CHAPTER IV

RESULTS

I. Patient Population

a) At Entry

The 61 patients under this study could be divided at the time of admission into the study into 18 asymptomatic, 34 PGL, 3 ARC and 6 AIDS based on clinical classification[68]. Their age, sex and risk factors are summarized in Table V. The majority (90%) were males and the mean age was 29.2 ± 7.2 years old. Half (52.5%) were homosexuals or bisexuals and 6 of the 9 symptomatic HIV patients (ARC and AIDS) or 67% were also homo/bisexuals. Male heterosexuals and IVDUs constituted of 21.3% and 11.5% of the study group respectively.

b) At 2 Years

At the end of the 2 year follow-up, 55.6% of the initially asymptomatic HIV progressed to PGL, ARC, AIDS or died (Table VI). In a few of the PGL patients, lymphadenopathy could no longer be noted by 2 years whereas 11.7 progressed to a more advanced disease stage. Collectively, 7 of the 52 initially asymptomatic HIV patients (asymptomatic and PGL) or 13.5% progressed to ARC, AIDS or died (Table VI). Similarly, all 3 ARC patients at entry progressed to AIDS (2) or death (1). Of the 6 patients initially diagnosed as AIDS, 2 died by 2 years and the remaining 4 the disease had progressed, ie., more opportunistic infections or other complications.

II. Comparing Immunologic Parameters of HIV Patients Under the Study at Entry and at the End of 2-Year Follow-Up or Just Before Death

The percentage and number of CD_4^+ T cells, CD_8^+ T cells. CD_4^+/CD_8^+ ratio, total T cell number, and β_2-microglobulin levels of the entire group of patients which were classified into various stages at entry M0 and again at the end of 2-year follow-up or just before death (M24) are presented in Table VII. The degree of immunologic abnormalities at entry correlated well with the advancement of the disease. Most profound changes were seen in AIDS followed successively by ARC and PGL. There was no significant difference between asymptomatic and PGL (Table VII). The changes were the decrease in total T cell number, percentage and total CD_4^+ T cells, total CD_8^+ T cells as well as CD_4^+/CD_8^+ ratios and the increase in β_2-microglobulin levels. The changes in the percentage of CD_8^+ T cells were not obvious in our study.

As compared to the normal controls (N=22)

(a) for AIDS group, all these markers were significantly different from normal controls except for the percentage of CD_8^+ T cells.

(b) for ARC, all these markers were significantly different from normal controls except for total T cell number at M0 and M24, the percentage of CD_8^+ T cells at M0 and M24 and the absolute number of CD_8^+ T cells at Mo.

(c) for PGL, all these markers were significantly different from normal controls except for total T cell number at M0 and absolute number of CD_8^+ T cells at M0.

(d) for asymptomatic,all these markers were significantly different from normal controls except for total T cell number at M0, the percentage and absolute number of CD_8^+ T cells at M0.

For the comparison of immunologic markers between M0 (at entry) and M24 (at 2 year follow-up or just before death), there were no significant differences between M0 and M24 for any groups (AIDS, ARC, PGL or asymptomatic) except for the significantly lower absolute number of CD_4^+ T cells in PGL at M24 and the significantly higher β_2 - microglobulin level in asymptomatic at M24 as compared to M0 (Table VII).

III. Immunologic Parameters of Progressors and Non-Progressors

At the end of the 2-year follow-up, the 61 patients could be divided into 2 groups of progressors (N=16) and non-progressors (N=45). Progressors were defined as individuals who progressed from asymptomatic HIV infection (including PGL) to symptomatic infection (ARC and AIDS) or death, or from ARC to AIDS or death, or from AIDS to death or having more episodes of opportunistic infections or other complications. Non-progressors were defined as individuals who had no clinical progression as mentioned above by 2 years. All of the non- progressors were the patients initially assigned to the groups of asymptomatic and PGL. The biographic data and the risk factors of the progressor and non-progressor groups were summarized in Table VIII. No siginificant difference between the 2 groups was found in regard to age, sex and risk factors.

When the immunologic parameters at entry of the progressors were compared with the non-progressors, it became evident that progressors had lower percentage and absolute number

of CD$_4^+$ cells at entry (27% vs 33% and 686 cells/cu.mm. vs 1,010 cells/cu.mm. respectively) but the difference did not reach statistical significance (Table IX). However, the difference became more obvious and reached statistical significance by 12 months and stayed so throughout the 2-year follow-up. On contrary, the percentage and the number of CD$_8^+$ cells between the progressors and non-progressors were essentially identical at entry. The absolute number of CD$_8^+$ cells in the progressor group became significantly less than the non-progressor group from 12 month on (Table IX).

The reduction in the number but not the percentage of CD$_8^+$ cells was indeed the reflection of the reduction of the total T cell (Table IX). The percentage of CD$_8^+$ cells had a tendency to be higher in the progressor group due to the relative reduction in the proportion or percentage of CD$_4^+$ cells but significant difference was obvious only at the 18 month determination (Table IX). CD$_4^+$/CD$_8^+$ ratio, however, was significantly lower in the progressor group both at entry and throughout the 2 year follow-up period. In contrast, although the levels of β_2-microglobulin seemed to be higher in the progressor group but was significant only at entry (Table IX).

IV. Predictive Value of Individual Immunologic Marker

In order to analyse the predictive value of individual immunologic parameter at entry for the development of AIDS, each marker was divided into 3 levels (except for p24 antigen which was divided only into 2 groups), namely, those which were near normal, those which were very abnormal and those in between (Table X). These different levels of a specific marker were analysed according to the Kaplan-Meier plot for the development

of AIDS. From these curves , relative hazards of each parameter can be calculated according to the method of Tibshirani [93,94,95] by referring to that of the near normal as 1.00. If that parameter correlates well with the progression to AIDS, the very abnormal level of that laboratory parameter should have a very high relative hazard, i.e., value greater than 2. The higher the relative hazard, the better is that parameter as prognostic marker.

(a) For the percentage of CD_4

Levels of CD_4^+ cells at enrollment were divided into 3 level ranges, namely, the near normal (> 30%, N=37),the intermediate (20-30%, N=14) and the very abnormal (< 20%, N=10) It is evident by the Kaplan-Meier plot that patients with CD_4^+ T cells less than 20% and between 20-30% at entry were 5.8 and 2.4 times more likely to develop AIDS than those with CD_4^+ T cells more than 30% respectively (Figure 8, Table X). It can also be estimated from Figure 8 that during the 2 year follow-up, 20% of patients who enrolled with CD_4 cells less than 20% progressed to AIDS within 7 months whereas 20% of patients with CD_4 between 20%-30% progressed to AIDS within 21 months and only 11% of patients with CD_4 more than 30% progressed to AIDS within 20 months.

(b) For the absolute value of CD_4

The absolute numbers of CD_4^+ T cells at entry were also divided into 3 level ranges, namely, the near normal (>500/cu.mm., N=47), the intermediate (200-500 /cu.mm., N=8) and the very abnormal (<200 /cu.mm.,N=6). The relative hazards of these 3 groups were 1.0, 6.2 and 12.3 respectively (Figure 9, Table X).

(c) <u>For the percentage of CD8</u>

The percentages of CD_8^+ T cells at entry were divided into 3 level ranges, namely, the near normal (>50%, N=5), the intermediate (40-50%, N=14) and the very abnormal (<40%, N=42). The relative hazards of these 3 groups were 1.0, 1.8 and 0.9 respectively (Figure 10, Table X).

(d) <u>For the absolute value of CD8</u>

The absolute numbers of CD_8^+ T cells at entry were divided into 3 level ranges , namely , the near normal (> 1,000 /cu.mm., N=27), the intermediate (500-1000 / cu.mm., N=24) an the very abnormal (< 500 /cu.mm., N=10). The relative hazards of these 3 groups were 1.0, 2.7 and 7.4 respectively (Figure 11, Table X).

(e) <u>For CD4/CD8 ratio</u>

The CD_4/CD_8 ratio at entry were divided into 3 level ranges, namely, the near normal (>1.0, N=26), the intermediate (0.5-1.0, N=25) and the very abnormal (<0.5, N=10). The relative hazards of these 3 groups were 1.0, 1.3 and 1.9 respectively (Figure 12, Table X).

(f) <u>For β_2-microglobulin</u>

The serum β_2-microglobulin level at entry were divided into 3 level ranges, namely, the near normal (<2.0 mg/L, N=20), the intermediate (2.1-3.0 mg/L , N=32) and the very abnormal (>3.0 mg/L , N=9). The relative hazards of these 3 groups were 1.0, 2.4 and 10.5 respectively (Figure 13, Table X).

(g) <u>For p24 antigen</u>

Serum p24 antigen was present in 17 of the 61 patients at entry, 3 in the asymptomatic, 7 in PGL, 2 in ARC and 5 in patients with AIDS. Its levels ranged from 5 to 38 pg/ml.

Due to its wide range, i.e., from negative to as high as 38 pg/ml, and for statistical simplicity, the serum p24 antigen levels at entry were divided into 2 groups, namely, negative (undetectable level of p24 antigen, N = 44) and positive (any detectable levels of p24 antigen, N=17). The relative hazards of these 2 groups were 1.0 and 5.9 respectively (Figure 14, Table X). The detectable limit of p24 antigen in our assay was 5 pg/ml.

(h) <u>For anti-p24</u>

The serum anti-p24 level at entry were divided into 3 groups, namely, positive, (N=46) weakly or very weakly positive (N=13) and negative (N=2) according to the intensity of the p24 bands shown on the strips. The relative hazards of these 3 groups were 1.0, 14.8 and could not be calculated for the negative group because of too few sample size (N=2) (Figure 15, Table X).

In summary, absolute number and percentage of CD_4^+ T cells at entry appeared to correlate well with the prediction of who was going to develop AIDS within 2 years. The lower the values, the more likelihood is to develop AIDS (Table X). The same was also true for low absolute CD_8^+ T cells, the elevated β_2-microglobulin level p24 antigen positivity and weak or very weak anti-p24 antibodies. No correlation was found with the percentage of CD_8^+ T cells and the CD_4^+/CD_8^+ ratio (Table X).

The usefulness of the absolute number of CD_4^+ T cells at entry as prognostic marker of HIV disease progression was also illustrated by the Kaplan - Meier plot against survival (Figure 22). It can be predicted from the curve that all (100%) of the HIV patients with CD_4^+ T cells less than 400 cells/cu.mm will die within 37 months.

V.Correlation between Variables

Comparisons were made to determine how close the changes in the variables correlated with each other by Pearson Correlation coefficient (Tabel XI). The percentage of CD_4^+ T cells correlated best with absolute number of both CD_4^+ T cells and the CD_4/CD_8 ratio and to a lesser extent with the absolute number of CD_8^+ T cells (r=0.66, 0.81 and 0.32 respectively). There were no correlations of the percentage of CD_4^+ T cells with the percentage of CD_8^+ T cells, β_2-microglobulin and p24 antigen (r=0.13, -0.14 and -0.26 respectively).

The absolute number of CD_4^+ T cells correlated well with the percentage of CD_4^+ T cells, the CD_4/CD_8 ratio and the absolute number of CD_8^+ T cells (r=0.66, 0.58 and 0.80 respectively) but an inverse correlation with the β_2-microglobulin levels (r=-0.30). There were no correlations of the absolute number of CD_4^+ T cells with the percentage of CD_8^+ T cells and p24 antigen (r=0.002 and -0.23 respectively).

The percentage of CD_8^+ T cells correlated well with the absolute number of CD_8^+ T cells and inversely with the CD_4/CD_8 ratio (r=0.39 and - 0.40 respectively). There were no correlations of the percentage of CD_8^+ T cells with β_2-microglobulin and p24 antigen (r=0.25 and 0.04 respectively).

The absolute number of CD_8^+ T cells did not correlate with CD_4/CD_8 ratio, β_2-microglobulin and p24 antigen (r=0.06, -0.16 and -0.12 respectively).

The CD_4/CD_8 ratio correlated inversely with β_2-microglobulin (r=-0.31) but did not correlate with p24 antigen (r=-0.28).

p24 antigen correlated well with β_2-microglobulin (r=0.39).

VI. <u>Combined Predictive Value</u>

The evidences described above indicate that measurements of CD_4^+ T cells are probably the most reliable prognostic markers for HIV progression. However, several of the serum markers are independent of the measurements of CD_4^+ T cells as well as of each other. Therefore, combinations of one serum marker (β_2-microglobulin or p24 antigen or anti – p24) with the measurements of CD_4^+ T cells (absolute number or percentage) were also analysed according to the Kaplan-Meier plot for the development of AIDS. From these curves, relative hazards of each combination were calculated by referring to that of the near normal as 1.0 or 0.0 if there was no progression to AIDS in the near normal group.

a) <u>For combined CD_4 percentage and β_2-microglobulin</u>
The percentages of CD_4^+ T cells and the serum β_2-microglobulin levels at entry were divided into 3 level ranges , namely , the near normal (CD_4^+ T cells > 30% and β_2-microglobulin < 1.5 mg/L, N = 8), the intermediate (CD_4^+ T cells 20-30% and β_2-microglobulin 1.5-2.5 mg/L, N=11) and the very abnormal (CD_4^+ T cells < 20% and β_2-microglobulin > 2.5 mg/L, N=4). The relative hazards of these 3 groups were 0.0, 1.0 and 2.9 respectively (Figure 16, Table XII).

b) <u>For combined CD_4 absolute number and β_2-microglobulin</u>
The absolute numbers of CD_4^+ T cells and the serum β_2-microglobulin levels at entry were divided into 3 level ranges, namely, the near normal (CD_4^+ T cells > 500/cu.mm. and

β_2-microglobulin < 1.5 mg/L, N=8) , the intermediate (CD$_4^+$ T cells 200-500 /cu.mm. and β_2-microglobulin 1.5-2.5 mg/L, N=2) and the very abnormal (CD$_4^+$ T cells < 200 / cu.mm. and β_2-microglobulin > 2.5 mg/L, N=3). The relative hazards of these 3 groups were 0.0, 1.0 and 35.2 respectively (Figure 17, Table XII).

c) For combined CD$_4$ percentage and p24 antigen

The percentages of CD$_4^+$ T cells and the serum p24 antigen levels at entry were divided into 3 groups, namely, the near normal (CD$_4^+$ T cells > 30% and negative p24 antigen, N=26), the intermediate (CD$_4^+$ T cells = 20-30% but positive p24 antigen, N=5) and the very abnormal (CD$_4^+$ T cells < 20% and positive p24 antigen, N=5). The relative hazards of these 3 groups were 1.0, 8.0 and 30.3 respectively (Figure 18, Table XII).

d) For combined CD$_4$ absolute number and p24 antigen

The absolute numbers of CD$_4^+$ T cells and the serum p24 antigen levels at entry were divided into 3 groups, namely, the near normal (CD$_4^+$ T cells > 500/cu.mm. and negative p24 antigen, N=37), the intermediate (CD$_4^+$ T cells = 200-500 but positive p24 antigen, N=4) and the very abnormal (CD$_4^+$ T cells < 200/cu.mm. and positive p24 antigen, N=4). The relative hazards of these 3 groups were 0.04, 1.0 and 1.44 respectively (Figure 19, Table XII).

e) For combined CD$_4$ percentage and anti-p24

The percentages of CD$_4^+$ T cells and the serum anti-p24 levels at entry were divided into 3 groups, namely, the near normal (CD$_4^+$ T cells > 30% and positive for anti-p24, N=30), the intermediate (CD$_4^+$ T cells 20-30% and weakly or very weakly

positive for anti-p24, N=4) and the very abnormal (CD_4^+
T cells < 20% and negative for anti-p24, N=2). The relative
hazards of these 3 groups were 0.2, 1.0 and 8.6 respectively
(Figure 20, Table XII).

f) For combined CD₄ absolute number and anti-p24

The absolute numbers of CD_4^+ T cells and the serum
anti-p24 levels at entry were divided into 3 groups, namely, the
near normal (CD_4^+ T cells > 500/cu.mm. and positive for anti-p24,
N=41), the intermediate (CD_4^+ T cells 200-500/cu.mm. and weakly
or very weakly positive for anti-p24, N = 4) and the very
abnormal (CD_4^+ T cells < 200/cu.mm. and negative for anti-p24,
N=2). The relative hazards of these 3 groups were 0.13, 1.0 and
1.3 respectively (Figure 21, Table XII).

In summary, the combinations of the serum markers
(p24 Ag) with measurements of CD_4^+ T cells seemed to have
substantially greater prognostic value than either was used alone
(Table XII) as shown by the greater relative hazard values.
Nevertheless, it could not be definitely concluded because of the
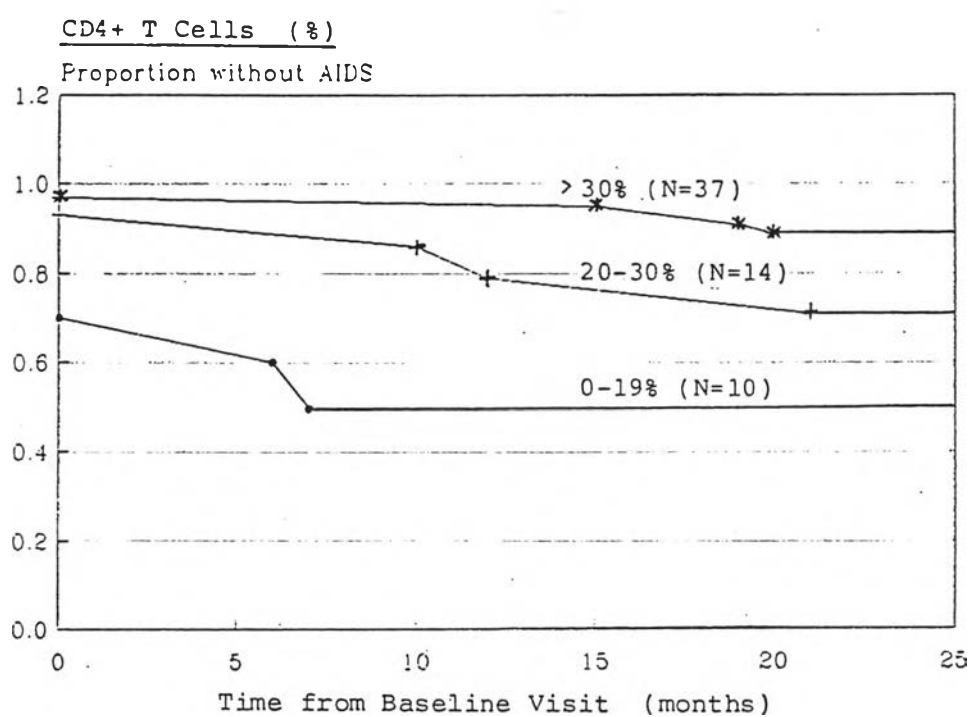unequal sample size in each comparative group.

Figure.8. Kaplan-Meier Plots of the proportion.without
AIDS of 61 HIV-infected patients in whom the
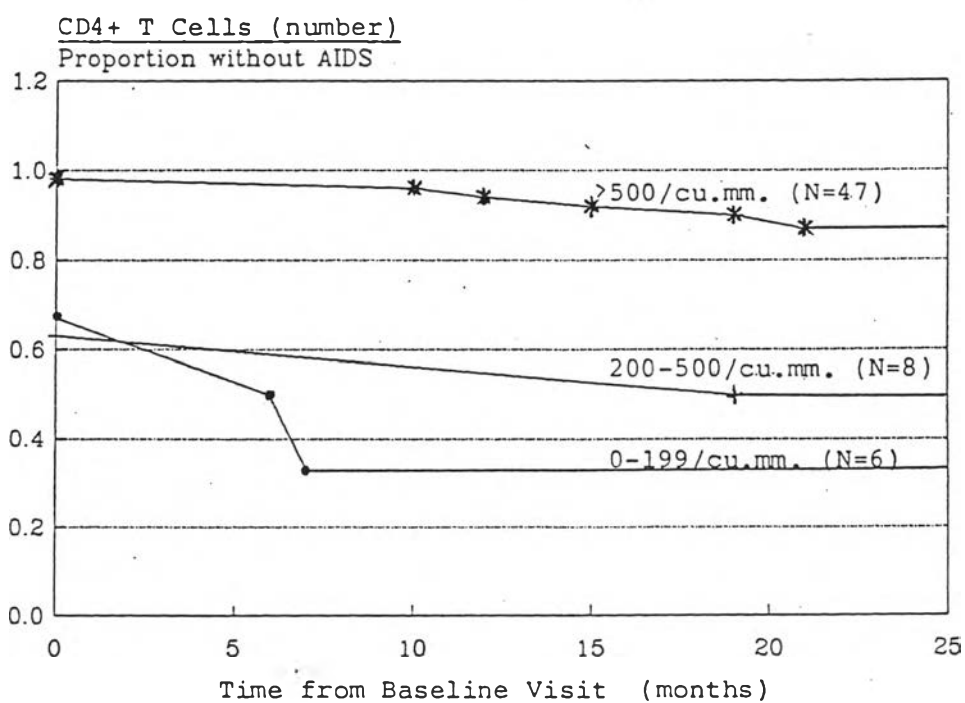percentage of CD4+ T cell were measured.

CD4+ T Cells (number)

Figure 9. Kaplan-Meier Plots of the proportion without AIDS of 61 HIV-infected patients in whom the number of CD4+ T cell were measured.
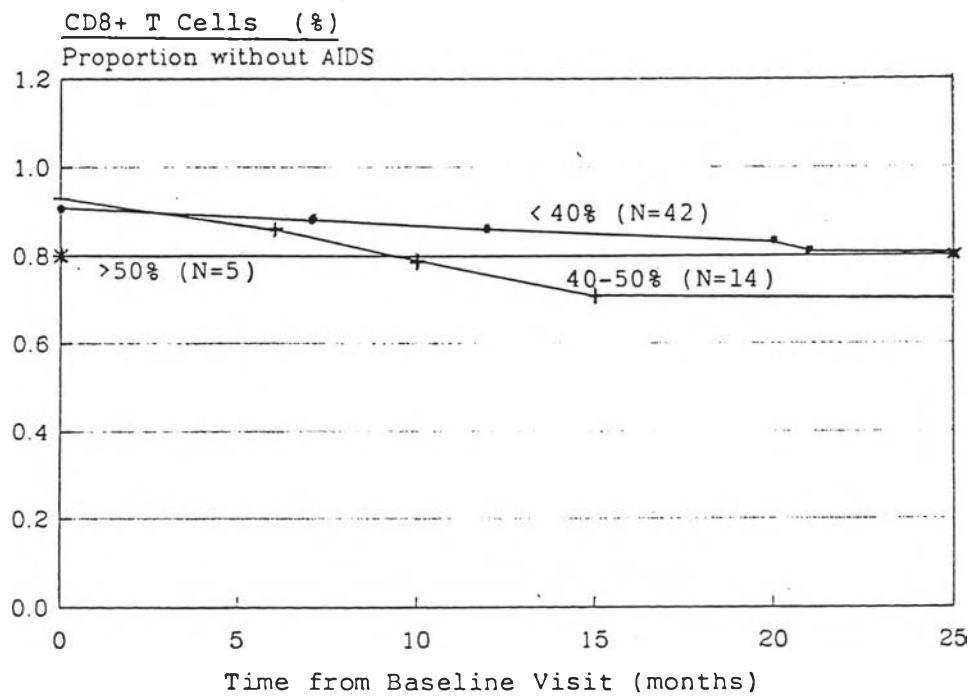
CD8+ T Cells (%)

Proportion without AIDS

Figure 10. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
percentage of CD8+ T cell were measured.

CD8+ T Cells (number)
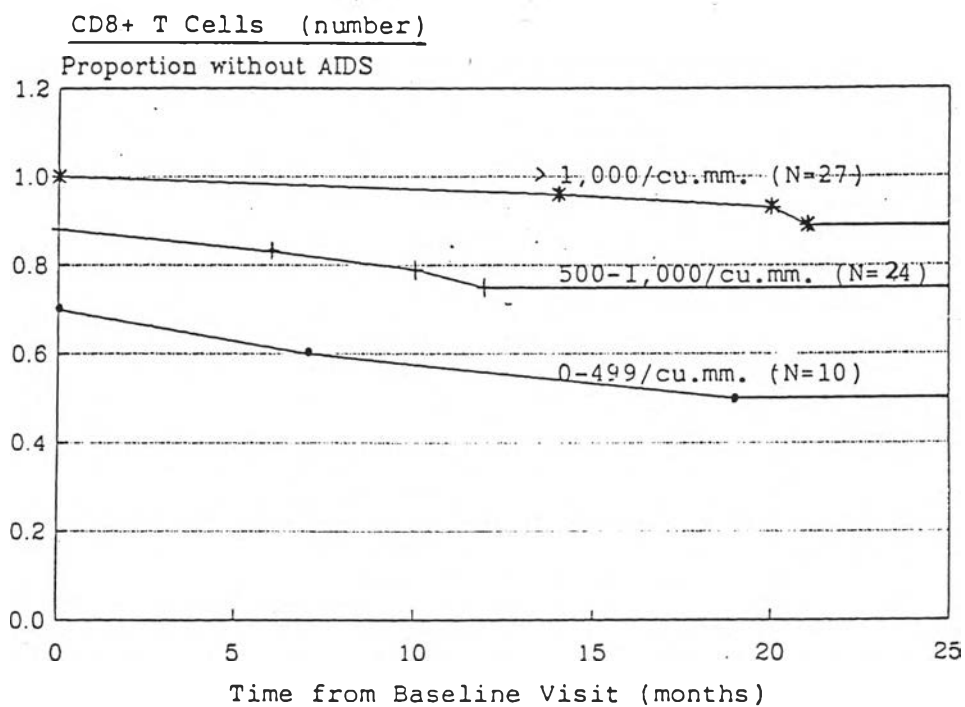

Figure 11. Kaplan-Meier Plots of the proportion without
          AIDS of 61 HIV-infected patients in whom the
          number of CD8+ T cell were measured.

CD4 /CD8 Ratio
proportion without AIDS

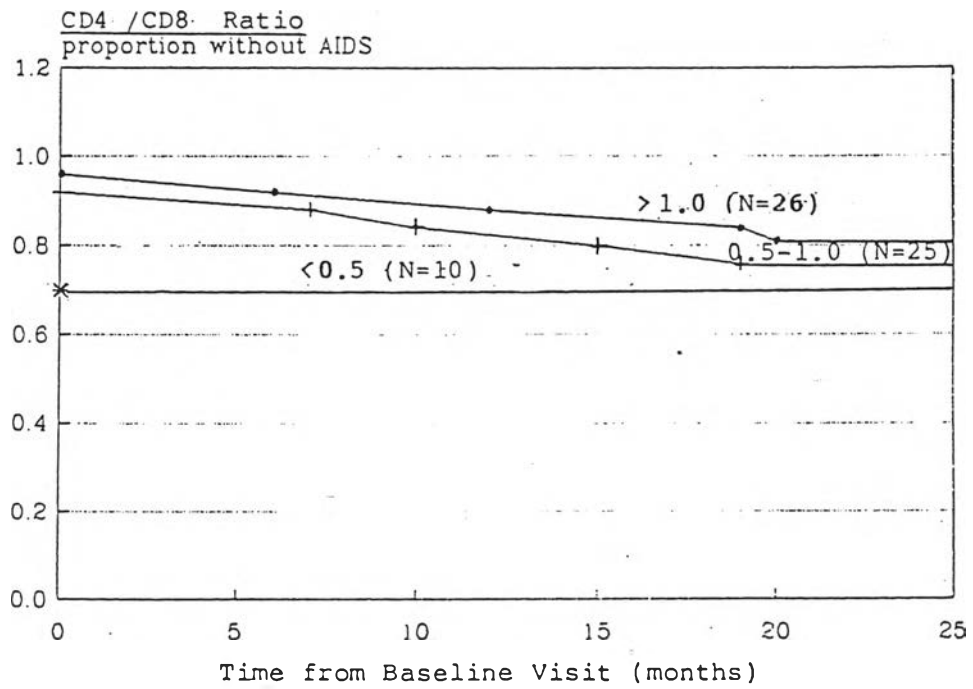Time from Baseline Visit (months)

Figure 12. Kaplan-Meier Plots of the proportion without
           AIDS of 61 HIV-infected patients in whom the
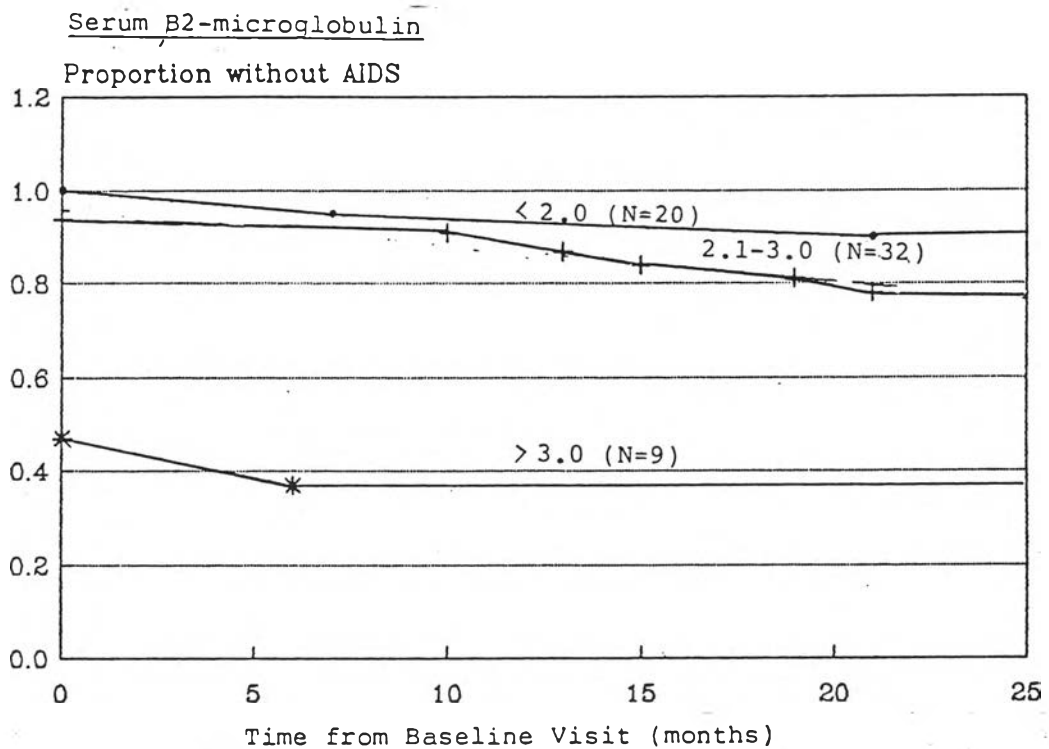   CD4 /CD8 ratio were measured.

Figure 13. Kaplan-Meier Plots of the proportion without AIDS of 61 HIV-infected patients in whom the serum B2-microglobulin level were measured.
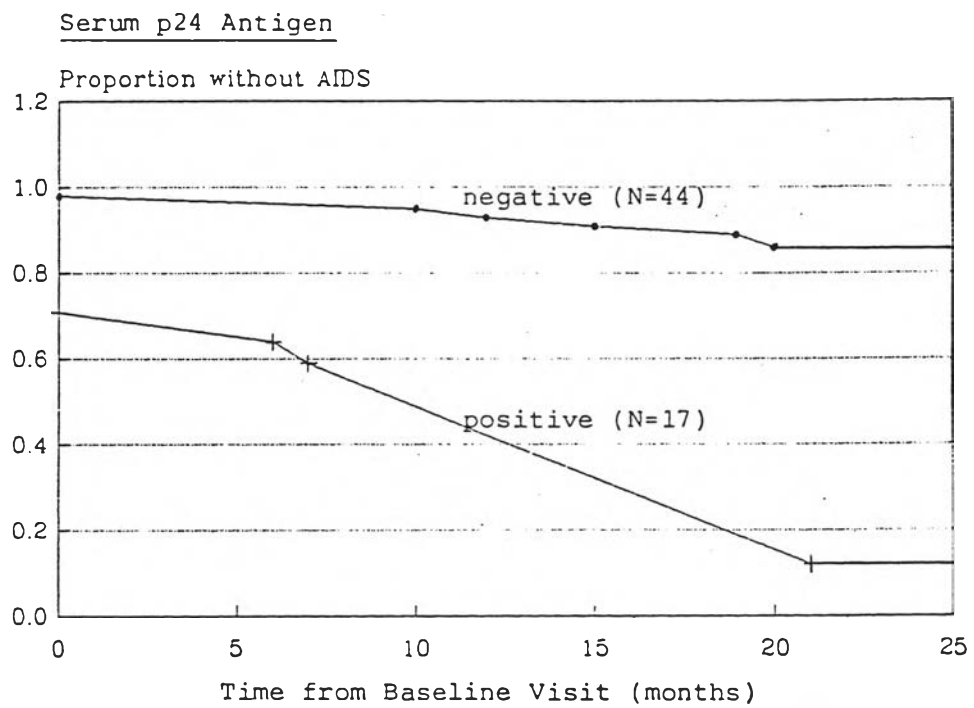
Serum p24 Antigen

Figure 14. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
p24 antigen were measured.

Figure 15. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
anti-p24 were measured.

% of CD4+ T Cells and β2-microglobulin Level

Figure 16. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
percentage of CD4+ T cell were combined with
β2-microglobulin level.

Number of CD4+ T Cells and β2-microglobulin Level

Proportion without AIDS

Figure 17. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
total number of CD4+ T cell were combined with
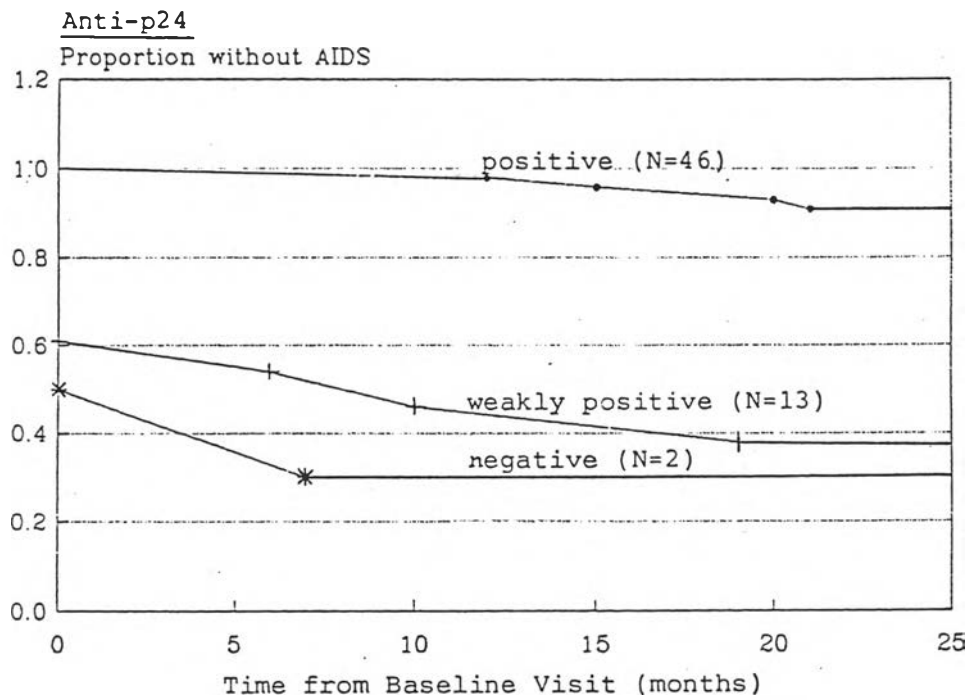β2-microglobulin level.

% of CD4+ T Cells and p24 Antigen

Proportion without AIDS

Figure 18. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
percentage of CD4+ T cell were combined with
p24 antigen.

Number of CD4+ T Cells and p24 Antigen

Proportion without AIDS

Time from Baseline Visit (months)

Figure 19. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
total number of CD4+ T cell were combined
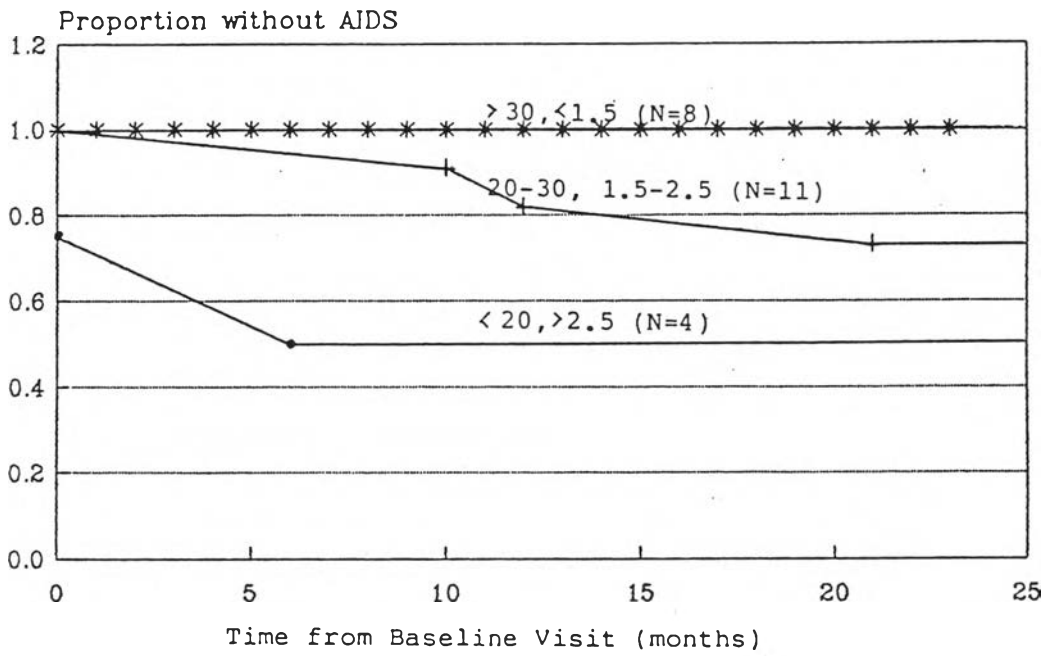with p24 antigen.

% of CD4+ T Cells and Anti-p24
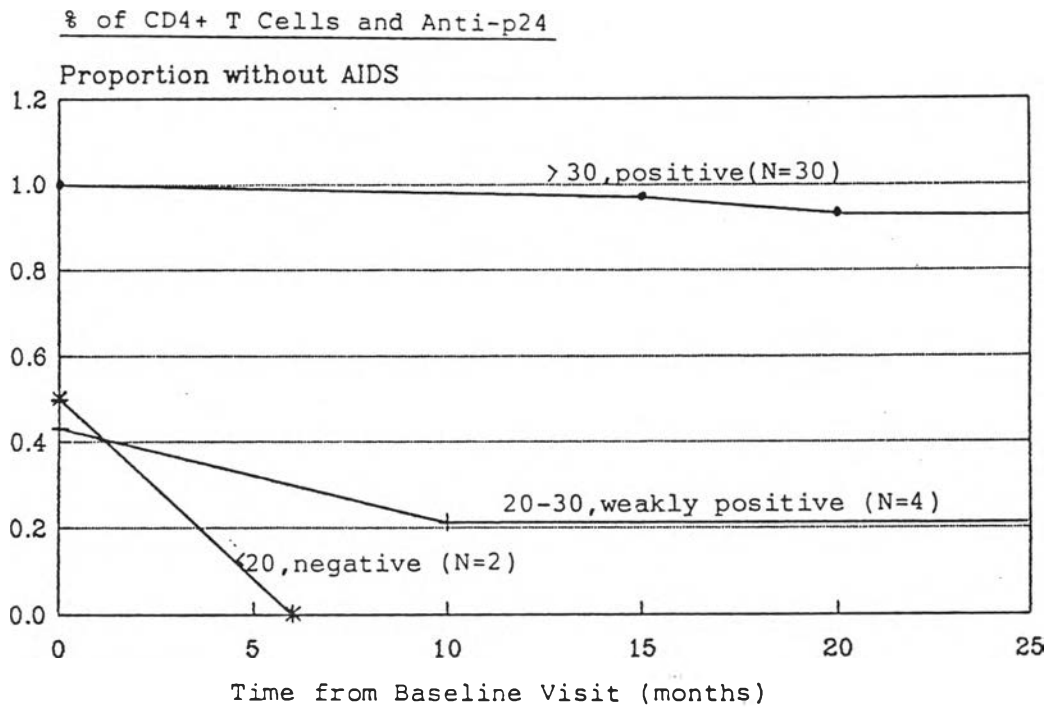
Figure 20. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
percentage of CD4+ T cell were combined with
anti-p24.

Number of CD4+ T Cells and Anti-p24

Proportion without AIDS
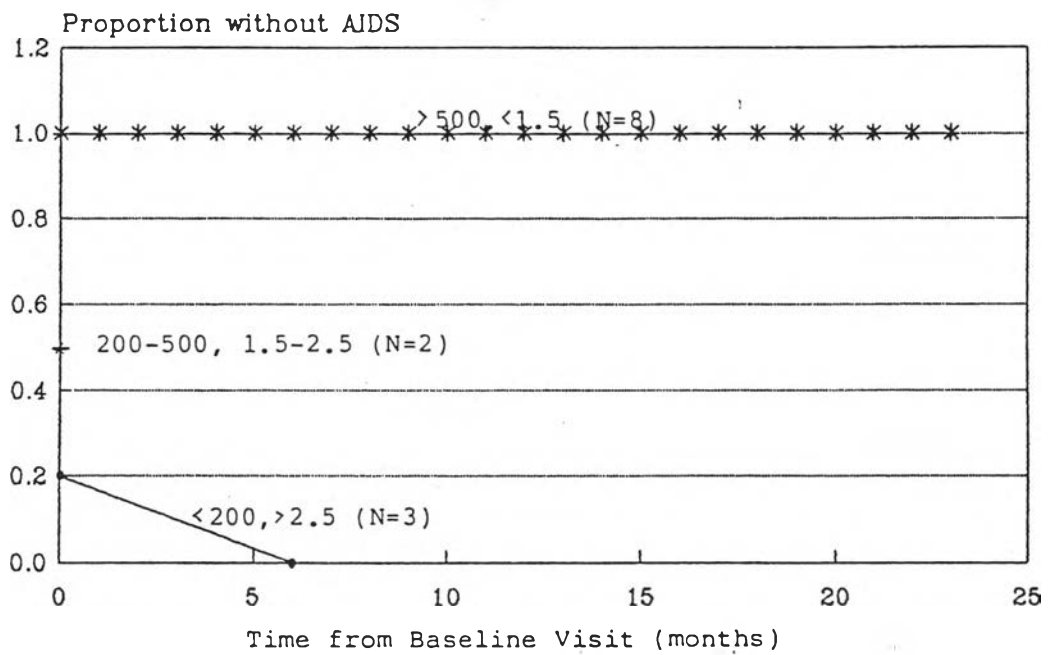

Time from Baseline Visit (months)

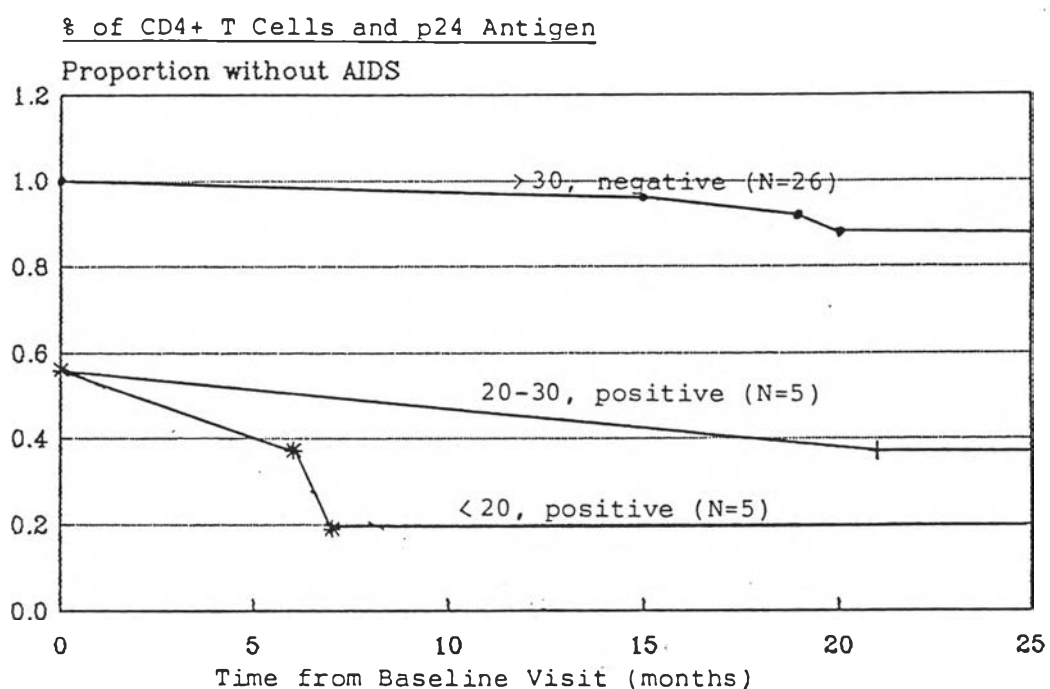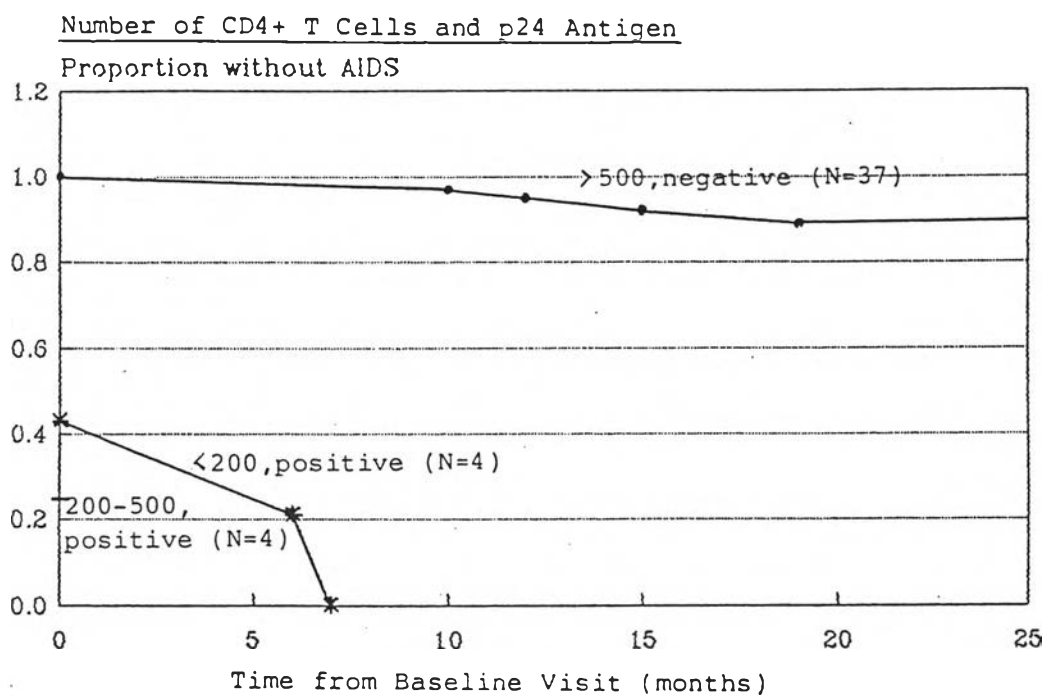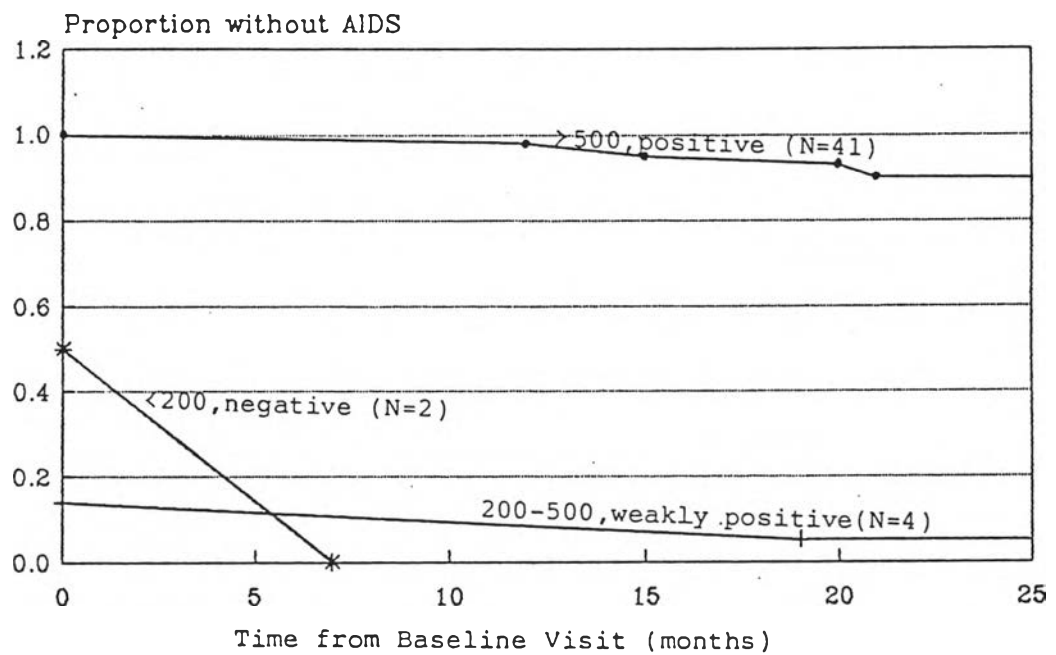Figure 21. Kaplan-Meier Plots of the proportion without
AIDS of 61 HIV-infected patients in whom the
total number of CD4+ T cell were combined
with anti-p24.

The Prognostic Value of Absolute Number of CD4+ T Cells

Proportion without death

Time from Baseline Visit (months)
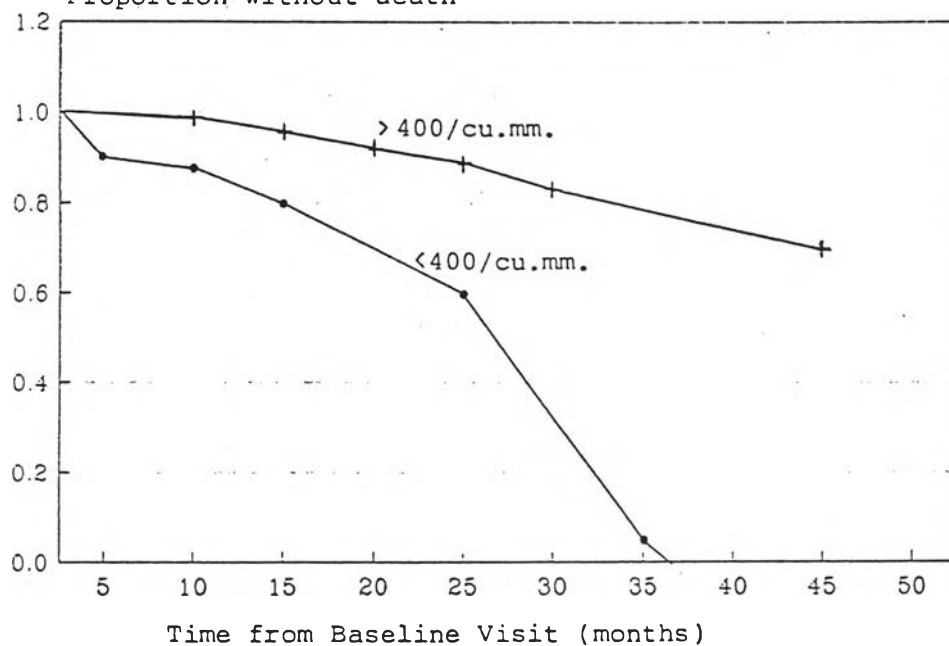
Figure 22. Kaplan-Meier Plots of death free events of
61 HIV-infected patients in whom the absolute
number of CD4+ T cell were measured.

Table V : Patient Population at Entry into the Study

	Asymptomatic	PGL	ARC	AIDS	Total
Total Number	18	34	3	6	61
M/F	16/2	31/3	3/0	5/1	55/6
Age ($\bar{X}\pm$SD)	30.5±7.8	27.8±6.9	36.0±5.3	30.0±6.6	29.2±7.2
IVDU	2	4	1	0	7(11.5%)
Male Homo/bisexual	6	20	2	4	32(52.5%)
Male Heterosexual	7	5	0	1	13(21.3%)
Female Heterosexual	2	3	0	1	6(9.8%)
Blood Transfusion	1	2	0	0	3(4.9%)

Table VI : Status of the Patients at the End of the 2 Year Follow-up (N=61)

	Stage at follow-up (2 years)				
	Asymptomatic	PGL	ARC	AIDS	AIDS-related Death
Asymptomatic (N=18)	8(44.4%)	7(38.8%)	1(5.6%)	1(5.6%)	1(5.6%)
PGL (N=34)	2 (5.9%)	28(82.4%)	2(5.9%)	1(2.9%)	1(2.9%)
ARC (N=3)				2(66.7%)	1(33.3%)
AIDS (N=6)				4(66.7%)	2(33.3%)

Initial Stage

Table VII : Comparing Immunologic Parameters of HIV Patients at Entry and at 2 years or Near Death

		Total T cell (per cu.mm.)	% $CD_4{}^+$	Total $CD_4{}^+$ (per cu.mm.)	% $CD_8{}^+$	Total $CD_8{}^+$ (per cu.mm.)	$CD_4{}^+/CD_8{}^+$	β_2-M (mg/L)
Normal Control (N=22)		2,307±1,161	50±6	1,800±797	31±5	1,221±542	1.6±0.3	0.8±0.5
AIDS[a] (N=6)	(MO)	* 568±372	* 25±17	* 318±286	38±15	* 497±296	* 0.6±0.3	* 3.9±1.4
	(M24)	* 376±302	* 18±11	* 162±155	37±14	* 317±233	* 0.6±0.3	* 5.0±3.1
ARC (N=3)	(MO)	1,001±934	* 28±13	* 515±423	34±7	612±469	* 0.8±0.2	* 2.1±0.7
	(M24)	1,011±426	* 25±20	* 337±223	35±20	* 558±282	* 0.6±0.2	* 1.8±0.3
PGL (N=34)	(MO)	1,915±756	* 33±11	* 1049±524	* 38±10	1,123±448	* 0.9±0.4	* 2.3±1.2
	(M24)	* 1,433±615	* 26±9	* 629±346**	* 37±10	* 848±340	* 0.8±0.4	* 4.2±2.7
Asympt. (N=18)	(MO)	1,782±769	* 30±10	* 964±745	33±7	975±525	* 1.0±0.4	* 2.3±0.7
	(M24)	* 1,332±838	* 25±10	* 609±546	* 36±10	* 825±548	* 0.7±0.3	* 5.4±3.8 **

(a) : Patient category was based on clinical evaluation at entry and the same group
       was followed up to 2 years or until death.

  * : p < 0.05 as compared to normal controls

 ** : p < 0.05 as compared between entry and at 2 year follow-up of the same group

Table VIII : Comparison of Biographic Data between Progressors
and Non-Progressors as Compared to the Entire
Patient Group [a]

	Progressors	Non-Progressors	Total
N	16	45	61
1. Age ($\bar{X}\pm$SD)	33.1±8.7	27.8±6.1	29.2±7.2
2. Sex (M/F)	14/2	41/4	55/6
3. % IVDU	6.2%[b]	13.3%	11.5%
4. % Male Homo/bisexual	56.3%	51.1%	52.5%
5. % Male Heterosexual	18.8%	22.2%	21.3%
6. % Female Heterosexual	12.5%	9.0%	9.8%
7. % Blood Transfusion	6.2%	4.4%	4.9%
Total	100%	100%	100%

(a) Progressors and non-progressors were defined at the and
of the 2 year follow-up.

(b) Percentage of each risk behavior in the entire group of
progressors and non-progressors.

Table IX : Comparison of Immunologic Parameters between Progressors and
Non-Progressors during the 2 Year Follow-up

		M0	M6	M12	M18	M24
CD_4^+ %	(P)	27±14	26±9	17±11	22±12	13±11
	(NP)	33±10	29±8	29±10*	28±9	27±9*
CD_4^+ No.	(P)	686±751	701±624	359±301	294±216	234±279
	(NP)	1010±541	788±443	822±457*	629±335*	689±431*
CD_8^+ %	(P)	37±11	33±8	42±14	42±12	31±11
	(NP)	36±9	35±10	35±12	32±9*	36±9
CD_8^+ No.	(P)	849±593	828±595	700±289	524±237	453±350
	(NP)	1043±451	929±457	958±412*	738±318*	908±398*
CD_4^+/CD_8^+	(P)	0.7±0.3	0.8±0.3	0.5±0.3	0.6±0.3	0.4±0.2
	(NP)	1.0±0.4*	0.9±0.3	1.0±0.5*	0.9±0.4*	0.8±0.4*
Total T	(P)	1246±82	1387±1091	1146±792	687±397	645±401
	(NP)	1859±791	1618±1103	1839±665*	1376±499*	1522±666*
B_2-microglobulin	(P)	3.15±1.39	2.95±2.34	3.44±2.09	3.37±1.63	4.86±1.95
	(NP)	2.20±1.00*	2.37±0.95	2.75±1.20	4.16±2.85	4.51±3.19

P = progressors (N=16)

NP = non-progressors (N=45)

* = p < 0.05

Table X : Relative-Hazard Characteristics of Different
Levels of Each Immunologic Marker

Marker	Group Size	Range of Values at month 0	Relative Hazard	95% Confidence Interval	Statistical Significance (* p<0.05)
CD_4^+ T Cells	47	>500	1.0		
(Number)	8	200-500	6.2	2.6-14.6	*
	6	0-199	12.3	3.8-39.9	*
CD_4^+ T Cells	37	>30	1.0		
(Percent)	14	20-30	2.4	0.8-0.9	*
	10	0-19	5.8	1.7-19.5	*
CD_8^+ T Cells	27	>1,000	1.0		
(Number)	24	500-1,000	2.7	0.7-11.0	
	10	0-499	7.4	2.3-24.1	*
CD_8^+ T Cells	5	>50	1.0		
(Percent)	14	40-50	1.8	0.2-16.9	
	42	0-39	0.9	0.1-7.6	
CD_4^+/CD_8^+ Ratio	26	>1.0	1.0		
	25	0.5-1.0	1.3	0.4-4.39	
	10	0-0.49	1.9	0.4-9.0	
β_2-Microglobulin	20	0-2.0	1.0		
	32	2.1-3.0	2.4	0.59-11.24	
	9	>3.0	10.5	2.11-46.97	*
Anti-p24	46	Positive	1.0		
	13	Weakly or very weakly	14.8	5.0-43.36	*
	2	Negative	–	(N.B.: number is too small to have statistical calculation)	
p24-Antigen	44	Negative	1.0		
	17	Positive	5.9	1.8-14.2	*

Table XI : Correlations among Markers in 61 HIV-Infected Patients[a]

Markers	% of CD$_4^+$ cells	No.of CD$_4^+$ cells	%of CD$_8^+$ cells	No.of CD$_8^+$ cells	CD$_4$/CD$_8$	β$_2$-MG	p24Ag
% of CD$_4^+$ cells	1.00	0.66**	0.13	0.32*	0.81**	-0.14	-0.26
No.of CD$_4^+$ cells	0.66**	1.00	0.00	0.80**	0.58**	-0.30*	-0.23
% of CD$_8^+$ cells	0.13	0.00	1.00	0.39**	-0.40**	0.25	0.04
No.of CD$_8^+$ cells	0.32*	0.80**	0.39**	1.00	0.06	-0.16	-0.12
CD$_4$/CD$_8$	0.81**	0.58**	-0.40**	0.06	1.00	-0.31*	-0.28
β$_2$-MG	-0.14	-0.30*	0.25	-0.16	-0.31*	1.00	0.39**
p24 Ag	-0.26	-0.23	0.04	-0.12	-0.28	0.39**	1.00

(a) : using Pearson Correlation Coefficient

  * : $p < 0.01$

 ** : $p < 0.001$

Table XII : Relative Hazard Characteristics of Various
Combinations of CD4 Measurements and
β_2-Microglobulin, p24 Antigen and Anti-p24

Combined Markers			Group Size	Relative Hazard	95 % Confidence Interval	Statistical Significance ($*$ p $<$ 0.05)
1. CD4 percentage + β_2 MG						
a)	> 30	+ < 1.5	8	0		
b)	20-30	1.5-2.5	11	1.0		
c)	< 20	+ > 2.5	4	2.9	0.91-17.54	
2. CD4 Number + β_2 MG						
a)	> 500	+ < 1.5	8	0		
b)	200-500	+ 1.5-2.5	2	1.0		
c)	< 200	+ > 2.5	3	35.2	0.17-117.9	
3. CD4 Percentage + p24 Ag						
a)	> 30	+ Negative	26	1.0		
b)	20-30	+ Positive	5	7.96	1.75-43.79	$*$
c)	< 20	+ Positive	5	30.32	7.17-126.41	$*$
4. CD4 Number + p24 Ag						
a)	> 500	+ Negative	37	0.04	0.0095-0.17	$*$
b)	200-500	+ Positive	4	1.0		
c)	< 200	+ Positive	4	1.44	0.17-12.8	
5. CD4 Percentage + Anti-p24						
a)	> 30	+ Positive	30	0.2	0.16-0.18	$*$
b)	20-30	+ Weak	4	1.0		
c)	< 20	+ Negative	2	8.6	0.23-38.5	
6. CD4 Number + Anti-p24						
a)	> 500	+ Positive	41	0.13	0.004-0.05	$*$
b)	200-500	+ Weak	4	1.0		
c)	< 200	+ Negative	2	1.3	0.59-2.94	