

MSS2024

HYBRID

The CCX cell line, a novel avian substrate for efficient virus production and seamless (CIM based) virus purification

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A novel avian cell line termed CCX was developed by Nuvonis. This quail-derived cell line was generated without the use of foreign genes and viral sequences and therefore CCX is a non-GMO cell line. The CCX cell line grows in animal component free commercially available medium and is available as suspension cell line termed CCX.E10 or as anchorage-dependent cell line termed CCX.2C4.

The CCX cell line was established by sub-passage of primary embryonic quail cells (*Coturnix japonica*) using low concentrations of pharma-grade serum for the first passages. Single cell clones were isolated and propagated, and adaptation to growth in suspension was carried out leading to CCX.E10 suspension cells.

Both cell lines exhibit stable growth over multiple passages at doubling levels of 0.8-1.0 per day. To use the CCX cell line for manufacturing of vaccines and vectors, large pools of GMP master cell bank and working cell bank ampoules were generated and extensively tested according to ICH guidelines. This includes the testing of tumorigenicity at the end of production generation level. CCX are very robust and can be grown in various standard cell culture systems (e.g. shaker, spinner, cell factories or bioreactors) to high cell densities. Quail derived cell lines can support the growth of a broad range of virus families (Poxviridae, Herpesviridae, Reoviridae, Orthomyxoviridae, Paramyxoviridae, Rhabdoviridae, Flaviviridae).

Here examples for New Castle Disease (NDV) and Vesicular stomatitis virus (VSV) will be presented. Both NDV and VSV are the basis for promising vectors against SARS-CoV-2, Ebola, H5N1 influenza, West Nile, and simian immunodeficiency viruses. Oncolytic NDV and VSV vectors also hold much promise for immunotherapies against various cancers.

In CCX cells, NDV and VSV can be grown to high titers of up to 9 log TCID₅₀/ml. The successful application of monolithic columns for the purification of CCX derived viruses with high yield and purity was demonstrated, providing a very fast and efficient downstream process.

The CCX cells are of great potential for future manufacturing of a range of viruses and vectors in scalable systems, and offer manufacturing solutions that are independent of SPF chicken-egg supply.

 PORTOROZ, SLOVENIA

 3-7 June 2024