

Title	The Parkinson's disease gene PINK1 activates Akt via PINK1 kinase-dependent regulation of the phospholipid PI(3,4,5)P3
Authors	Furlong, Rachel M.;Lindsay, Andrew J.;Anderson, Karen E.;Hawkins, Phillip T.;Sullivan, Aideen M.;O'Neill, Cora
Publication date	2019-10-22
Original Citation	Furlong, R. M., Lindsay, A., Anderson, K. E., Hawkins, P. T., Sullivan, A. M. and O'Neill, C. (2019) 'The Parkinson's disease gene PINK1 activates Akt via PINK1 kinase-dependent regulation of the phospholipid PI(3,4,5)P3', Journal of Cell Science, 132(20), jcs233221, doi: 10.1242/jcs.233221
Type of publication	Article (peer-reviewed)
Link to publisher's version	<a href="https://jcs.biologists.org/content/132/20/jcs233221">https://jcs.biologists.org/content/132/20/jcs233221</a> - 10.1242/jcs.233221
Rights	© 2019. Published by The Company of Biologists Ltd.
Download date	2025-01-13 23:08:57
Item downloaded from	<a href="https://hdl.handle.net/10468/9727">https://hdl.handle.net/10468/9727</a>

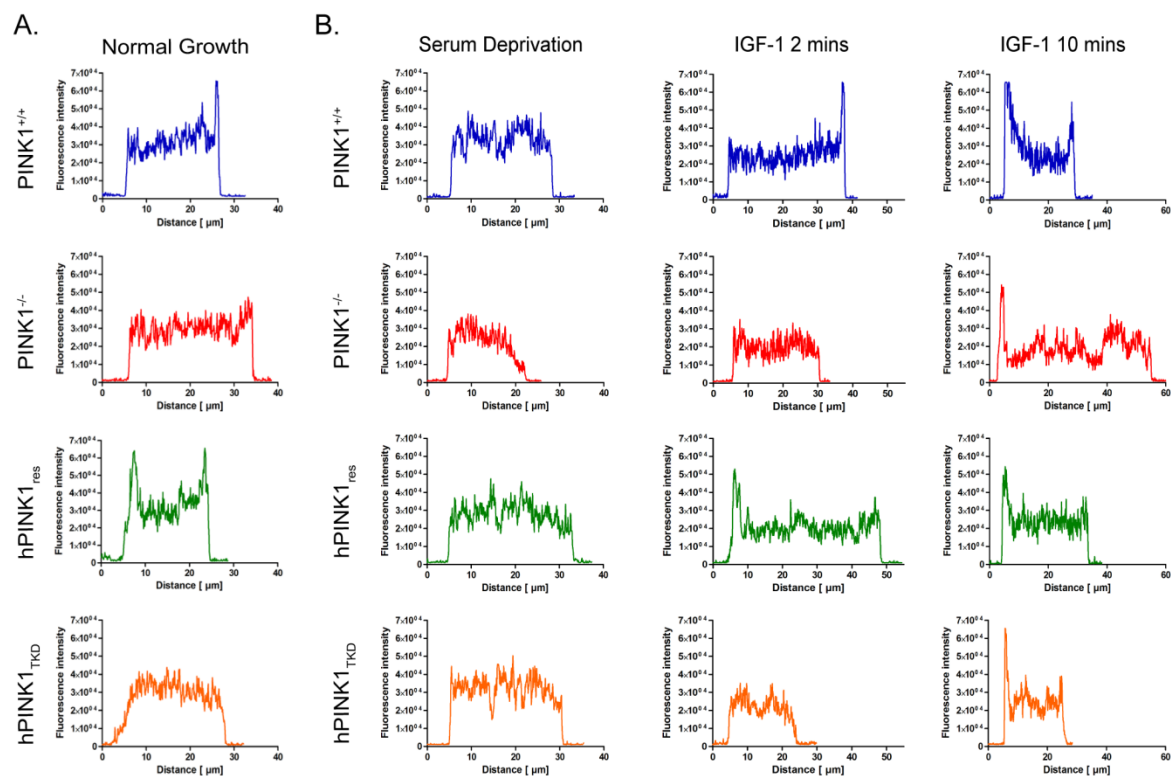


# UCC

**University College Cork, Ireland**  
Coláiste na hOllscoile Corcaigh

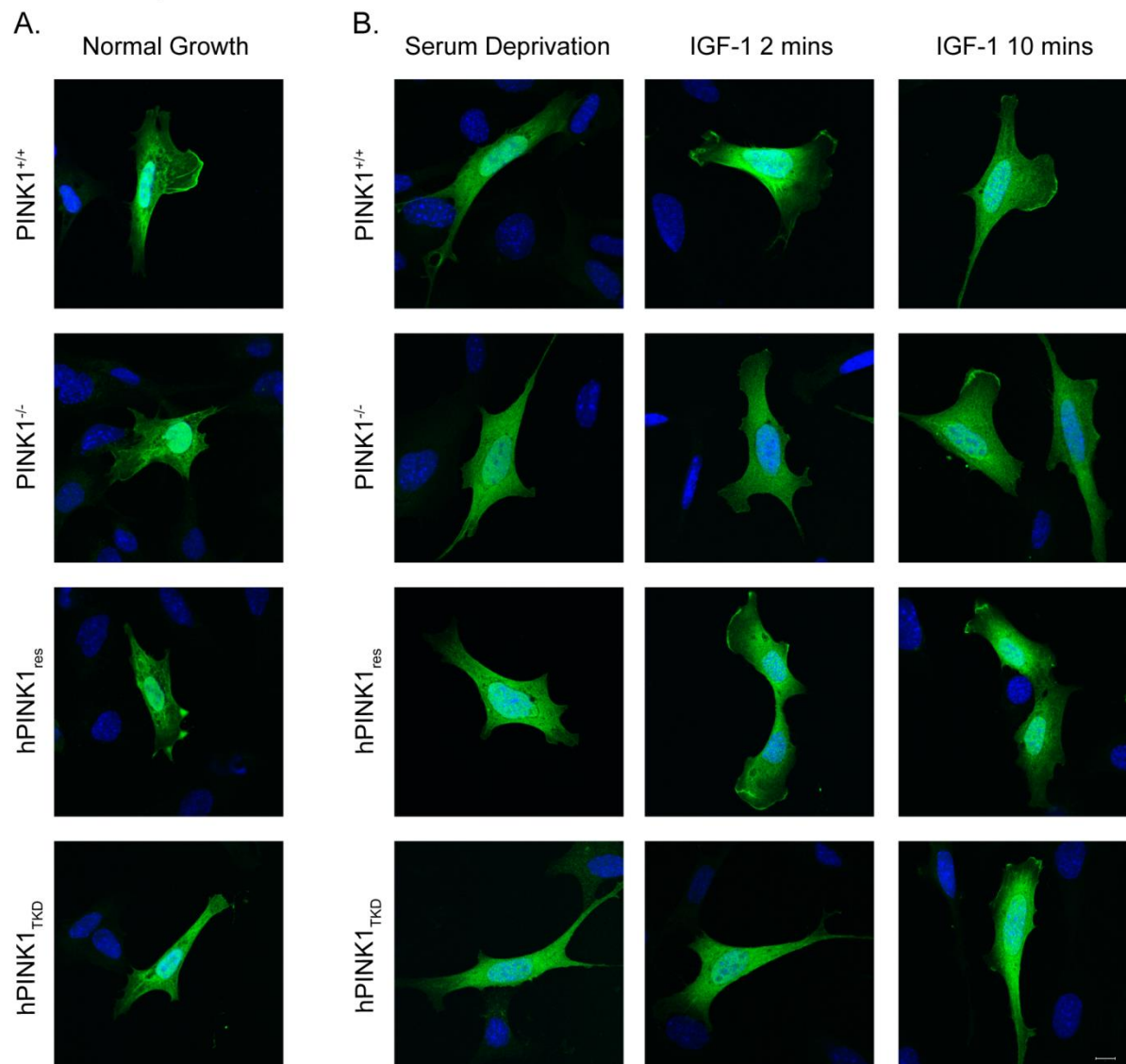
**Table S1. RT-PCR primer and conditions.**

Primer Set	Sequences	Conditions
mPINK1	F: 5' GCTGATCGAGGAGAAGCAG 3' R: 5' GATAATCCTCCAGACGGAAGC 3'	95°C 15 min, [94°C 30 secs, 60°C 30 secs, 72°C 30 secs] 35 cycles.
hPINK1	F: 5' AGACGCTTGCAGGGCTTTC 3' R: 5' GGCAATGTAGGCATGGTGG 3'	95°C 15 min, [94°C 30 secs, 50°C 30 secs, 72°C 30 secs] 35 cycles.



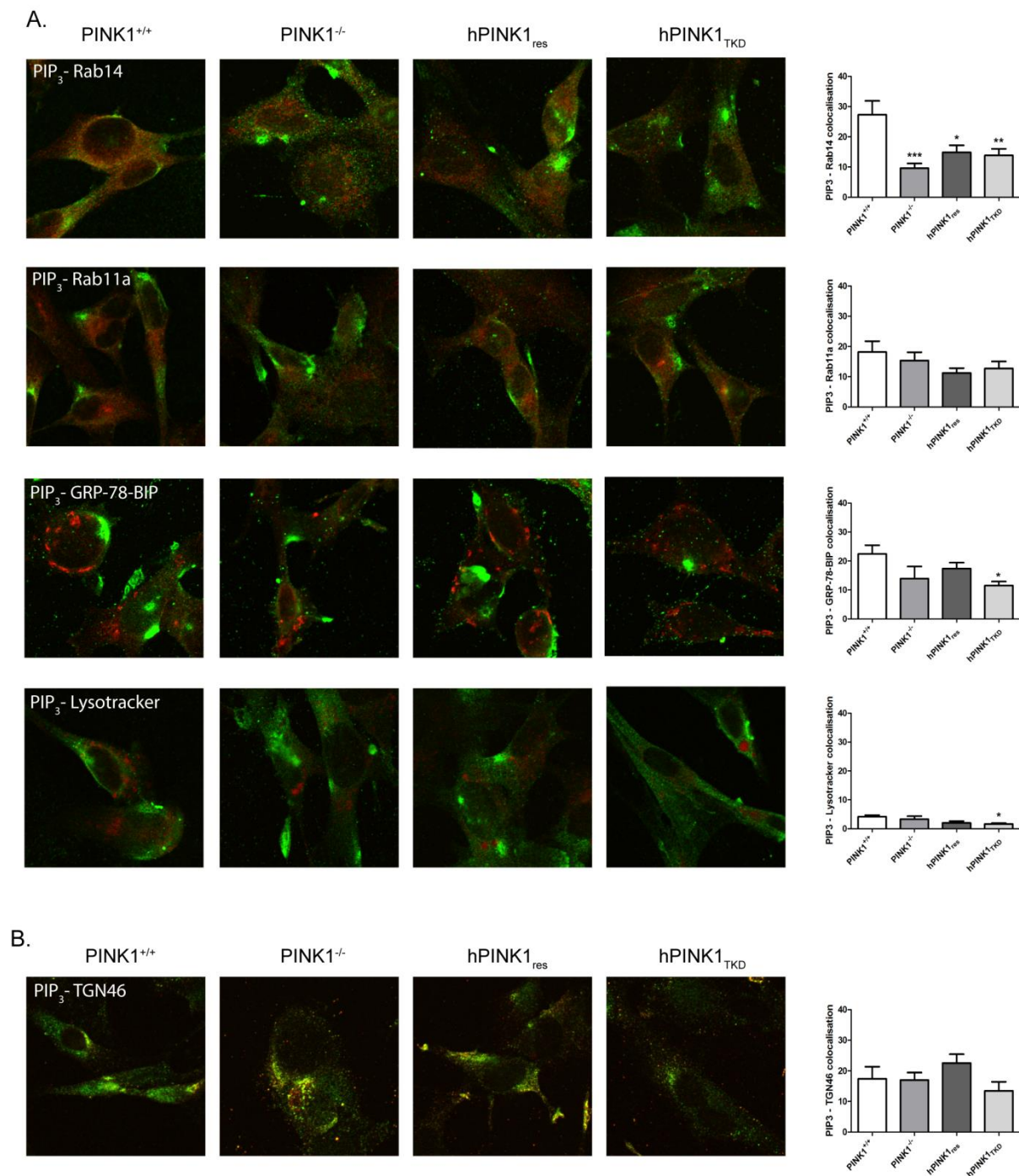
**Figure S1. Increases in fluorescence intensity at the plasma membrane show that PINK1 decreases the time taken for Akt localisation to the plasma membrane in response to IGF-1 stimulation.**

Representative line plots indicating the fluorescence intensity of GFP-Akt-PH along the white lines shown in Figure 2 (A) and 3 (A). Normal growth MEFs were grown in DMEM-Hi supplemented with 10% FBS. Serum-starved cells were stimulated with 10 ng/ml IGF-1 for the indicated times and subsequently stimulated with 10 ng/ml IGF-1. Scale bars 10  $\mu\text{m}$ .



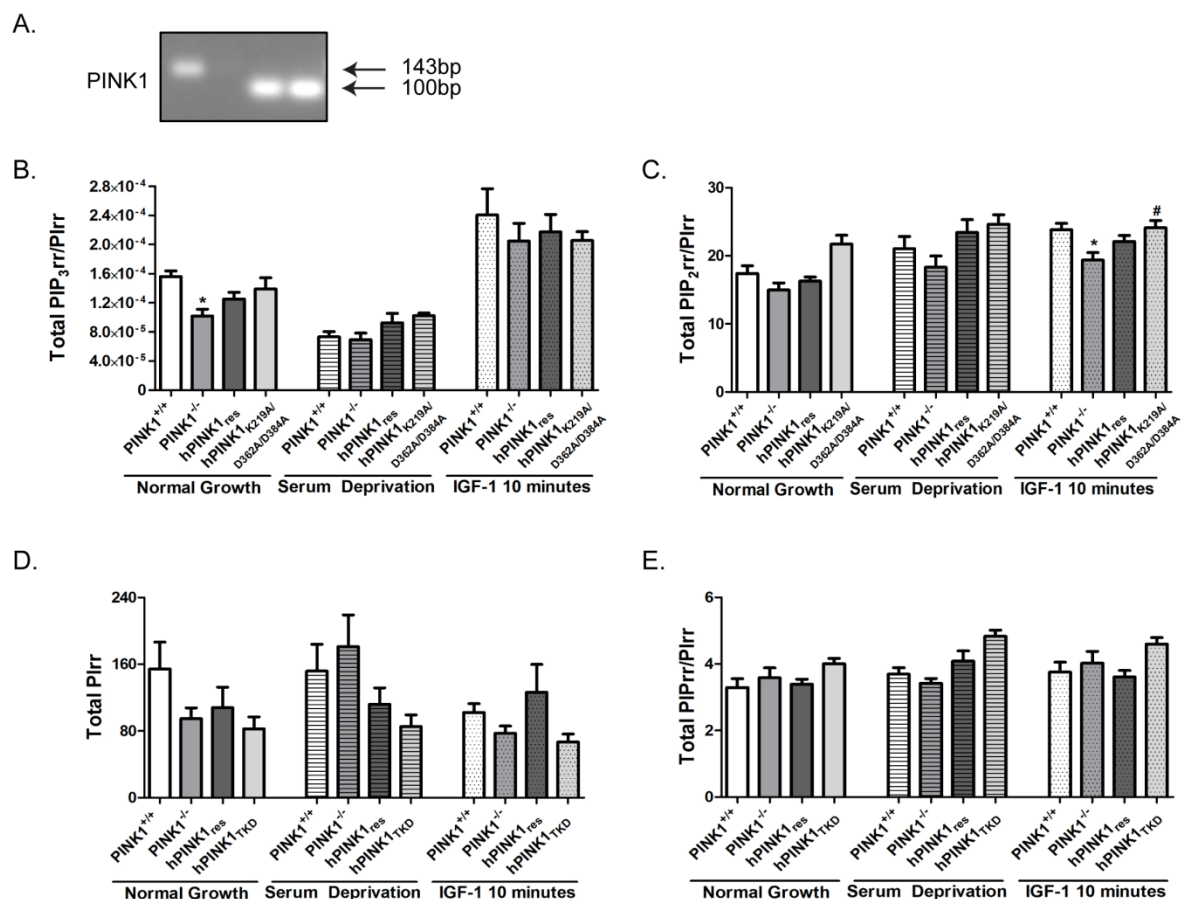
**Figure S2. PINK1 regulates the localisation of Akt to the plasma membrane under normal growth conditions and decreases the time taken for Akt to get to the plasma membrane in response to IGF-1 stimulation.**

A Representative confocal images showing GFP-Akt localisation in  $PINK1^{+/+}$ ,  $PINK1^{-/-}$ ,  $hPINK1_{res}$  and  $hPINK1_{TKD}$  MEFs, which were grown in DMEM-Hi supplemented with 10% FBS, transfected with GFP-Akt for 24h and stained with DAPI (blue). B Representative confocal images showing GFP-Akt localisation in  $PINK1^{+/+}$ ,  $PINK1^{-/-}$ ,  $hPINK1_{res}$  and  $hPINK1_{TKD}$  MEFs, following transfection with GFP-Akt for 24 h and stained with DAPI (blue). Serum-starved cells were stimulated with 10 ng/ml IGF-1 for the indicated times (n = 3). Scale bar 10  $\mu$ m.



**Figure S3. Colocalisation analysis using endomembrane markers Rab14, Rab11a, GRP-78-BIP and Lysotracker reveals selective localisation of PIP<sub>3</sub> to the medial-Golgi.**

Representative confocal images showing PIP<sub>3</sub> colocalisation with endomembrane markers in PINK1<sup>+/+</sup>, PINK1<sup>-/-</sup>, hPINK1<sub>res</sub> and hPINK1<sub>TKD</sub> MEFs, which were grown in DMEM-Hi supplemented with 10% FBS. A, B Cells were immunostained for PIP<sub>3</sub> (green) and Rab 14, Rab 11a, GRP-78-BIP, Lysotracker and TGN46 (red). Scale bar 10  $\mu$ m. Data information: In A, B, data are presented in corresponding graphs as mean  $\pm$  SEM (n=3 for each). \*= $p < 0.05$ , \*\*= $p < 0.01$ , and \*\*\*= $p < 0.0001$  with respect to PINK1<sup>+/+</sup> MEFs (One-way ANOVA).



**Figure S4. PINK1 modification in MEFs, PINK1 modulates PIP<sub>3</sub> and PIP<sub>2</sub> levels.**

A. Agarose Gel showing PINK1 deletion and re-expression as confirmed by RNA extraction and RT-PCR analysis. Total PIP<sub>3</sub> (B), PIP<sub>2</sub> (C), PI (D), and PIP (E) levels as measured by mass spectrometry in PINK1<sup>+/+</sup>, PINK1<sup>-/-</sup>, hPINK1<sub>res</sub> and hPINK1<sub>TKD</sub> MEFs grown in DMEM-Hi supplemented with 10% FBS, serum deprived for 24h or stimulated with 10 ng/ml IGF-1 for 10 min (n = 3). Data information: In B-E, data are presented in corresponding graphs as mean ± SEM. \* = p < 0.05 with respect to PINK1<sup>+/+</sup> MEFs, # = p < 0.05 with respect to PINK1<sup>-/-</sup> MEFs (Two-way ANOVA).