An antigen capture assay for the detection of mycolactone, the polyketide toxin of Mycobacterium ulcerans

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

ID 4646041
Author(s) Warryn, L.; Dangy, J. P.; Gersbach, P.; Gehringer, M.; Altmann, K. H.; Pluschke, G.
Author(s) at UniBasel Warryn, Louisa ; Dangy, Jean-Pierre ; Pluschke, Gerd ;
Year 2021
Title An antigen capture assay for the detection of mycolactone, the polyketide toxin of Mycobacterium ulcerans
Journal J Immunol
Volume 206
Number 11
Pages / **Article-Number** 2753-2762
Mesh terms Animals; Antibodies, Monoclonal, immunology; Antigens, Bacterial, immunology; Macrolides, immunology; Mice; Molecular Structure; Mycobacterium ulcerans, immunology
Mycolactone is a cytotoxin responsible for most of the chronic necrotizing pathology of Mycobacterium ulcerans disease (Buruli ulcer). The polyketide toxin consists of a 12-membered lactone ring with a lower O-linked polyunsaturated acyl side chain and an upper C-linked side chain. Mycolactone is unique to M. ulcerans and an immunological Ag capture assay would represent an important tool for the study of Buruli ulcer pathogenesis and for laboratory diagnosis. When testing sets of mycolactone-specific mouse mAbs, we found that Abs against the hydrophobic lower side chain only bind mycolactone immobilized on a solid support but not when present in solution. This observation supports previous findings that mycolactone forms micellar structures in aqueous solution with the hydrophobic region sequestered into the inner core of the aggregates. Although an Ag capture assay typically requires two Abs that recognize nonoverlapping epitopes, our search for matching pairs of mAbs showed that the same mAb could be used both as capture and as detecting reagent for the detection of the mycolactone aggregates. However, the combination of a core-specific and a core/upper side chain-specific mAb constituted the most sensitive ELISA with a sensitivity in the low nanogram range. The results of a pilot experiment showed that the sensitivity of the assay is sufficient to detect mycolactone in swab samples from Buruli ulcer lesions. Although the described capture ELISA can serve as a tool for research on the biology of mycolactone, the assay system will have to be adapted for use as a diagnostic tool.
ISSN/ISBN 1550-6606 (Electronic)0022-1767 (Linking)
edoc-URL https://edoc.unibas.ch/89628/
Full Text on edoc No;
Digital Object Identifier DOI 10.4049/jimmunol.2001232
PubMed ID http://www.ncbi.nlm.nih.gov/pubmed/34031146
ISI-Number WOS:000656519100023
Document type (ISI) Journal Article