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Disorders of the mitochondrial homeostasis in human keratinocyte cells during HHV-1 and HHV-2 infection

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Mitochondria have emerged as one of the key organelles in the maintenance of cellular homeostasis, innate immunity metabolism, aging, innate immunity, metabolism, apoptosis and other signaling pathway. In the last decade, work on the mitochondria has expanded our knowledge of its roles in cellular homeostasis in many parallel ways. There are not many report about interaction mitochondria – virus. Although all mitochondria have the same architecture, they vary greatly in shape and size. The mitochondria are composed of outer mitochondrial membrane, inner mitochondrial membrane, inter membrane space (space between outer and inner membrane), and matrix (space within inner mitochondrial membrane). The outer membrane is a smooth phospholipid bilayer, with different types of proteins imbedded in it. Mitochondria in eukaryotic cell formed network and they are distributed throughout the cells. In this study we examined changes of the mitochondrial network in HaCat cells during herpesvirus infection. For immunofluorescent staining, cells were plated onto laminin-coated coverslips. After 24, 48 h.p.i., infected cultures were fixed in 3.7% paraformaldehyde/PBS (Sigma Chemicals) for 30 min at room temperature. The cells were permeabilized in 0.5% Tween/PBS for 5 min, washed in PBS and blocked with PBS containing 1% bovine serum albumin (BSA) (Sigma Chemicals). Mitochondria were visualized using MitoRed (300 nM; Sigma Chemicals) and the cell nuclei were stained with Bisbenzimide /Hoechst 33258 according to the manufacturers recommendations. Results were evaluated under confocal microscope (Fluoview FV10i, Olympus). Due to infection with HHV-1 and HHV-2, the mitochondrial network is reorganized, both in the early and late stages of infection. Changes are manifested mainly through fragmentations of the mitochondrial network.

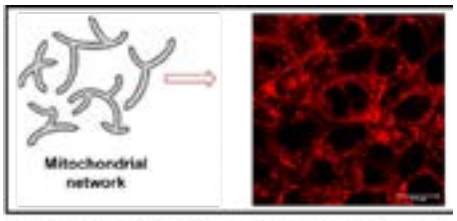

Fig.1 Mitochondrial network in human keratynocyte cells.

Recent Publications

1. Chodkowski M, Cymerys J, Słońska A and Bańbura M W (2017) Onkolityczne wirusy zwierzęce i ich zastosowanie w terapiach przeciwnowotworowych. Medycyna Weterynaryjna 73(1):4-9.
2. Chodkowski M, Brzezicka J, Cymerys - Bulenda J, Słońska A and Bańbura M (2017) Wirus Zika - aktualny stan wiedzy. Badania i rozwój Młodych Naukowców w Polsce – Nauki przyrodnicze, wyd. Młodzi naukowcy, pod red. Panfil M 25 – 30.
3. Golke A, Cymerys J, Tucholska A, Chmielewska A, Słońska A, Chodkowski M, Serafińska I, Brzezicka J and Bańbura M W (2017) Acyclovir and trichostatin A modulate EHV-1 replication in murine neurons *in vitro*. Medycyna Weterynaryjna 73(10):632–636.
4. Chodkowski M, Serafińska I, Brzezicka J, Bańbura M W and Cymerys J (2017) Application of NucleoCounter for the comprehensive assessment of murine cultured neurons during infection with equine herpesvirus type 1 (EHV-1). Polish Journal of Veterinary Sciences 20(4):831–834.

Biography

M Chodkowski is a PhD candidate in the Division of the Veterinary Medicine in Warsaw University of Life Sciences. His main research topic is: Changes in the mitochondrial network in primary murine neurons infected with EHV-1. He is interested in molecular virology, neurovirology and novel treatment approaches using viruses e.g. oncolytic viruses.

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