

Effect of Refrigeration Storage of Madin Darby Bovine Kidney Cells on Their Viability and Functionality in Serum Neutralization Assays

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Introduction:

Even though cell cultures are no longer as widely used in veterinary diagnostics as in the past, they remain an essential tool in the virologist's diagnostic toolbox, especially in the discovery of new viruses. Indeed, when new viruses emerge, it is important to be able to obtain an isolate for characterization and development of diagnostic reagents and vaccines to combat the disease. Traditional cell culture maintenance methods by freezing or serial passaging are costly, time-consuming, and not conducive for daily use in a busy diagnostic virology laboratory. In fact, the cost factor considerations have caused some veterinary diagnostic laboratories to discontinue classical virology assays. To alleviate the cost factor in using cell cultures for diagnostics, we investigated the viability and functionality of a commonly used cell line, Madin Darby Bovine Kidney (MDBK), during short-term storage at refrigerator temperature ($4 \pm 2^\circ\text{C}$).

Materials and Methods:

A confluent monolayer of MDBK cells was trypsinized and the cells suspended in standard cell culture medium containing 9% fetal bovine serum. The cell suspension was divided into five aliquots and stored in a refrigerator. Starting from the day of trypsinization, cells from one aliquot at a time were counted using trypan blue-exclusion method in an automated cell counter to determine viability.

Cells from the same aliquot were used to setup serum neutralization assays for antibodies against Bovine viral diarrhea virus type 1 (BVDV1) and Infectious bovine rhinotracheitis virus (IBRV) daily for five consecutive days. Daily cell viability (%) and mean antibody titers against BVDV1 and IBRV were compared.

Results:

The results showed that cell viability was stable at $\geq 95\%$ for up to fifteen days and antibody titers against both viruses also remained stable over the 5-day testing period.

Discussion:

Because MDBK cells stored in refrigerator temperatures maintain their viability and functionality for at least five days, it is possible to minimize the labor and expense in using cell cultures in a diagnostic virology laboratory. However, the results of this study need to be validated for other cell lines.

Conclusions:

MDBK cells may be trypsinized once a week for daily use in virological assays during an entire week. Such practice would fit well within a workflow whereby cells are trypsinized on Monday and stored in the refrigerator for daily use through Friday.