Interleukin-4 (B Cell Growth Factor-II/Eosinophil Differentiation Factor) is a Mitogen and Differentiation Factor for Preactivated Murine B Lymphocytes

Anne O'Garra, David J. Warren, Colin J. Sanderson, Anthony I. Magee and Gerry G.B. Klaus
National Institute for Medical Research, London

1 Introduction

Type II B cell growth factor (BCGF II) was originally detected by its capacity to induce proliferation of the murine B cell lymphoma BCL 1 in vitro (Swain & Dutton, 1982; Swain et al, 1983). Its effects on normal B cells have not been well defined, since it has proved difficult to separate BCGF II from other potentially relevant factors. We have recently described a novel source of BCGF II which is free of any other lymphokine believed to act on B cells. This activity is produced by a murine T cell hybrid NIMP-TH1, which was selected for its capacity to secrete the eosinophil differentiation factor (EDF) (Warren & Sanderson, 1985; Sanderson et al, 1986). The BCGF II and EDF co-purify in every fractionation procedure employed (Fig. 1) : both activities migrate with an approximate Mr of 44,000 (Fig. 2) and a pI of approximately 5.0 (unpublished data). These findings, together with earlier evidence that BCGF II and EDF are co-ordinately produced by a large panel of T cell clones (Sanderson et al, 1985) strongly suggested that the two activities are due to the same molecule, which has therefore been named interleukin 4 (IL-4) (Sanderson et al, 1986). We have examined the effects of this factor on normal murine B cells.
T Cell Hybrid
NIMP TH-1
5 x 10^5 cells per ml

PMA (5 ng/ml)
48 hr, 37°C

Harvested
Centrifuged
Filtered

Ammonium Sulphate Precipitation
(50%-85% saturation)

Lentil Lectin Affinity Chromatography
IL-4 eluted with α-methyl mannose

Phenyl Sepharose
Hydrophobic Interaction Chromatography
(elutes towards end of gradient 0.6M(NH₄)₂SO₄
30% ethanediol)

AcA54 Gel Filtration Chromatography

Partially Purified IL-4

Isoelectric Focusing
(in centre of pH gradient corresponding to pI 4.5-5.5)

Reverse Phase High Performance Liquid Chromatography

SDS-PAGE
(centre of activity corresponds to a band of Mr44,000)

Fig. 1. Purification of IL-4