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pag gene-like protein (ABP-25) of the Cynops embryo: regional distribution and gene expression during early embryogenesis

Introduction

One popular model for how cell fates are determined invokes the existence and asymmetric distribution of cytoplasmic determinants of cell fates. According to this model, developmental programs of embryonic blastomers are specified by internal factors differentially segregated into different blastomers during early cleavages of the zygote. There have been exciting findings which prove the regional distribution of the determinants that control axis formation of the amphibian embryo (Kageura 1990; Yuge et al. 1990; Hainski and Moody 1992). Recently, many molecular markers of regional specificity have been investigated. Especially interesting is the regionally differential expression of genes during amphibian development, for example Vg1 (Yisraeli et al. 1990), noggin (Smith and Harland 1992) and goosecoid (Blumberg et al. 1991). One recent advance in embryology is the realization that these molecules have an essential role in body pattern formation.

Fig. 1 Western blot analysis of ABP-25 (animal blastomere protein, molecular weight 25,000) in animal half (A) and vegetal half (V) of early gastrula
We reported a region-specific maternal protein which was distributed more restrictively in the ecto-mesoderm region during early *Xenopus* embryogenesis (Suzuki et al. 1991) and whose distribution changed during progesterone-induced maturation (Suzuki et al. 1993). We also raised another monoclonal antibody which reacted specifically with the ecto-mesodermal cells of the early *Cynops* embryo and which also showed a clear polarity in the cellular distribution of the antigen.

In this paper we report the unique distribution pattern of the antigen protein, ABP-25 (animal blastomere protein, molecular weight 25,000), and the ABP-25 gene, which showed a high homology with the human *pag* gene (Prosperi et al. 1993).

### Materials and methods

#### Preparation of antigen

Fertilized eggs of *Cynops pyrrhogaster* were obtained by gonadotropin injection. The eggs were permitted to develop at room temperature. The neural plates of the late gastrulae were isolated together with the underlying chorda-mesoderm and sonicated in Steinberg’s solution on ice. The homogenate was used as an immunogen.

**Fig. 2A–D** Immunohistochemical distribution of ABP-25 antigens during early embryogenesis. A Uncleaved egg (A animal side, V vegetal side). B 8-cell embryo (arrows labelling in animal parts of the vegetal blastomeres, A animal side, V vegetal side). C Early blastula (bc blastocoel). D Higher magnification of the enclosed animal cap in C (arrow intensive labelling along the membrane, arrowhead strong labelling of inner surface, bars 500 μm)