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# Pro- and anti-apoptotic signaling pathways in poliovirus-infected neuronal cells

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Poliovirus (PV), the etiological agent of paralytic poliomyelitis, is a member of the genus *Enterovirus* belonging to the *Picornaviridae* family. Infection of motoneurons by PV is the direct cause of flaccid paralyses characteristic of poliomyelitis. In PV-infected mice, motor neurons die through an apoptotic process. However, mechanisms by which PV induces cell death in neurons remain unclear. Analyses of the apoptotic pathways induced following PV infection in several cell lines have demonstrated that mitochondria are key actors of PV-induced apoptosis. We have shown that mitochondrial dysfunction in PV-infected human neuronal IMR5 cells was dependent on the protein Bax, a proapoptotic member of the Bcl-2 family. Bax activation was mediated by c-Jun $NH_2$-terminal kinase (JNK) phosphorylation after PV infection [1]. Surprisingly, JNK activation occurred early after PV infection whereas apoptotic features were observed later in PV-infected cells. These events may involve a balance between pro- and antiapoptotic signals following PV infection. We have recently shown that, early after infection, PV also activates the phosphatidylinositol 3-kinase (PI3K)/Akt survival signaling pathway in these cells, limiting the extent of JNK activation, and thereby cell death. JNK inhibition is associated with PI3K-dependent negative regulation of the apoptosis signal-regulating kinase 1 (ASK1), which acts upstream from JNK in PV-infected IMR5 cells [2]. This survival pathway may limit the spread of PV-induced damage in the central nervous system during poliomyelitis.

## References

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