 spleen lymphocytes.

Table 3: The plaque forming cell response 4 days after infection of 10 mice with cercariae(Group III A_1).

Exp.No.	The mean No. of PFC response/10^6 spleen lymphocytes in the individual mouse tested $\pm$ S.D.
1	190
2	178
3	208
4	105
5	50

The mean No. of PFC/10^6 spleen lymphocytes of the whole group was $\bar{X}$ = 146.2, S.D. $\pm$ = 66.5/10^6 spleen lymphocytes.

The group was tested for the presence of worms in liver and mesentry, the results was negative.

Table 4 : The plaque forming cell response 7 days after infection of 10 mice with cercariae (Group III A_2).

Exp. No.	The mean No. of PFC response/10^6 spleen lymphocytes in the individual mouse tested $\pm$ S.D.
1	Zero
2	Zero
3	1
4	Zero
5	Zero

The mean No. of PFC/10^6 spleen lymphocytes of the whole group was $\bar{X}$ 0.2 and S.D. = $\pm$ 0.4/10^6 spleen lymphocytes.

The group was tested for the presence of worms in liver and mesentry, the result was negative.

Table 5: The plaque forming cell responseone month after infection of 10 mice with cercariae (Group III A_3).

Exp.No.	The mean No. of PFC/10^6 spleen lymphocytes in the individual mouse tested ± S.D.
1	1 ±
2	5 ±
3	5 ±
4	2 ±
5	1 ±

- The mean No. of PFC/10^6 spleen lymphocytes of the whole group was 2.8 and S.D. ± 2 /10^6 spleen lymphocytes.

- The group was tested for the presence of worms in liver and mesentry, the following results were obtained.

Exp. No. 1 = 2 ♂ + 1 ♀ immature worms

Exp. No. 2 = 3 ♀ + 2 ♂ "

Exp. No. 3 = 1 ♀ + 2 ♂ "

Exp. No. 4 = 3 ♂ + 1 ♀ "

Exp. No. 5 = 2 ♂ + - ♀ "

Table 6 a : The plaque forming cell response in 10 mice infected with cercariae for one month and injected with 2 X 10^8 SRBCs 5 days before dissection. (Group III A_4).

Exp.No.	The mean No. of PFC/10^6 spleen lymphocytes in the individual mouse tested ± S.D.
1	146
2	73
3	83
4	50
5	115

- The mean No. of PFC /10^6 spleen lymphocytes of the whole group = 93.4 and S.D. ± 37.5/10^6 spleen lymphocytes.
- The group was examined for the presence of worms in liver and mesentry the following results were obtained.

Exp. No. 1 = 3 immature ♂

No. 2 = 3 " ♂ + 1 immature ♀

No. 3 = 2 " ♂ + 1 " ♀

No. 4 = 1 " ♂ + 2 " ♀

No. 5 = 1 " ♂ — ♀

Table 6 b : The plaque forming cell response in 10 mice infected with cercariae for one month and injected with $2X10^8$ SRBCs 10 days before dissection.

(Group III A_5).

Exp.No.	The mean No. of PFC/10^6 spleen lymphocytes in individual mouse tested $\pm$ S.D.
1	10
2	25
3	16
4	30
5	5

- The mean No. of PFC/10^6 spleen lymphocytes of the whole group was 17.2 and S.D. $\pm$ 10.3/10^6 spleen lymphocytes.

- The decrease in number of the plaque means that the initial stimulation was due to the antigenic stimulation of the SRBCs (i.e.) the immune system in infected mice is still working for antigens other than the schistosomal antigens.

Table 7 : The plaque forming cell response in 15 mice infected with cercariae for 9-12 weeks (Group III B_1).

Exp.No.	The mean No. of PFC/10^6 spleen lymphocytes in the individual mouse tested S.D. $\pm$
1	25
2	40
3	1
4	50
5	Zero
6	Zero

9-12 weeks after infection of Swiss albino mice with S. mansoni cercariae, the plaque assay gave a mean No. of Ab forming cells of 19.3 and S.D. $\pm$ = 22.2/10^6 spleen lymphocytes.

The group was examined for the presence of worm in liver and mesentry the following results were obtained:

Exp. No. 1 = 2 mature ♀ and 1 mature ♂
No. 2 = 3 mature ♀ and 2 mature ♂
No. 3 = - and 2 mature ♂
No. 4 = 3 mature ♀ and 2 mature ♂
No. 5 = 2 mature ♀ and -ve ♂
No. 6 = 1 mature ♀ and 2 mature ♂

The microscopic field in all experiment was full of Sch.mansoni eggs.

Table 8 a: The plaque forming cell response in 30 mice infected with Sch.mansoni for 9-12 weeks and injected 5 days before dissection with 2 X 10^8 sheep red cells. (Group III B_2)

Exp.No.	The mean No. of PFC/10^6 spleen lymphocytes in individual mouse tested ± S.D.
1	250
2	340
3	80
4	550
5	290
6	78
7	293
8	56
9	98
10	42

The mean No. of PFC/10^6 spleen lymphocytes of the whole group was 207.7 S.D. ± 165.3

Table 8 b : The plaque forming cell response in 15 mice infected with Sch.mansoni for 9-12 weeks and injected 10 days before dissection with 2 X 10^8 sheep red cells (Group III B_3)

Exp. No.	The mean No. of PFC/10^6 spleen lymphocytes in individual mouse tested.
1	Zero
2	4
3	1
4	Zero
5	3

The mean No. of PFC/10^6 spleen lymphocytes of the whole group was 1.6 and S.D. $\pm$ 1.8.

This table illustrated that the No. of the PFC decreased greatly reaching the original position; this means that the elevation in number is due to SRBCs stimulation it indicats that the immune system is still working.

Table 9 : A comparison between the plaque cell response different groups of mice.

No. of mice	Groups of mice	Mean ± S.D.
25	Group I = Control group: Mice neither infected with S.mansoni not injected with sheep RBCs	1.0 ± 1.3
25	Group II= Control group: Mice injected with sheep RBCs.	724.7±303.2
	GroupIII= Infected group:	
10	A1 = Mice infected with cercariae and dissected after 4 days.	146.2±66.5
10	A2 = Mice infected and dissected after 7days.	0.2 ± 0.4
10	A3 = Mice infected for one month.	2.8 ± 2.0
10	A4 = Mice infected for one month and injected with sheep RBCs 5 days before dissection	93.4 ± 37.5
10	A5 = Mice infected for one month and injected with sheep RBCs 10 days before dissection	17.2±10.3
15	B1 = Mice infected for 9-12 weeks.	19.3 ± 22.2
15	B2 = Mice infected for 9-12 weeks and injected with sheep RBCs 5 days before dissection	207.7±165.3
15	B3 = Mice infected for 9-12 weeks and injected with sheep RBCs 10 days before dissection	1.6 ± 1.8

Table 10 : The plaque forming cell response in 20healthy human controls.

Exp.No.	The mean No. of PFC/10^6 blood lymphocytes in the individual human tested $\pm$ S.D.
1	98
2	72
3	60
4	88
5	62
6	91
7	200
8	115
9	300
10	60
11	63
12	67
13	82
14	320
15	120
16	205
17	117
18	100
19	50
20	81

The mean No. of PFC/10^6 lymphocytes of the whole group was 118 and S.D. $\pm$ = 77.6.

Table 11 : The plaque forming cell response in 15 humans infected with Sch.mansoni (Early stage)

Exp. No.	The mean No. of PFC/10^6 blood lymphocytes in the individual human tested ± S.D.
1	80
2	20
3	55
4	100
5	60
6	76
7	36
8	25
9	23
10	50
11	45
12	29
13	40
14	66
15	29

The mean No. of PFC/10^6 lymphocytes of the whole group was 48.9 and S.D. ± = 23.7.

Table 12 : The plaque forming cell response in 15 humans infected with Sch.mansoni (Late stage).

Exp.No.	The mean No. of PFC/10^6 blood lymphocytes in the individual human tested ± S.D.
1	4
2	19
3	Zero
4	12
5	24
6	6
7	Zero
8	Zero
9	Zero
10	2
11	1
12	Zero
13	9
14	5
15	Zero

The mean No. of PFC/10^6 lymphocytes of the whole group was 5.4 and S.D. ± = 7.5 .

Table 13 : A comparison between the plaque forming cell responce of different groups of humans

No.of cases	Groups of human tested		Mean ± S.D.	t value	P value
20	Group I	human control	118.0±77.6		
15	Group II	Early cases of Sch. mansoni infection.	48.9±23.7	3.755	0.001 H.Sig.
15	Group III	Late cases of Sch. mansoni infection.	5.4± 7.5	6.47	0.001 H.Sig.

Table 13 shows that:

There are highly significant differences between the control group and the two other bilharzial groups (early and late). Also there is a highly significant difference between early and late cases ($t = 6.77$, $P < 0.001$).

Groups I . Human control
II. Early cases of S.mansoni infection
III. Late cases of S.mansoni infection.

Mean and S.D.± values of plaque forming cell response among different groups of mice.

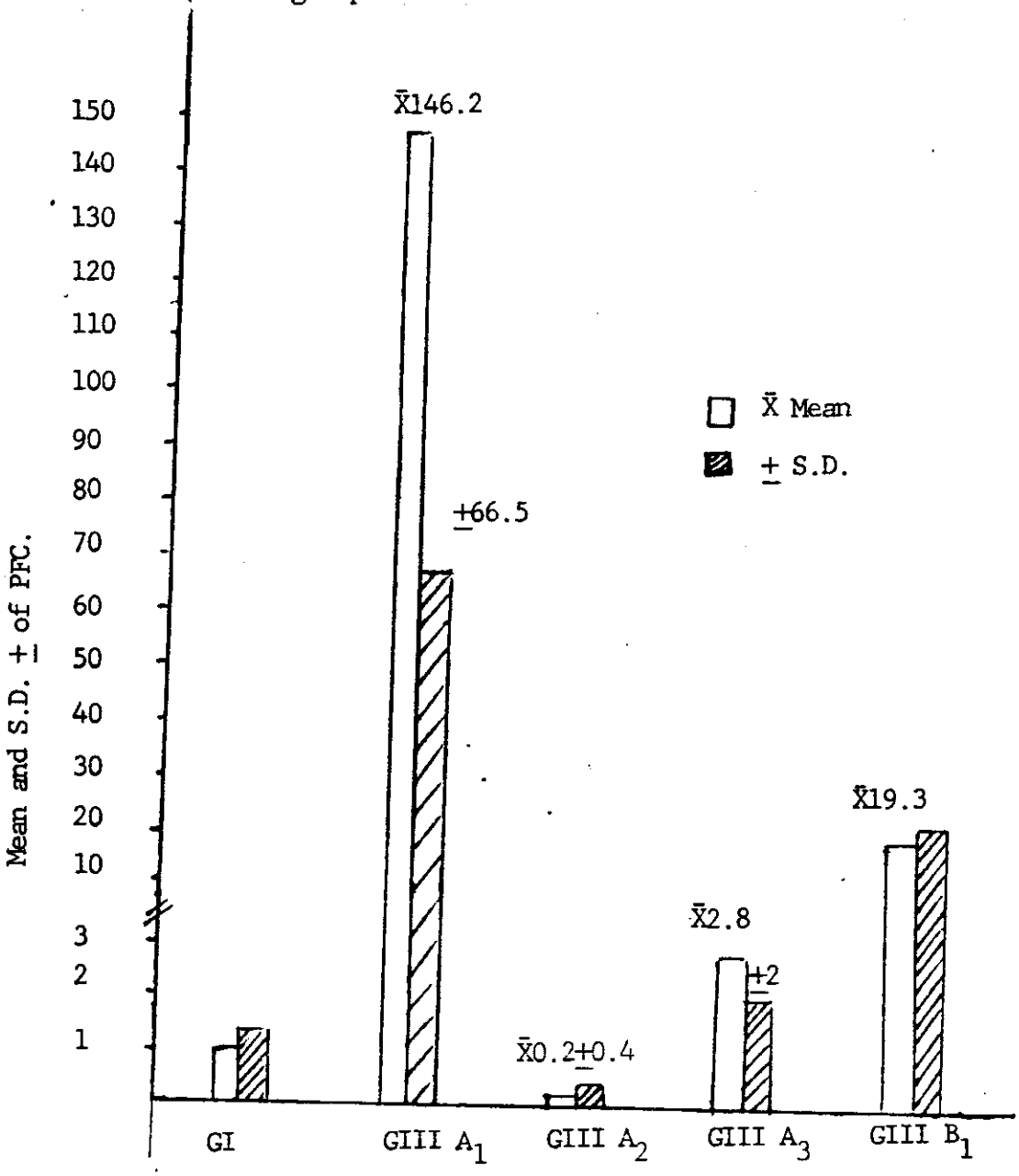


Fig.1: Groups.

GI = PFC response of control mice.
$GIIIA_1$= PFC response 4 days after infection.
$GIIIA_2$= PFC response 7 days after infection.
$GIIIA_3$= PFC response one month after infection
$GIIIB_1$= PFC response 9-12 weeks after infection.

Mean and S.D. ± values of plaque forming cell response of different groups of mice challenged with sheep R.BCs.

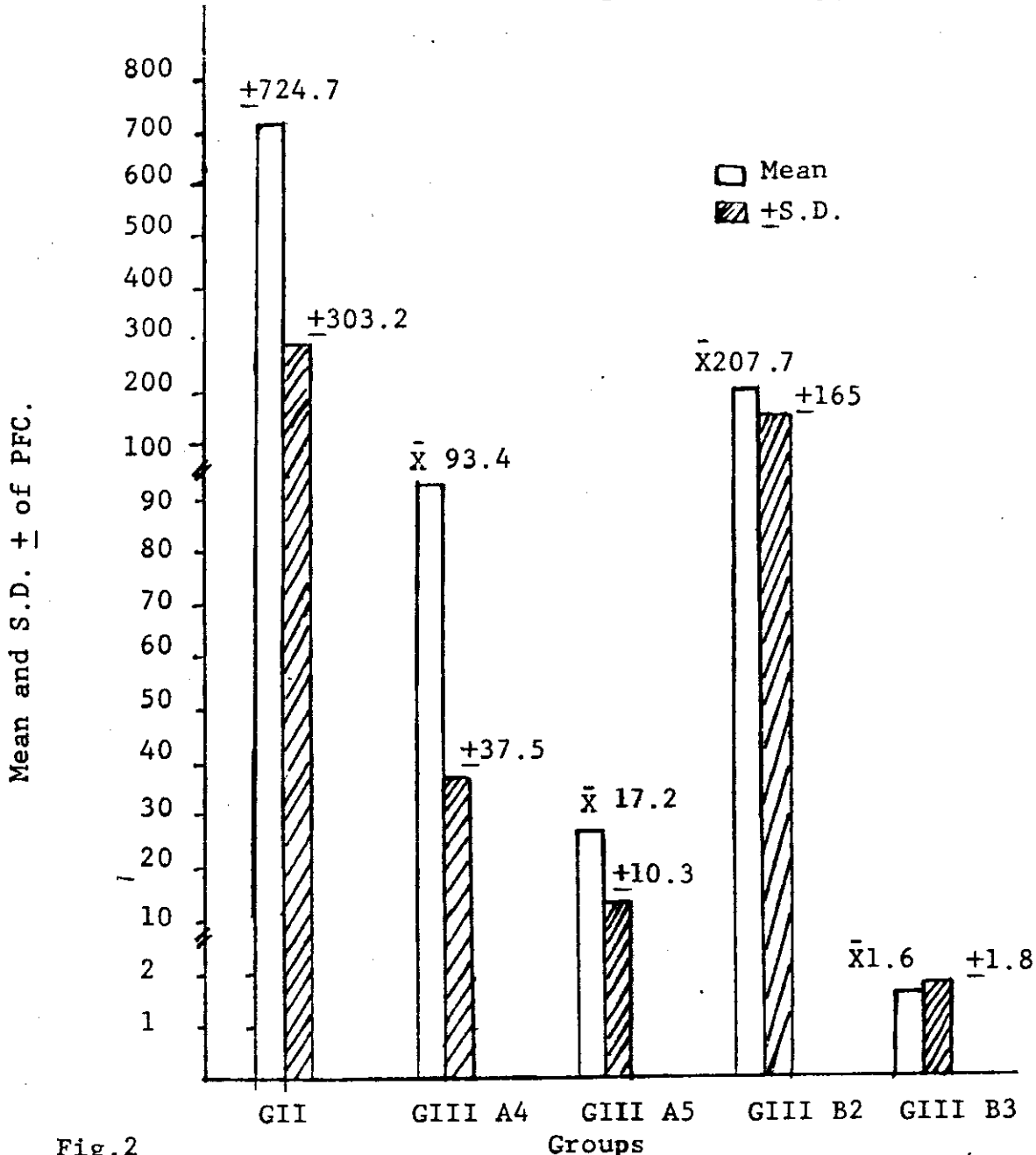


Fig.2

GII = PFC response in mice immunized with sheep R.B.Cs 5 days before dissection.

GIIIA4= PFC response in mice infected with S.mansoni for one month and injected with sheep R.B.Cs 5 days before dissection.

GIIIA5= PFC response in infected mice for one month and injected with sheep R.B.Cs 10 days before dissection.

GIIIB2= PFC response in infected mice for 9-12 weeks and injected with sheep R.B.Cs. 5 days before dissection.

GIIIB3= PFC response in infected mice for 9-12 weeks and injected with sheep R.B.Cs 10 days before dissection.

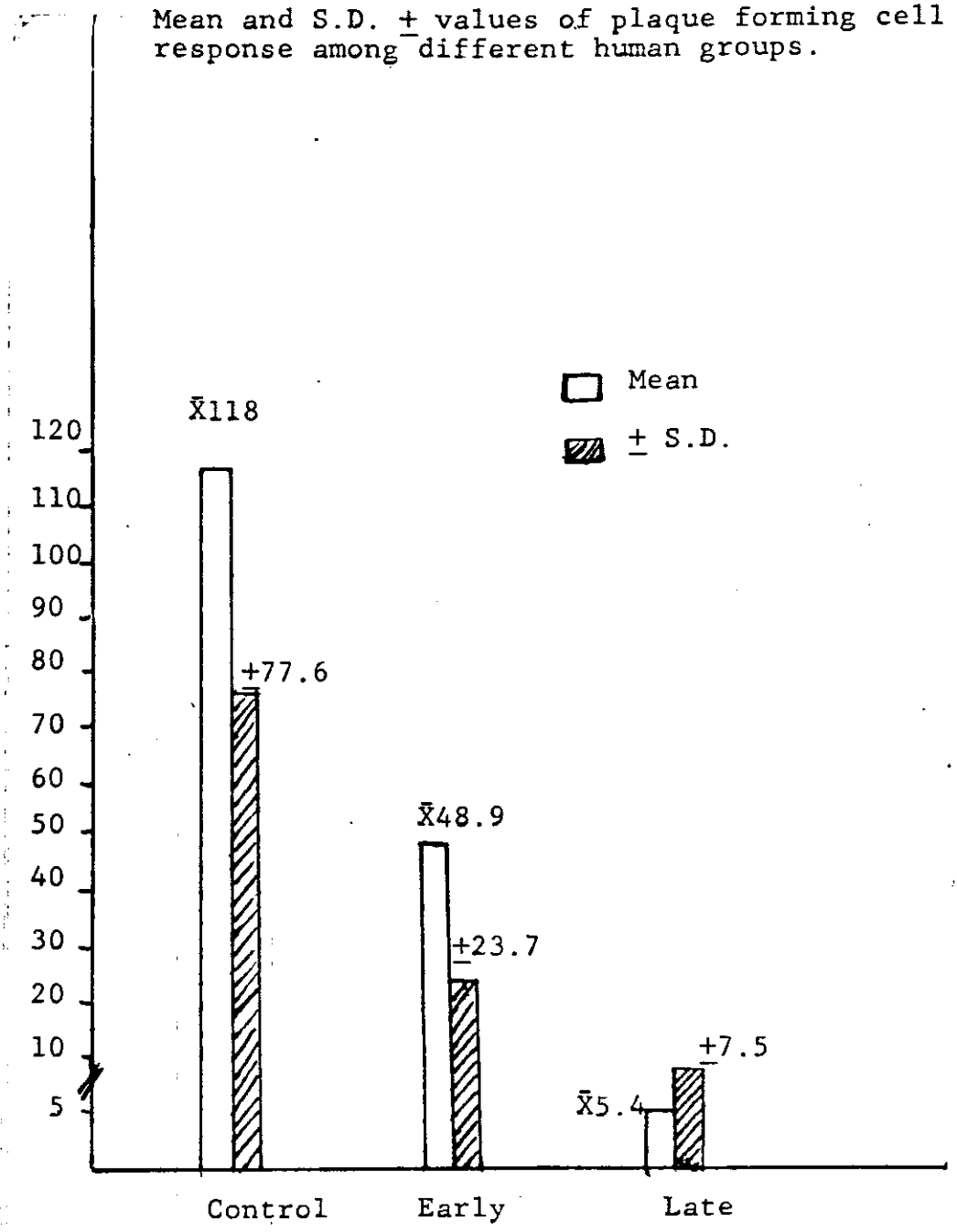


Fig. 3: A comparison between the PFC of different human groups.

DISCUSSION