A PCR system for detection of species and genotypes of the *Echinococcus granulosus*-complex, with reference to the epidemiological situation in eastern Africa

We describe the development of a specific and sensitive PCR/semi-nested PCR system for the rapid diagnosis of *Echinococcus granulosus* genotype G1, *E. granulosus* genotype G6/7, and *Echinococcus ortleppi* (G5). Diagnosis of G1 and the group G5/6/7 is performed by a simple PCR, while discrimination between *E. ortleppi* (G5) and G6/7 involves a subsequent semi-nested PCR step. The target sequence for amplification is part of the mitochondrial 12S rRNA gene. Specificity of the PCRs was 100% when evaluated with isolates of 16 species of cestodes, including *Echinococcus multilocularis*, *Echinococcus equinus*, *E. ortleppi*and three strains of *E. granulosus* (G1, G6 and G7). Sensitivity threshold was 0.25 pg of DNA. This new approach was compared with published protocols of restriction fragment length polymorphism-PCR and sequencing of mitochondrial cytochrome *c* oxidase subunit 1 and NADH dehydrogenase 1 genes using *Echinococcus* isolates of human, sheep, goat, camel, cattle and pig origin from Kenya and Sudan. Additionally, two internal DNA probes were developed, one hybridising only with G1, the other with G5, G6 and G7 amplification products. Preliminary epidemiological results obtained with this PCR approach include the detection of a camel strain (G6) infection for the first time in a human patient from eastern Africa, and the first reports of *E. ortleppi* (G5) in livestock from Kenya and the Sudan.