ELISA and immunoblot using purified glycoproteins for serodiagnosis of cysticercosis in pigs naturally infected with *Taenia solium*


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Abstract

The establishment of reliable serological methods for cysticercosis in pigs is important for the surveillance, control and prevention of taeniosis/cysticercosis in humans as well as in pigs to prevent economic loss. Both ELISA and immunoblot using glycoproteins (GPs) purified by a single step of preparative iso-electric focusing, which are highly useful for human cysticercosis, have been applied for a serological study in pigs naturally infected with *Taenia solium*. All sera from pigs showed similar responses to those in human cysticercosis. Therefore, it is expected that both ELISA and immunoblots using GPs would be useful in differentiating infected pigs from uninfected ones.

Neurocysticercosis (NCC) is one of the major causes of neurological disease and is spreading throughout the world (Schantz et al., 1992, 1998; Simanjuntak et al., 1997; White 1997; Wandra et al., 1999). Recently, we have established highly sensitive and specific serodiagnostic techniques for human cysticercosis using ELISA and immunoblot (Ito et al., 1998). This is the first report to show a similar sensitivity and specificity of ELISA compared with immunoblot for human cysticercosis. The antigens are glycoproteins (GPs) prepared by preparative iso-electric focusing. The purification method is basically a single step and the purity of the GPs is thoroughly different from lectin affinity purified GPs (Tsang et al., 1989). It is a major advance in serodiagnosis for human cisticercosis as highly specific ELISA can be used instead of immunoblot (Tsang et al., 1989). There are
commercially available ELISAs for NCC but they fail to differentiate cross reactive echinococcosis (Sloan et al., 1995).

As cysticercosis is a zoonotic parasitic disease and the life cycle is completed between pigs and humans, the prevention, control and surveillance for cysticercosis should be based on surveillance in both humans and pigs.

In this short study, we aim to demonstrate that serological methods such as immunoblot and ELISA using new GP antigens can be useful for the detection of pigs infected with *T. solium* as in the case of cysticercosis in humans (Ito et al., 1998).

A total of eight sera from pigs (four from China, three from Mexico and one from Indonesia) naturally infected with *T. solium* was examined and all eight were found to harbour multiple cysticerci. All sera from pigs naturally infected with *T. solium* showed very similar antibody responses (fig. 1) as human cysticercosis (Ito et al., 1998). The ELISA optical density values were between 0.567 and 2.500 (maximum OD), whereas those from the uninfected four pigs were 0.07 ≤ 0.014. The cut-off value in human cysticercosis was 0.150 (Ito et al., 1998).

These preliminary results strongly suggest that a new serodiagnostic technique using GPs purified by a preparative isoelectric focusing is most useful and reliable for both swine and human cysticercosis (Ito et al., 1998). To date, all sera from patients of cysticercosis with multiple cysts, confirmed parasitologically, showed specific antibody responses against these GPs. Most recently, two cases were reported with a single cyst in the brain. One showed an antibody response before surgical resection which fell below the cut-off level within one year after surgery (Ito et al., 1999), whereas the other showed no antibody response at all (Ohsaki et al., 1999). It is therefore of interest to establish the sensitivity of serodiagnosis for cases with a single cyst in the entire body in humans and pigs (Wilson et al., 1991). Antibody responses in sera from pigs experimentally infected with *T. solium* are currently being analysed in collaboration with Mexican, Ecuador and Belgian groups and human cases with a single cyst in the brain in collaboration with a South African group. Following these studies, it is hoped that serodiagnosis using specific antigens purified by a single step of preparative isoelectric focusing will be used both for swine and human cysticercosis.

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**References**


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Serodiagnosis for swine cysticercosis


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