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Research Note

Autofluorescence as a Visual Marker for the Hooklets of *Cysticercus cellulosae*

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Differential diagnosis of cerebral cysticercosis from other parasitic or non-parasitic diseases is difficult especially in a stage of necrosis. Those include echinococcosis, sparganosis mansoni, cerebral paragonimiasis, and tumor with central necrosis. Therefore, recognition of the hooklets is essential in order to avoid any erroneous identification of parasites; however, this task may encounter many difficulties because of the following reasons. First, by the use hematoxylin-eosin (HE) staining, these hooklets appear to be transparent; second, the hooklets are extremely small compared with the whole of the body structure of the parasite. Third, this parasite has only one set of hooklets and, fourth, the parasite may disintegrate due to necrosis. Our observations revealed that the hooklets of *Cysticercus cellulosae* display autofluorescence (under UV excitation using UG1 as an excitation filter and L420 as a barrier filter), leading to the potentiality for the use of this autofluoresence as a visual marker in tissue sections, and allowing in this manner to overcome some of the difficulties faced during differential diagnosis.

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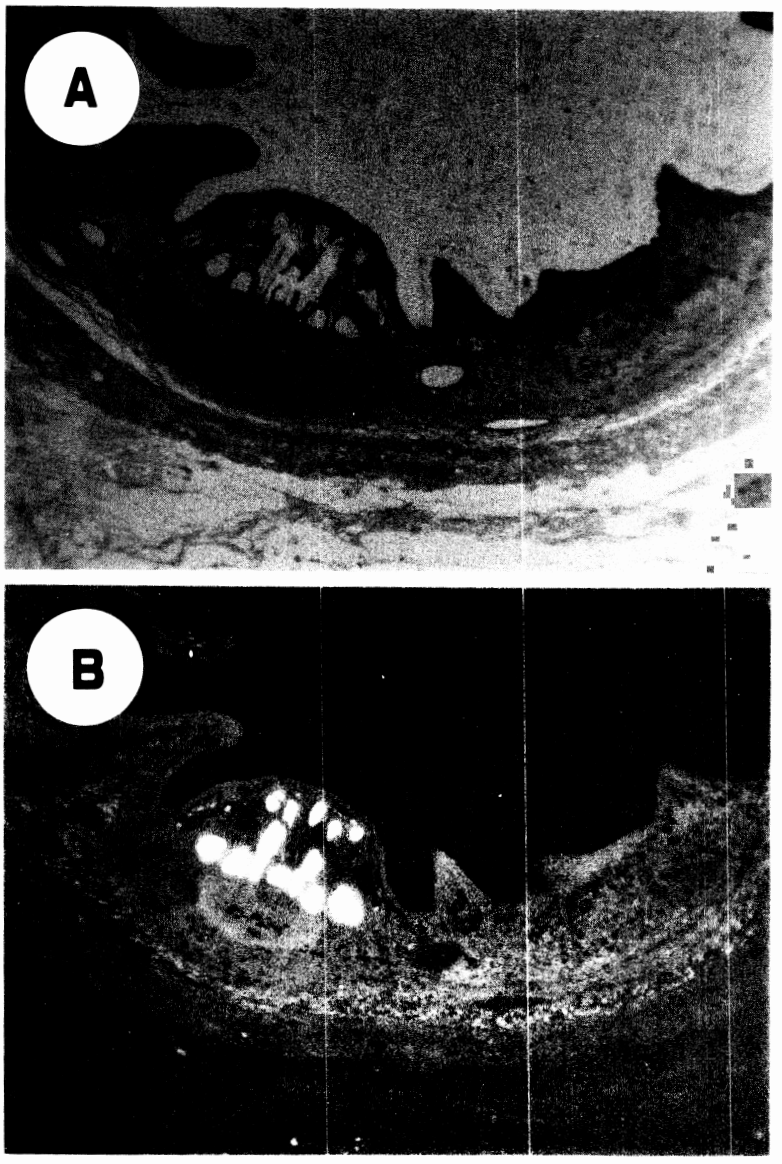
When HE-stained sections of *C. cellulosae* (obtained from cases with human and porcine cysticercosis) were exposed to ultraviolet (UV) light, orange, yellow, and green-colored autofluorescence occurred in a spotty pattern in the bladder wall and in the parenchymatous portion. Of particular interest was the fact that the hooklets displayed a very bright, blue-colored fluorescence in contrast to the rest of the scolex which showed orange- or yellow-colored fluorescence. Micrograph A shows an HE-stained section of the scolex including the hooklets, and Micrograph B shows autofluorescence of the same scolex. When the hooklets were cut transversely, they exhibited a circular shape suggesting a tubular structure. Because of this bright autofluorescence, it is feasible to scan HE-stained section using UV as a light source even at a low magnification, and to examine a large area of the section in a short time. A conclusive identification can be made based on both the HE staining and the fluorescent profile by alternatively switching the light source. So far as the present authors are aware, no studies have been reported on the autofluorescence of the hooklets. The strong red fluorescence of the cysticercus was reported to depend on the presence of several porphyrins in the vesicular fluid of the parasite (Larralde et al 1986). The origin, chemical composition and histochemical staining pattern of hooklets are summarized in great detail in the Slais' text book (1970), however, the autofluorescence of the hooklet is not described in any parasites.



Micrograph A is an HE profile of the scolex of C. *cellulosae*. The nooklets are transparent, however, when the light source is switched to ultraviolet light they display bright blue autofluorescence as shown in Micrograph B.

The hooklet autofluorescence is not likely induced by processes for HE histology such as fixation, dehydration and embedding since even unfixed cryosection displayed same blue autofluorescence (unpublished data). Although currently we have no ready explanation for the chemical origin of this autofluorescence, the fluorescent profile of the hookles is so unique among the autofluorescence of other compositions of the parasite that this bright, blue-colored autofluorescence can be employed as a visual marker for the hooklets. These simultaneous observations, by fluorescence and conventional microscopy techniques of the *C.*

cellulosae, seem to open a new way for the fast detection of the hooklets of this parasite.

References

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