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Comparison of the intracellular distribution of lyssavirus matrix proteins

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Lyssaviruses are neurotropic rhabdoviruses with bats as the main reservoir. Of the different genotypes, only the one comprising classical Rabies Virus (RABV) is able to sustain in non-bat host population, suggesting that lyssaviruses differ in virus-host interactions required for efficient virus replication. Based on the recent finding, that matrix (M) proteins of RABV and bat-adapted European bat lyssavirus type 1 (EBLV-1) may differ in the targeting of cellular membranes, we compared the intracellular distribution of RABV and EBLV-1 M proteins. According to the essential role of M in virus budding, both M were detected at the cytoplasma and intracellular membranes. For the latter, a remarkable difference was observed: in contrast to RABV M, EBLV-1 M perfectly colocalized with Golgi-markers, confirming the postulated differences in membrane targeting. The use of a novel, highly cross-reactive antibody also allowed the detection of both M not only in the cytoplasm but also in the nucleus of infected cells, suggesting that lyssavirus M proteins are also involved in the regulation of nuclear processes. Furthermore, colocalization of both M proteins with cytoplasmic inclusion bodies for the first time showed the presence of lyssavirus M proteins at the suspected sites of virus replication, suggesting a direct influence of lyssavirus M on viral RNA synthesis in or nucleocapsid export from inclusion bodies. The identification of similar and distinct features of M proteins of bat and non-bat adapted lyssavirues may allow the further identification of restrictive virus-host interactions and their contributions to host barriers and virus tropism.