

## Microwave-Assisted Rapid Tissue Processing For Disease Diagnosis In A Veterinary Diagnostic Laboratory

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Recent advances in microwave (MW) technology have elucidated a unified procedure for rapid microwave-assisted thin section electron microscopy tissue preparation incorporating all aspects of specimen preparation from aldehyde fixation through resin polymerization. This procedure drastically reduces tissue preparation time without compromising specimen quality (1-3).

The California Animal Health and Food Safety Laboratory is a large state veterinary diagnostic laboratory system whose primary goal is rapid accurate diagnosis of livestock and poultry diseases within the state of California. As such the laboratory encounters a wide range of diseases in domestic and wildlife species. Diseases are often encountered for which there are no available commercial diagnostic test reagents. These may include both known or established livestock diseases, as well as previously unrecognized diseases. Within this diagnostic environment, thin section electron microscopy (TEM) has been an extremely useful tool, particularly in the diagnosis of infectious diseases. However, staff commitment and turnaround time previously limited the practical usefulness of TEM on a regular basis. With the adoption of rapid MW processing, we have been able to expand sample volume without the addition of FTE. Also, the rapid MW processing technique has allowed us the flexibility to achieve 4-5 hour turnaround on high profile cases. This is extremely important not only in regards to highly contagious endemic disease diagnosis, but also allows us to offer TEM as a further adjunct in foreign or exotic animal disease surveillance, a topic that is very timely in today's global environment. The following is offered as a recent example of the usefulness of this technique in the rapid diagnosis of a contagious viral disease hatchery raised fish.

A sample of formalin fixed and fresh unfixed sturgeon skin was received from a large fish hatchery raising endangered Pallid sturgeon fingerlings. Skin lesions noted on the affected fish were sent with a request to rule out Lymphocystis, a contagious disease caused by a member of the iridovirus family. While viral isolation was possible a rapid diagnosis was needed to institute immediate control measures. Rapid (MW) processing allowed for examination of the sample within 5 working hours with a specific diagnosis of iridovirus infection. Based on this diagnosis, immediate control measures were undertaken by the hatchery to eliminate further spread of the disease. Iridoviruses are known to cause serious disease in many vertebrate mammalian, reptilian and amphibian animal species [4]. Pigs are susceptible to the highly contagious foreign animal disease, African swine fever and many varieties of fish are susceptible to a couple of different iridoviruses, one of which causes lymphocystosis, resulting in unsightly skin lesions. Other iridoviruses cause viral erythrocytic necrosis in oceanic and fresh water species that can be problematical, especially in fish culture operations [5]. Figure 1 illustrates this case material showing large 240 nm hexagonally shaped iridovirus particles from skin of the hatchery reared Pallid sturgeon that is infected with iridovirus

and in the early stages of development of lymphocystosis. The virus spreads through the water as the epithelial cells are sloughed. Lymphocystis is considered a serious and unacceptable disease in fish aquaculture and as a result of our electron microscopy the hatchery was depopulated and disinfected.

## References

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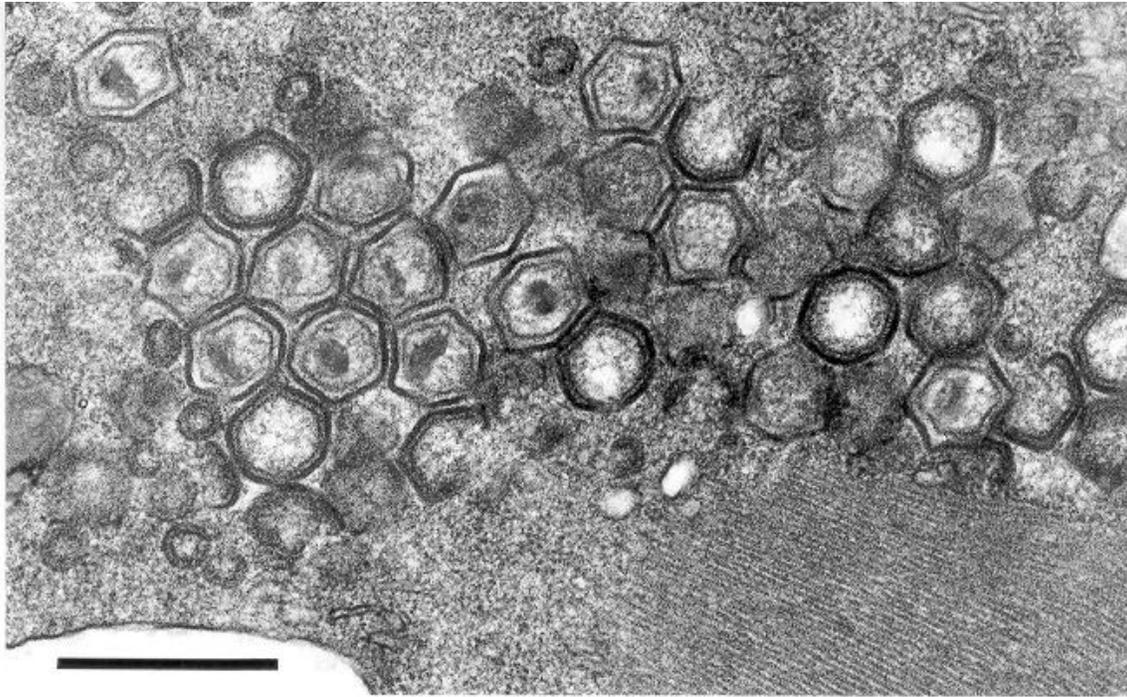


FIG.1 High magnification image of the Pallid sturgeon skin infected with the hexagonally shaped iridovirus. Bar marker is 500nm.