Amino Acid Deprivation in Neurons

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Background

When cells are deprived of amino acids, they undergo an integrated stress response pathway, ultimately resulting in cell death.

AA Deprivation Pathway

Goals

- To determine whether neurons undergo the same amino acid deprivation response as other cells
- To determine whether neuronal death by amino acid starvation is apoptotic, necrotic, or neither

Left: [Image Link](http://ars.sciencedirect.com/content/image/1-s2.0-S0300908410000817-gr5.jpg)
Right: [Image Link](http://ars.els-cdn.com/content/image/1-s2.0-S0955067409002324-gr1.jpg)
Results

Neurons deprived of amino acids survived only when treated with Necrostatin-1, a necrotic death inhibitor. Treatment with ZVAD, an apoptosis inhibitor, was not consequential. This indicates that in neurons, amino acid starvation induces necrosis.

Amino acid deprivation is a novel means of inducing necroptosis in neurons. This pathway has been previously unreported in the literature.

Above: Survival chart of neurons maintained or deprived of amino acids, treated with ZVAD or Nec-1

Below: Pictures of necrostatin and ZVAD treated neurons, showing Necrostatin’s saving potential