Expression of Rabies Antibodies in Transgenic Maize

INTRODUCTION

- Rabies, an important disease in Asia and Africa, is an acute viral disease of the central nervous system that affects humans and other mammals (Fig. 1 and 2). Upon bites or contact with rabid animals, patients are immediately immunized with antibodies followed by human diploid cell vaccine (HDCV). Lack of post-exposure treatment usually results in 100% fatality.
- Monoclonal antibodies are inherently stable human mucosal surface defence proteins with high specificity, low toxicity, and appropriate for chronic conditions as injectable, topical and orally applied. Plants have proven to be efficient production system for therapeutic proteins with advantages of scalability and product safety compared to other production systems.
- The monoclonal antibody (MAb) E559 is part of a cocktail of antibodies that are used as post exposure prophylaxis against rabies.
- Rabies antibody production in plants to be used as model for other high-value antibody targets.


Downstream analysis

Southern analysis(T1 plants)
Western analysis (T2 seed)
Functional Analysis (VNA)
Antibody purification

SUMMARY OF RABIES ELISA DATA

- Bialaphos (bar) 25 putative transgenics in the greenhouse
- Phosphomannose isomerase (PMI)- 24 events screened by ELISA
  - 9 LC independent events
  - 7 HC independent events
  - 7 seeds from 4 different events have HC/LC

DISCUSSION AND CONCLUSION

- Seeds from the maize were drilled and analysed using the ELISA technique. The expression levels for the transgenic lines is shown on Fig. 6, with the highest expression of 0.7 pg g⁻¹. The seeds expressing both heavy and light chains were planted for the next generation.
- Plant-made pharmaceuticals is arguably the fastest growing area of biotechnology, where the potential of addressing some of the troublesome public health issues in the developing world cannot be emphasised. In the current study we showed the production of anti-rabies mAb in transgenic maize.
- We also believe that plant production systems, be they transgenic, transient or cell culture are a genuine and scalable system for producing affordable anti-rabies mAbs for prophylaxis therapy in the developing world.

REFERENCES