Table I.

Serum Immunoglobulin		Normal
Ig G (mg%)	70	953 ± 206
Ig M (mg%)	19	134 ± 49
Ig A (mg%)	131	114 ± 47
Ig E (U/ml)	<5	200–400
Ig D (mg%)	Undetectable	0–6
T cells	7.7%	9% (control)
B cells	65 %	83% (control)
C Ig Cells*	0.5–1%	8–12%
Delayed hypersensitivity. All negative to recall antigens.		

* Positive cytoplasmic immunoglobulin cells upon stimulation with pokeweed mitogen.

Table II.

	ΔCPM* Without indomethacin	Indomethacin
(+) PPD	20747	16605
Patient	1603	1208
Allogeneic response	21699	9271
Coculture with PPD	28786	45441 (0.2 μg/well) 46093 (1 μg/well)

* Mean values expressed in counts per minute of H^3-thymidine incorporation.
* ΔCPM = experimental count per minute minus baseline count.

the positive PPD control cells alone. When the co-culture of the patient's cells and the positive PPD control cells was done in the presence of PPD antigen, the proliferative response was only 65% of the expected response (sum of the allogeneic response and response to PPD antigen of both patient's cells and the positive PPD control cells) indicating a suppression of the response of the positive PPD control cells by the patient's cells in the presence of PPD antigen. However, the effect of the suppression is abolished by adding indomethacin in the culture system. The low concentration of indomethacin (0.2 micrograms per well) was equally effective at reversing the suppression as was the higher concentration (1 microgram per well). The results are shown in Table II and illustrated in Figure 3.

The cell type responsible for the suppression of the proliferative response in the patient was investigated by an experiment using the graded addition of adherent cells to the co-culture system. As seen in Figure 4, by using only nonadherent cells (0% adherent cells) the response was comparable to the proliferative response when indomethacin was used in the co-culture. A gradual increase in the percentage of adherent cells per total patient's cell resulted in a progressive decrease of the proliferative response of the co-culture with PPD.

Discussion

By using a co-culture system of the patient's mononuclear cells and normal positive PPD control mononuclear cells, we have demonstrated the existence of suppressor cells in the patient's cell population which are capable of suppressing the proliferative response of normal control cells in the presence of PPD antigen. These suppressor cells are adherent cells which are probably monocyte-macrophages. Their activity seems to be mediated by prostaglandin, since by using a prostaglandin inhibitor (indomethacin) we were able to reverse the suppression.

Increased suppressor cell activity has been observed in many diseases.[3-11] Adherent cells have been implicated

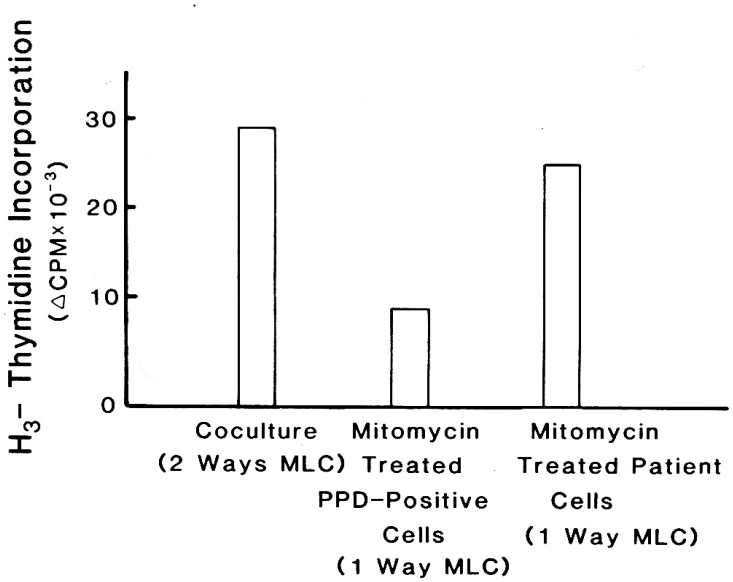

Figure 2. Mixed lymphocyte cultures (MLC) *Two ways MLC: Co-culture of untreated patient's cells and untreated cells from a normal positive PPD control subject. *One way MLC: The stimulating cells were treated with mitomycin to prevent proliferation then were cocultured with the untreated responding cells. The allogeneic response of the patient's cells was poor compared with the normal control cells.

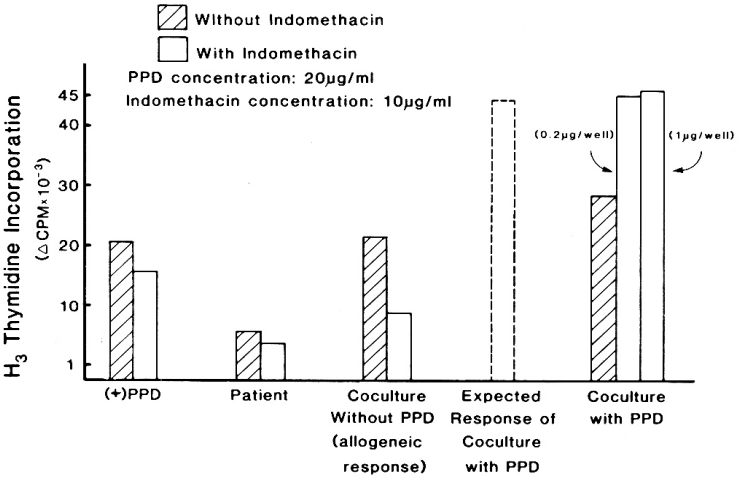

Figure 3. *Proliferative responses as measured by H3-thymidine incorporation of: normal positive PPD control cells, the patient's cells, co-culture of the patient's cells and normal positive PPD cells with and without PPD antigen. *All cultures were done in quadruplicate with and without indomethacin. *Expected response of the co-culture with PPD was calculated as sum of the allogeneic response and response to PPD antigen of both patient's cells and the positive PPD control cells. The measured response was only 65% of the expected response which approximated the latter when the coculture was done in the presence of indomethacin.