Chicken scFvs in bluetongue virus serogroup-reactive and type-specific inhibition ELISAs.

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A large semi-synthetic recombinant antibody library based on chicken immunoglobulin genes was recently constructed at Onderstepoort. This library has yielded single-chain Fvs (scFvs) specific for viruses, proteins and haptens (1). Two scFvs that recognised bluetongue virus (BTV) serotype 10 were evaluated in an inhibition ELISA. The binding of one (F3) to purified BTV was inhibited by antibodies directed against the serotype upon which it was selected. The other (F10) was inhibited by guinea-pig antisera to each of the 24 different BTV serotypes. F10 recognised VP7, one of two important structural proteins that make up the core of the double-shelled BTV particle, but not if the protein was directly adsorbed to a plastic surface. It did, however, recognise recombinant VP7 that had been captured from suspension by rabbit IgG. This made it possible to use the scFv in an inhibition ELISA for BTV antibodies without first purifying the recombinant VP7. The resulting immunoassay detected antibodies to 24 BTV serotypes, but not those against the related epizootic haemorrhagic disease virus. A filamentous phage library displaying fusion peptides expressed by fragments of the BTV genome segment 7 cDNA was constructed and screened with the group-reactive scFv. Comparing the selected peptides showed that the binding of F10 to VP7 required a 131-residue sequence representing an upper domain which forms the outer surface of the viral core. By providing well-characterised immunological reagents, recombinant antibody technology is expected contribute to the development of improved immunoassays for BTV diagnosis.

[1] Van Wyngaardt, W., Malatji, T., Mashau, C., Fehrsen, J., Jordaan, F., Miltiadou, D.R. and du Plessis, D.H. A large semi-synthetic single-chain Fv phage display library based on chicken immunoglobulin genes. BMC Biotechnol. 2004 Apr 1;4(1):6. Epub 2004 Apr 01. http://www.biomedcentral.com/1472-6750/4/6)