Characterization of DNase activity from the parasitic nematode *Haemonchus contortus*

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The antiparasitic drug fenbendazole (FBZ) induces nuclear DNA fragmentation (DF) in intestinal cells of *Haemonchus contortus*. Since this effect is almost certainly lethal, mechanisms responsible for this DF are of interest to elucidate. The DNA fragments produced had 3'-OH, which suggests involvement of a neutral DNase. To identify a DNase(s) involved, DNase activity in *H. contortus* intestine was characterized relative to classic DNases I (neutral) and II (acidic) and compared to whole worms and excretory/secretory products (ESP) of the parasite. Methods based on plasmid digestion and zymograms were used in the investigation. Seven distinct DNase activities were identified in the fractions analyzed. These differed according to M*r*, pH requirement, and sensitivity to 10 mM EDTA. M*r*s of the DNases occurred predominately in four bands, 34, 36, 37 and 38.5 kDa. Three intestinal DNase bands (34, 36 and 38.5 kDa) were sensitive to EDTA at pH 5 and 7. Sensitivity to EDTA at pH 5 is unexpected for acidic DNase activity, suggesting unusual properties of these intestinal DNases. In whole worms, however, 36 and 38.5 kDa bands were relatively insensitive to EDTA. A 37 kDa band in ESP had an acidic pH requirement and was insensitive to EDTA, resembling classic acidic DNase activity. Under conditions of pH 5 and 7, intestinal lysates produced 3'-ends that could be labeled by TdT, indicating presence of 3'-OH, a characteristic of neutral DNase activity. This characteristic, again, is unexpected for acidic DNase activity. However, additional experiments are required to confirm this result. Treatment of *H. contortus* with FBZ did not induce any detectable DNase activity distinct from normal intestine. Hence, intestinal genome fragmentation induced by this anthelmintic might be mediated by one or more of the DNases described from normal worm intestine. The biochemical properties described will facilitate isolation of intestinal DNases to further assess their role in FBZ-induced DNA fragmentation. Furthermore, several activities suggest that the worm DNases have characteristics distinct from the classic DNases I and II.