Mimicking early Batrachochytrium dendrobatidis-host interactions using A6 cells

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Organisation

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SCOPE OF THE METHOD

The Method relates to	Animal health
The Method is situated in	Basic Research
Type of method	In vitro - Ex vivo
Species from which cells/tissues/organs are derived	Xenopus laevis
Type of cells/tissues/organs	Kidney

DESCRIPTION

Method keywords

A6 cells

Immunofluorescence

in vitro model

chytrid

Scientific area keywords

host-pathogen interaction

adhesion

invasion

intracellular maturation

fungus

amphibian

Method description

We describe a fluorescent cell-based *in vitro* infection model that reproduces host-*Batrachochytrium dendrobatidis* (Bd) interactions. Using the epithelial cell line A6 from *Xenopus laevis*, we reproduced different stages of host cell infection and intracellular growth of Bd, resulting in host cell death, a key event in chytridiomycosis. The presented *in vitro* models may facilitate future mechanistic studies of host susceptibility and pathogen virulence.

Lab equipment

Biosafety cabinet ;

CO2 incubator at 26°C ;

Fluorescent microscope.

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

To date, infectivity and the pathogenicity of Bd have mostly been studied using light microscopy (LM), scanning electron microscopy (SEM) and transmission electron microscopy (TEM) on *in vivo*-infected skin tissues or ex vivo-infected skin explants. We now established a cell-based assay that mimics the colonization stages of Bd *in vitro* (adhesion, germ tube development, penetration into skin cells, invasive growth and the induction of host cell death), allowing rapid and efficient screening of host-Bd interactions and reducing the number of animals used in infection trials.

Challenges

This is and stays an *in vitro* model that mimics the *in vivo* situation. Caution should always be exercised when extrapolating *in vitro* data to the *in vivo* situation, but *in vitro* cell culture models allow an experimental flexibility making them highly suitable to study host-pathogen interactions.

Modifications

The method is optimized for the fungal pathogen *Batrachochytrium dendrobatidis*. Expanding this to other pathogens needs further optimization.

Future & Other applications

The method can be used for a wide range of applications. The availability of an *in vitro* model using a continuous cell line may, for example, be used to analyze the differences in host-pathogen interactions between different Bd strains. Also, expression patterns during different infection steps can be examined.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Elin Verbrugghe, Pascale Van Rooij, Herman Favoreel, An Martel, Frank Pasmans (2019) *In vitro* modeling of *Batrachochytrium dendrobatidis* infection of the amphibian skin. PLoS ONE 14(11):

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Associated documents

journal.pone.0225224.pdf

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