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cell based solutions

NEURODEGENERATIVE DISEASES

PARKINSON DISEASE
PARKIN-PINK1 CELL LINE

P30711

Parkinson disease (PD) is a neurological disorder that affects to the central nervous system. The symptoms appear gradually and range from tremor or bradykinesia to muscle rigidity.

Among the hallmarks that distinguish the pathology of PD, the loss of dopaminergic neurons in the substantia nigra and the reduction of dopamine levels in the striatum are the most characteristic. Although other areas of the brain may also be affected.

The mechanism that produces the loss of dopaminergic neurons remains misunderstood. At a molecular level, Parkinson's disease (PD) is characterized by a combination of protein aggregation, mitochondrial dysfunction, oxidative stress, neuroinflammation, and impaired cellular homeostasis, which ultimately lead to dopaminergic neuron death.

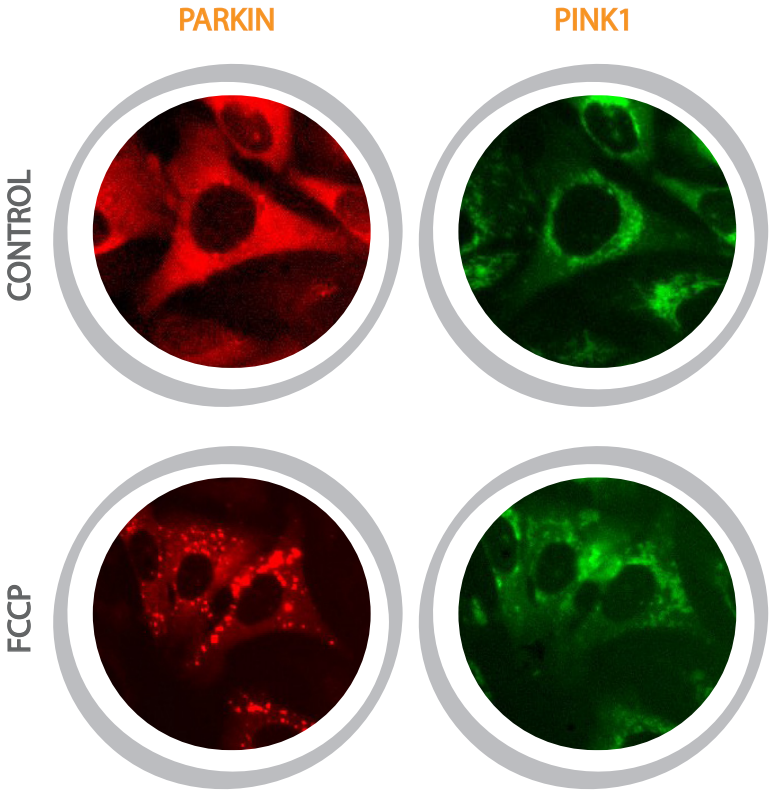
Prot. Official Full Name: Parkin (PARK2) & PINK1
cDNA Acc. numbers: Park: NM_004562.3 Pink NM_032409.3
Host Cell Line: U2OS
Resistance: Geneticin (G418) + Puromycin
Quantity: > 3 x 10^6 cells / vial
Storage: Liquid Nitrogen

Background

Parkin and Pink are key proteins in the regulation of mitophagy, a crucial process for the removal of damaged mitochondria and the maintenance of cellular homeostasis.

Parkin is an E3 ubiquitin ligase that translocates to the outer mitochondrial membrane in response to mitochondrial depolarization, mediating ubiquitin tagging for subsequent degradation.

Pink, a serine/threonine kinase localized to mitochondria, acts as a sensor of mitochondrial damage and is essential for Parkin activation.



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Assay Description

Parkin is primarily distributed in the cytosol under normal conditions. Upon FCCP treatment, which disrupts mitochondrial membrane potential (ΔΨm), Parkin localizes in intracellular vesicles.

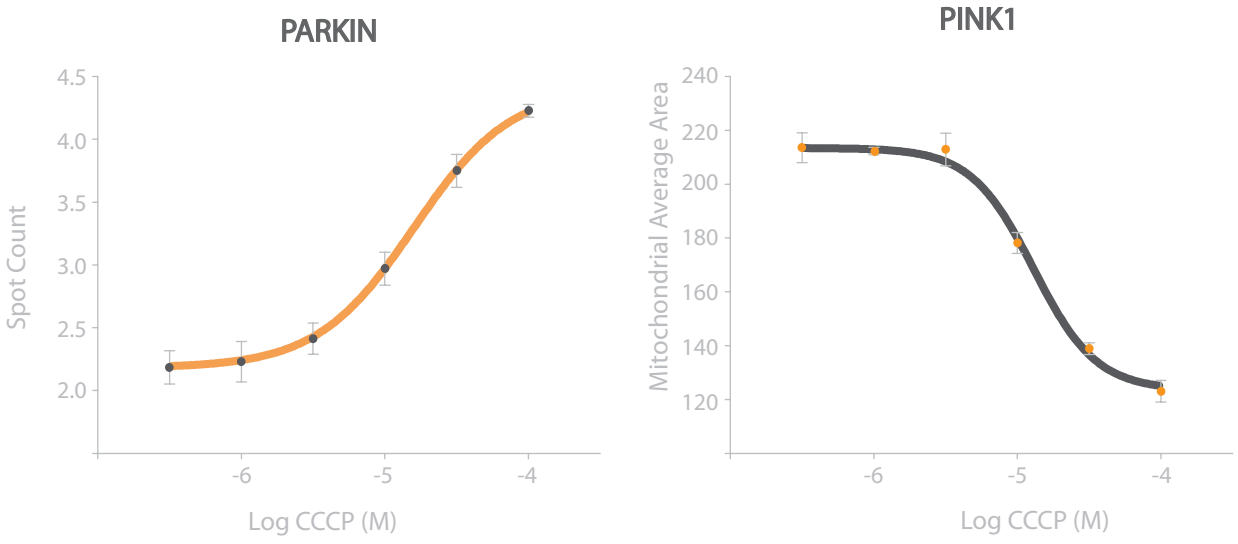
Simultaneously, mitochondrial membrane potential disruption alters mitochondrial shape, which in turn affects the distribution of Pink within the cell.

Parkin redistribution is quantified by counting the number of spots, while PINK relocalization is measured by analyzing the mitochondrial average area through image analysis (Figure 1).

Applications

Real-Time Tracking of Mitophagy Dynamics: This model allows live-cell imaging to monitor the recruitment and localization of Parkin and Pink in response to mitochondrial stress, providing insights into the sequence and kinetics of mitophagy activation.

High-Throughput Drug Screening: It enables screening for small molecules or genetic modulators that influence Parkin/Pink recruitment and mitophagy, facilitating the discovery of potential therapies for neurodegenerative diseases.



EC_{50} FCCP: 1.61×10^{-5} M	EC_{50} FCCP: 1.30×10^{-5} M
Z´: 0.69+/- 0.01	Z´: 0.75+/- 0.01

Figure 1. Dose-response curves for FCCP-induced recruitment of Parkin (orange, left panel) and Pink (grey, right panel). Data were collected after 90 minutes of FCCP treatment. Error bars represent the standard deviation from four replicate wells.

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