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Monoclonal antibodies as useful tools for the diagnosis and biological characterization of *Echinococcus multilocularis* and *Echinococcus granulosus sensu lato*

Philipp A. Kronenberg[1,2], Michael Reinehr[3], Ramon M. Eichenberger[1], Sina Hasler[1], Mar Siles-Lucas[4], Paola Pepe[5], Laura Rinaldi[5], Achim Weber[3], Bruno Gottstein[6], Norbert Müller[6,7], Peter Deplazes[1]

[1]Institute of Parasitology, Vetsuisse and Medical Faculty, University of Zurich, Zurich, Switzerland. [2]Graduate School for Cellular and Biomedical Sciences, University of Bern, Bern, Switzerland. [3]Department of Pathology and Molecular Pathology, University Hospital Zurich, Zurich, Switzerland. [4]Instituto de Recursos Naturales y Agrobiologia (IRNASA-CSIC), Salamanca, Spain. [5]Unit of Parasitology and Parasitic Diseases, University of Naples Federico II, Naples, Italy. [6]Institute for Infectious Diseases, Medical Faculty, University of Bern, Bern, Switzerland. [7]Institute of Parasitology, Vetsuisse Faculty, University of Bern, Bern, Switzerland

Abstract

Introduction: Alveolar (AE) and cystic echinococcosis (CE) are severe parasitic diseases affecting a range of animal intermediate and dead-end hosts like humans. The diseases are caused by the larval stages of *Echinococcus multilocularis* or *E. granulosus sensu lato*, respectively. Monoclonal antibodies (mAbs) represent valuable tools for the immunohistochemical diagnosis of *Echinococcus spp.* metacestodes in human and animal tissue, and facilitate affinity-purification of native antigens for serological tests.

Materials and Methods: A panel of mAbs was selected against specific and shared epitopes of *E. multilocularis* and *E. granulosus s.l.* Native and recombinant antigens of both species were used to immunize mice and generate antibody-secreting hybridoma cell lines. All mAbs were evaluated for their cross-reactivity with a panel of 44 antigens from *Echinococcus spp.* and other parasites. In addition, their binding capacity for *Echinococcus spp*. excretory/secretory products (ESP) was analyzed in sandwich ELISAs. Immunohistochemical-stainings were performed on human AE and CE tissue samples.

Results: Overall, two mAbs were directed against recombinant and native Em18 and 2B2 antigens. Two other mAbs recognized *E. granulosus s.l.* metacestodes only. One mAb was *Echinococcus* genus specific, and reactive with a shared epitope of Antigen B. ESPs of both *E. multilocularis* and *E. granulosus sensu stricto* could be detected by sandwich-ELISAs with supernatants from in vitro cultivated vesicles, which could be subsequently confirmed by the detection of circulating ESP in serum samples from infected gerbils and mice.

Discussion: Monoclonal antibodies represent valuable tools for the diagnosis of *E. multilocularis* and *E. granulosus s.l.* metacestodes. Our panel of mAbs showed distinct and specific binding capacities in ELISA and immunohistochemical-stainings. Together with already established mAbs Em2G11 and EmG3, those mAbs could become inaugurating research tools for species diagnosis or activity markers by

immunohistochemistry, novel sero-diagnostics, therapeutics and in vivo imaging applications, besides providing insights into parasite-host interactions.