Vaccination of dogs against *Echinococcus granulosus*, the cause of cystic hydatid disease in humans


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**Abstract**

Dogs are pivotal in *Echinococcus granulosus* transmission to humans, and dog vaccination provides a very practical and cost-effective prevention strategy. We vaccinated dogs with soluble native proteins isolated from protoscoleces of *E. granulosus* and induced significant suppression of worm growth and egg production. Accordingly, we tested for vaccine efficacy using recombinant proteins derived from a developmentally regulated gene family (egM) specifically expressed in mature adult *E. granulosus* worms. Three egM genes—egM4, egM9, and egM123—were subcloned into an expression vector that expressed the molecules as soluble glutathione S-transferase (GST) fusion proteins in *Escherichia coli*. The 3 fusion proteins were purified for dog vaccination trials (3 doses of 80 microg/protein/dog) in which the dogs were challenged and then necropsied 45 days after infection. Compared with worms in the control dogs that received GST, the 3 recombinant proteins induced a very high level of protection (97%-100%) in terms of suppression of worm growth and, especially, of egg development and embryogenesis. We have thus shown that vaccination of the dog host against *E. granulosus* is feasible when recombinant proteins are used. Because the egg stage is crucial in the echinococcal life cycle, successful suppression of egg development by vaccination would halt transmission to intermediate hosts, thereby effecting long-term control.