

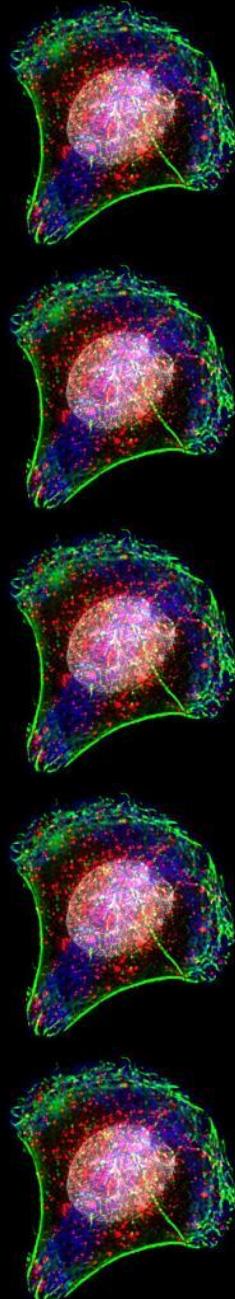
Peripheral positioning of lysosomes supports melanoma aggressiveness

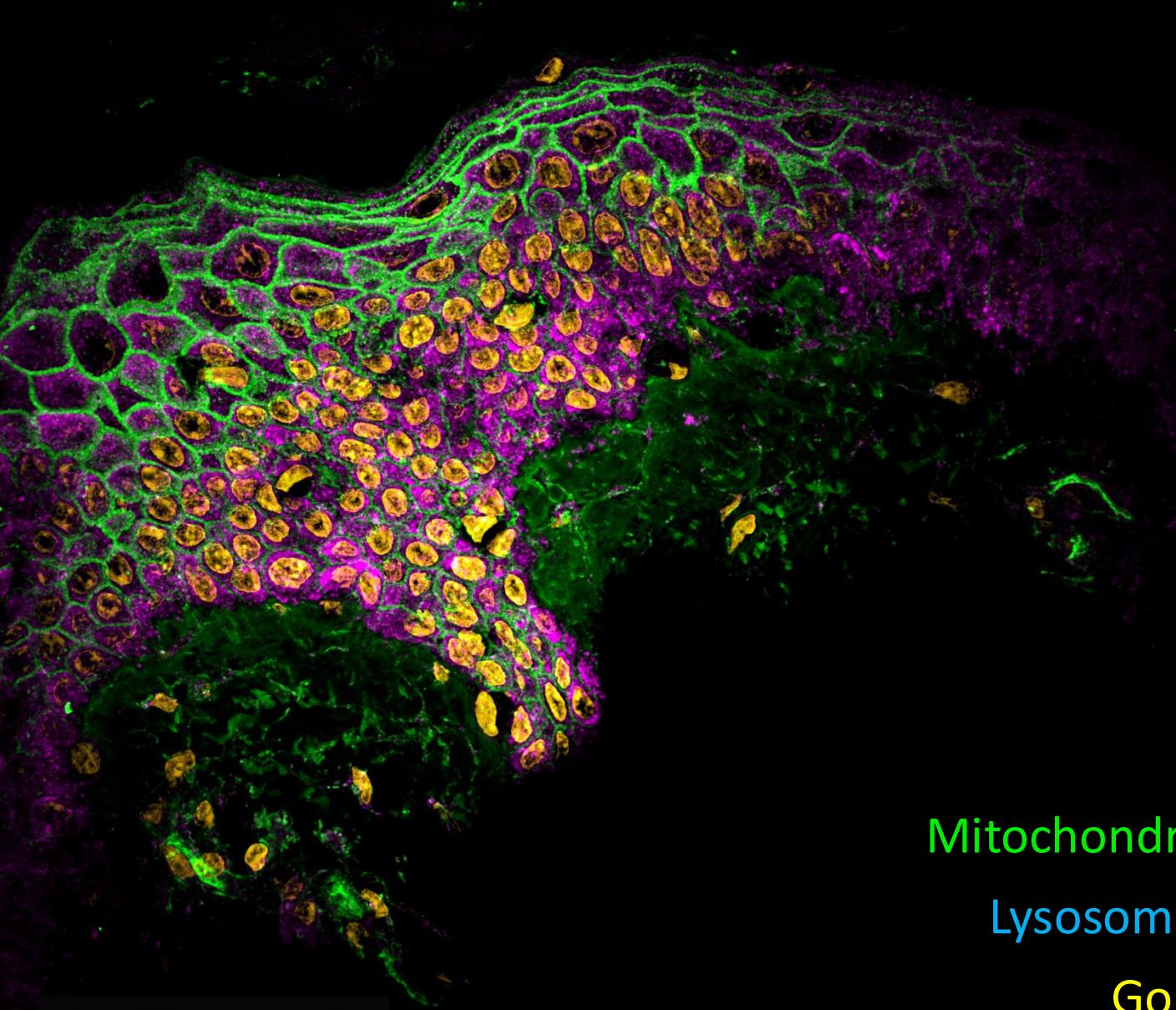
Katerina Jerabkova-Roda

Postdoctoral researcher

Tumor Biomechanics lab, Strasbourg, France

14e Forum du Cancéropôle Est, 28th November 2025





Mitochondria

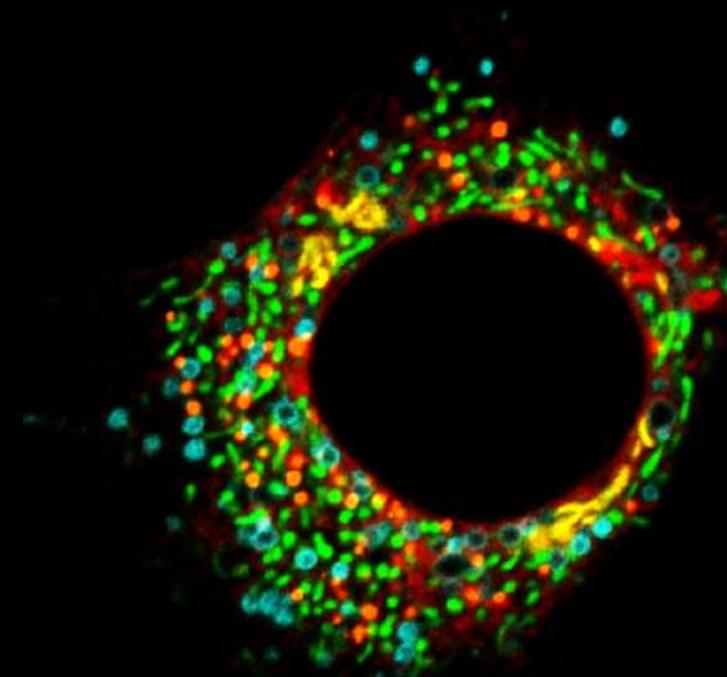
Lysosomes

Golgi

ER

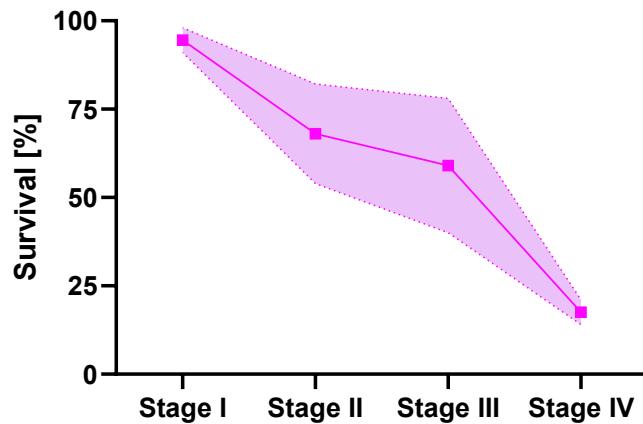
Why are some cells more aggressive than others?

Transcriptional profiles
Subcellular architecture



Melanoma model to study phenotypic transitions

Patient 5-year survival



Stage 0-II. = 96%, Stage IV. = 15%-25%

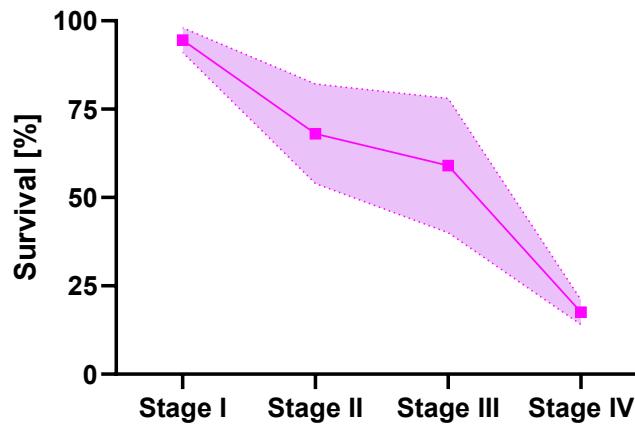
No molecular marker for diagnosis



Main risk factor: UV radiation

Melanoma model to study phenotypic transitions

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Main risk factor: UV radiation

Radial Growth

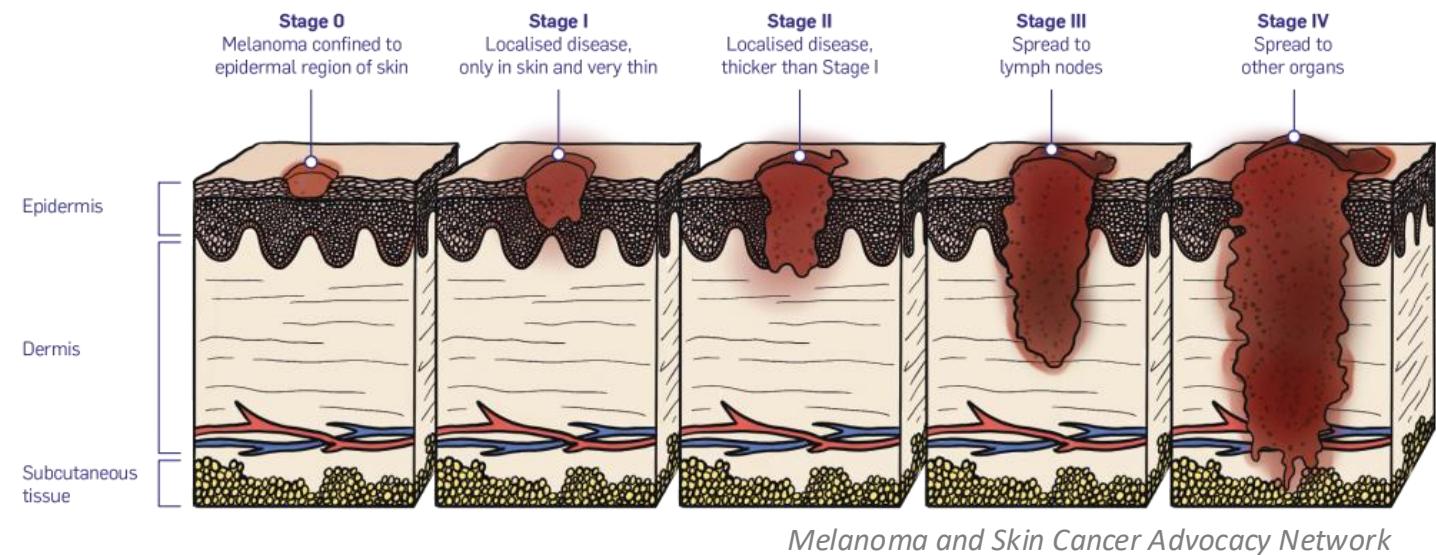
RGP

Vertical Growth

VGP

Metastatic

Met

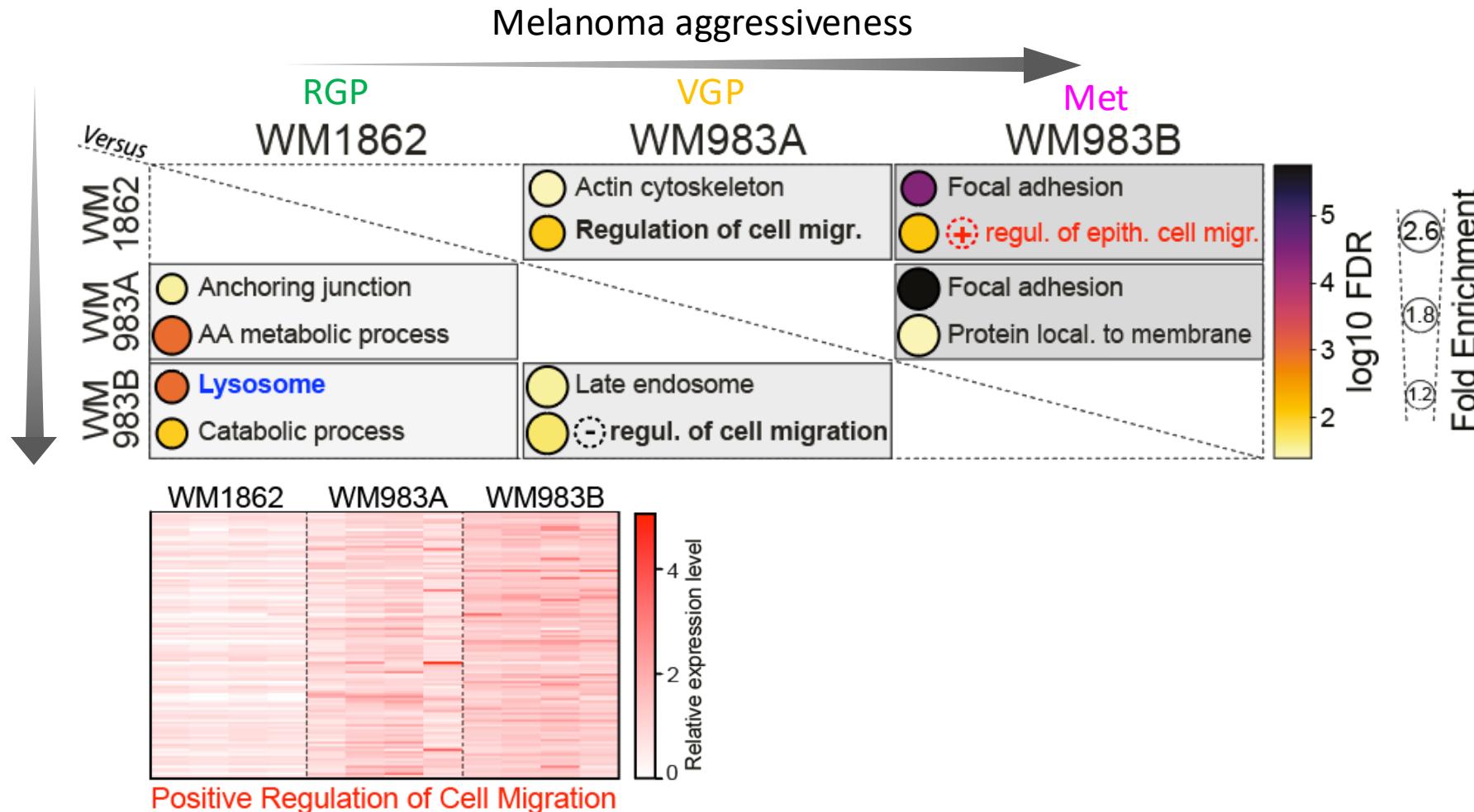


Panel of Patient-derived cells

	Healthy	RGP		VGP		Metastasis		
Cell line	Melanocyte	WM1862	WM1552c	WM983A	WM115	WM983B	A375	
Mutations	-	BRAF V600E	PTEN	BRAF V600E	BRAF V600D	PTEN	BRAF V600E	CDKN2A

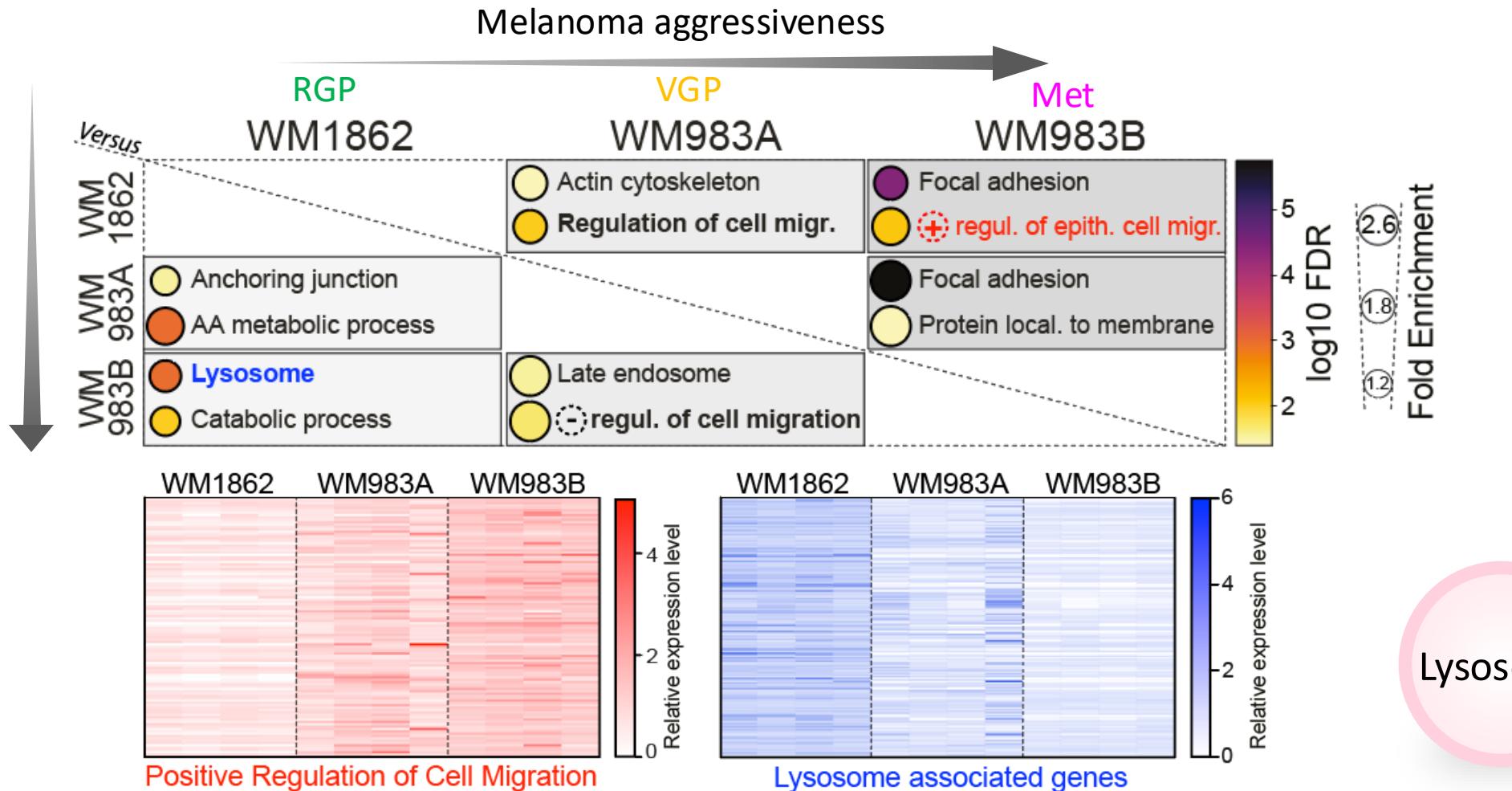
What drives melanoma cell adaptation?

Transcriptomics analysis

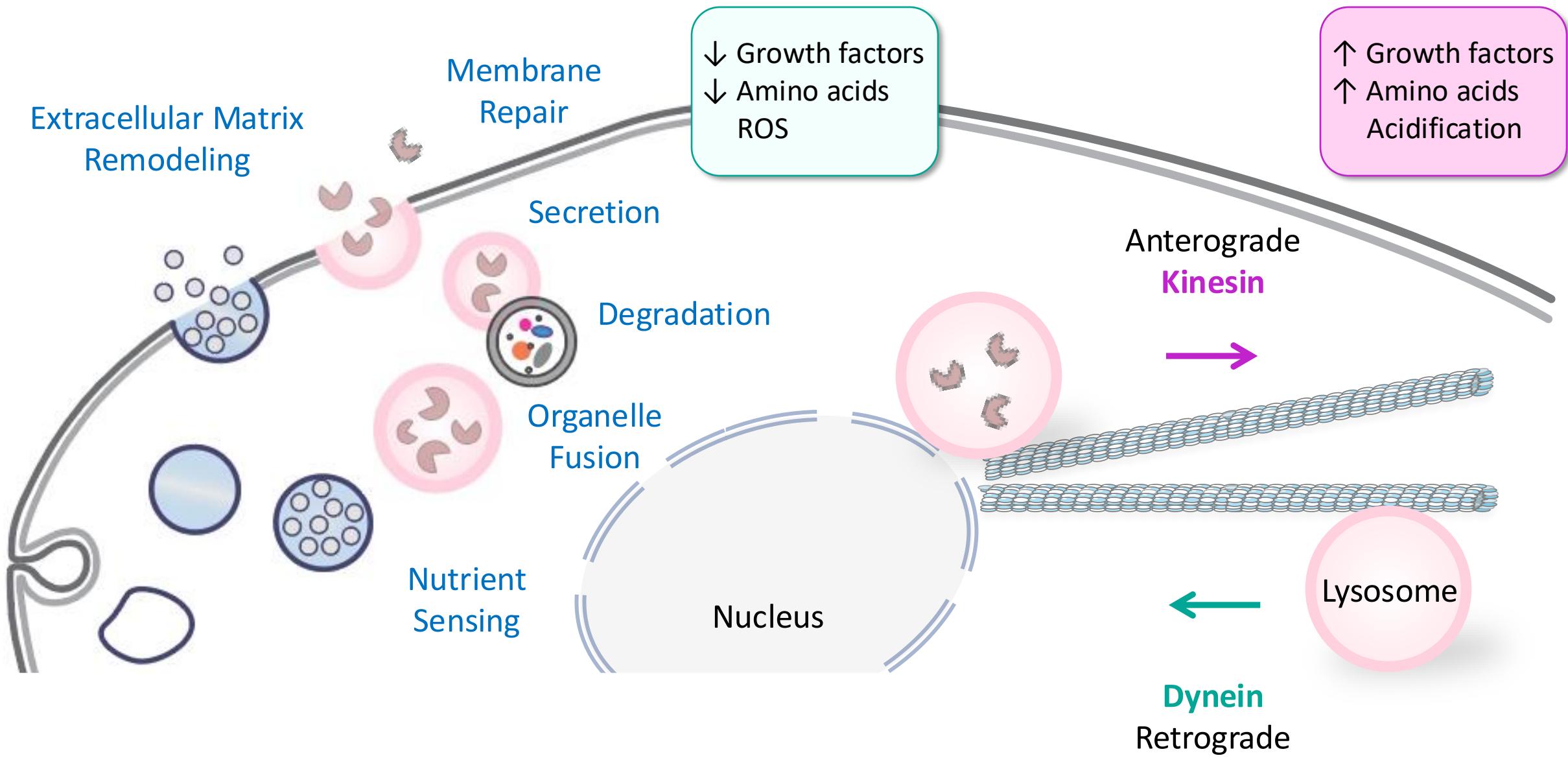


What drives melanoma cell adaptation?

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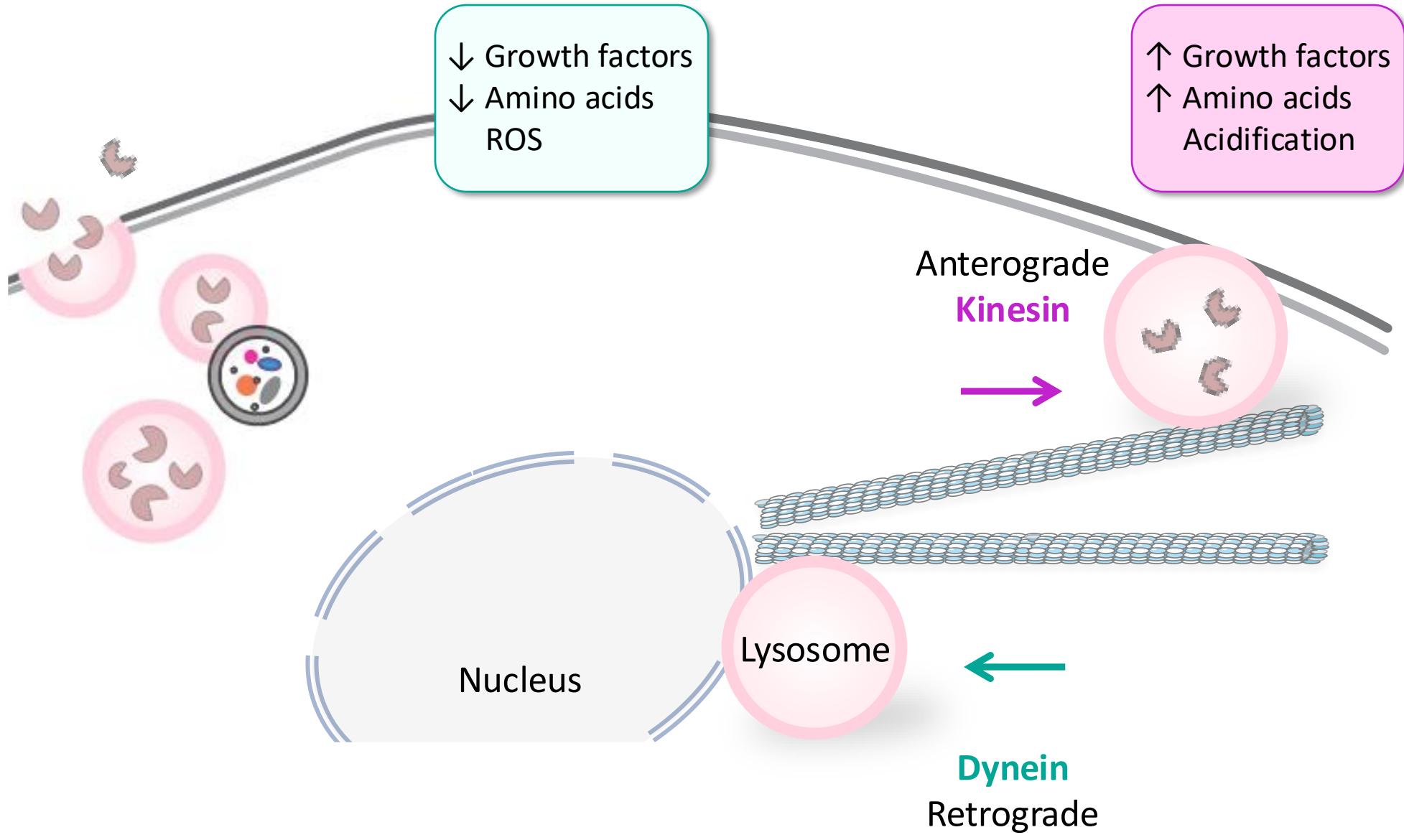
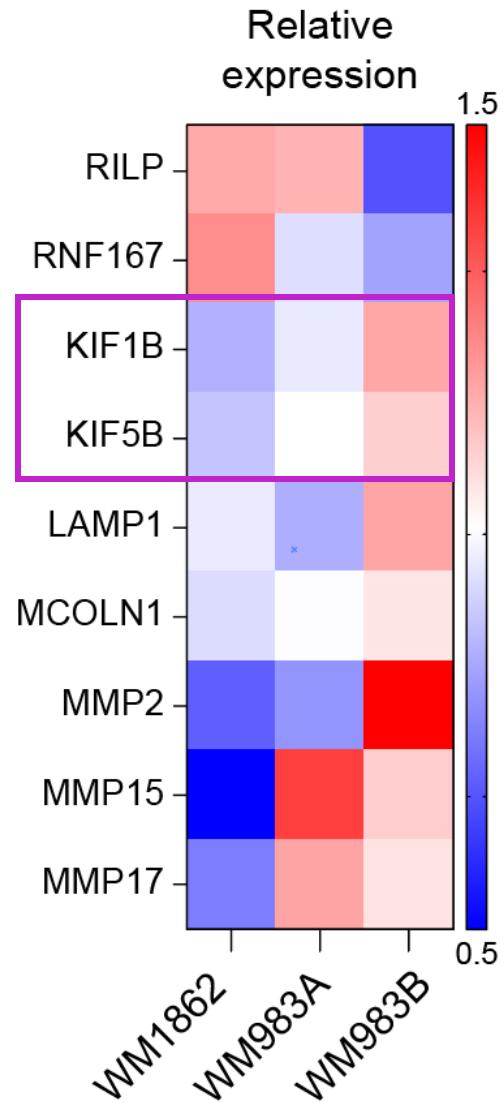


Lysosomes are important signaling hubs of the cells



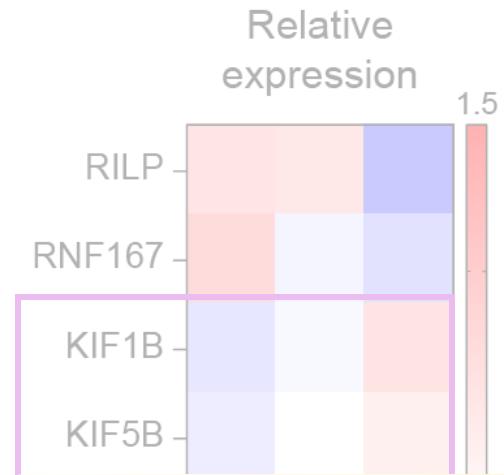
Lysosomes are important signaling hubs of the cells

Transcriptomics analysis



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Transcriptomics analysis



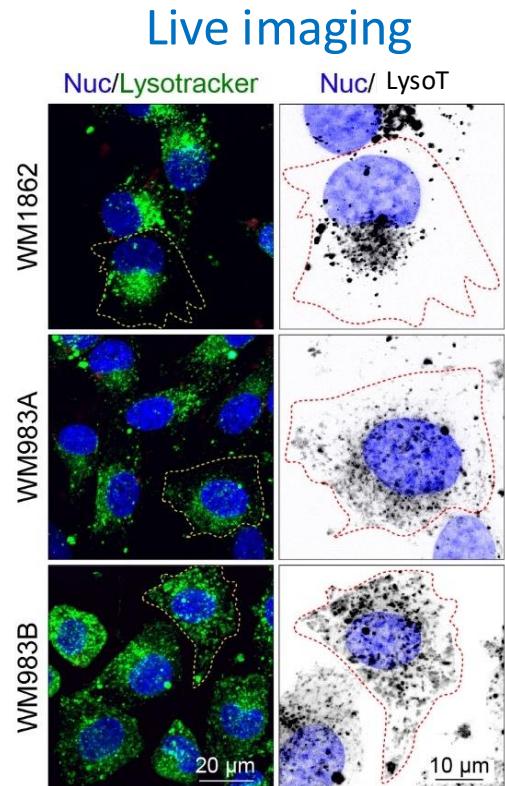
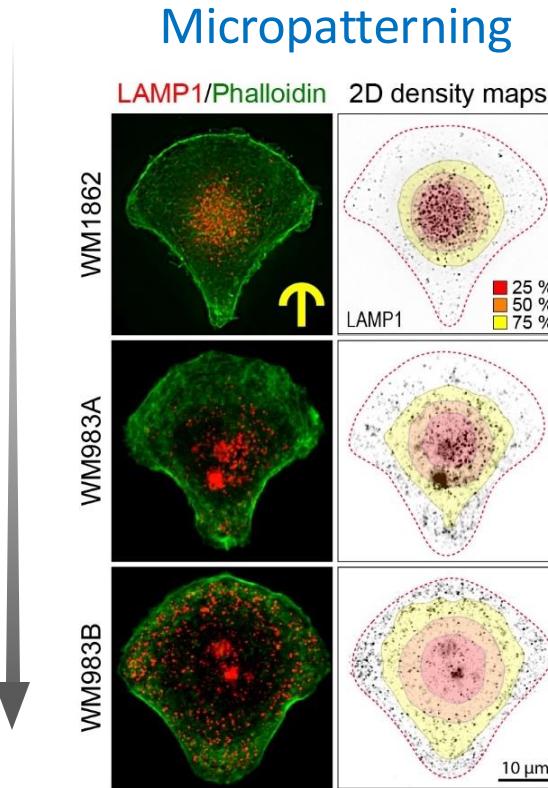
Is lysosome positioning changing along melanoma progression?



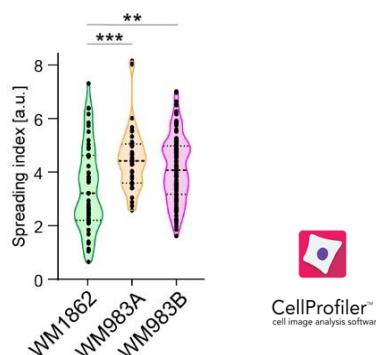
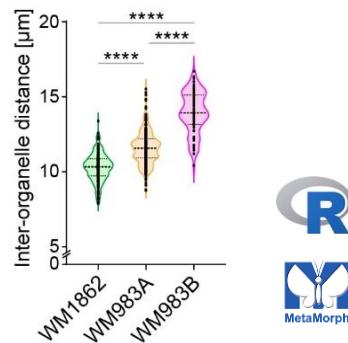
Lysosome positioning in aggressive melanoma cells

Patient-derived melanoma cells

Melanoma invasiveness



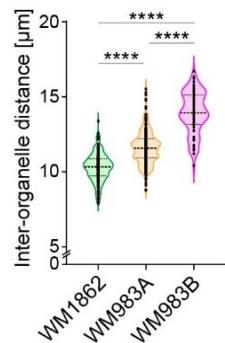
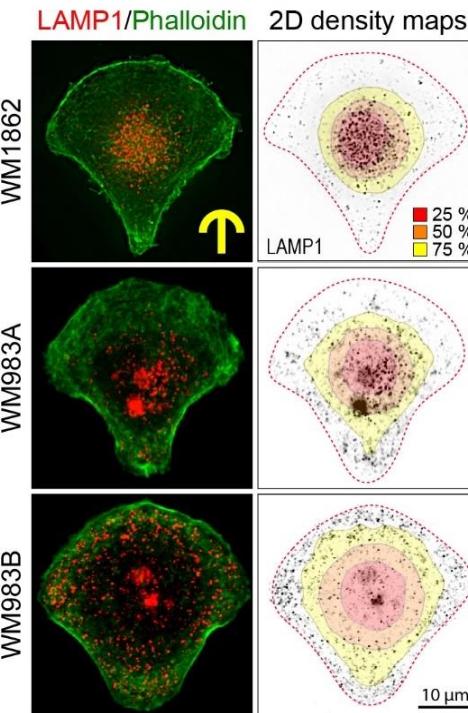
Peripheral lysosomes



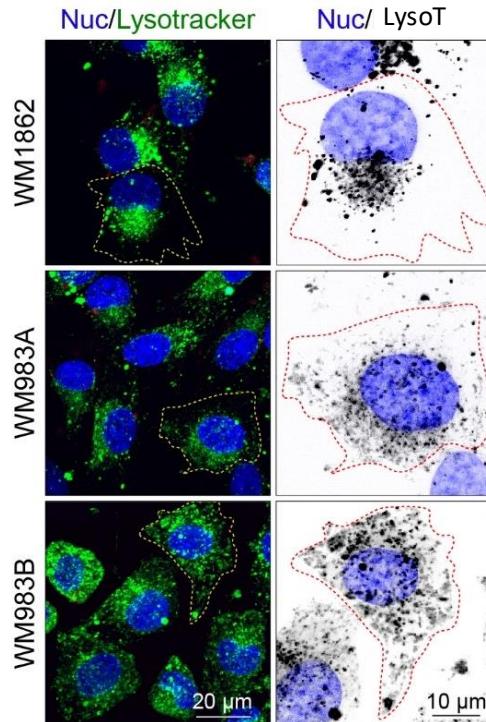
Lysosome positioning in aggressive melanoma cells

Patient-derived melanoma cells

Micropatterning



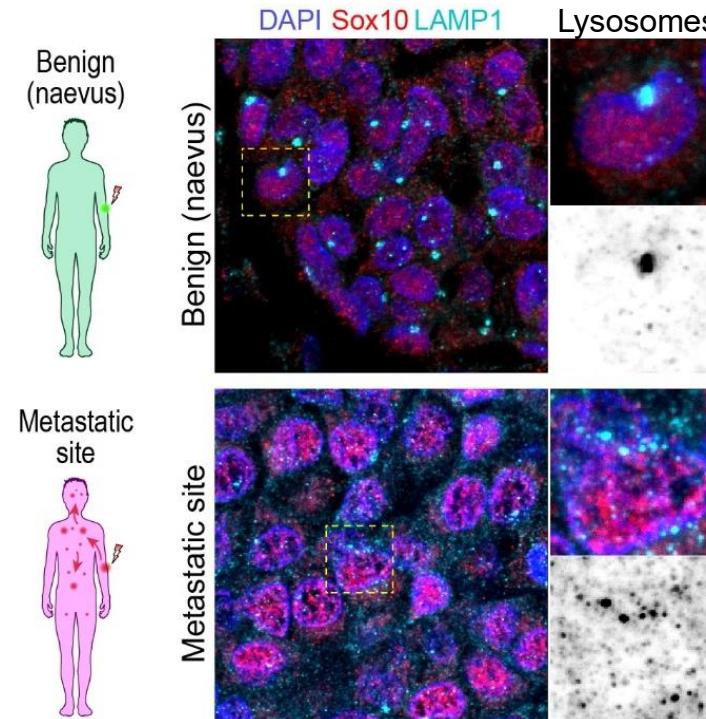
Live imaging



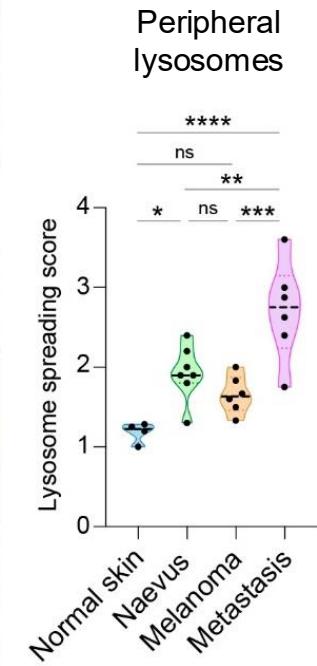
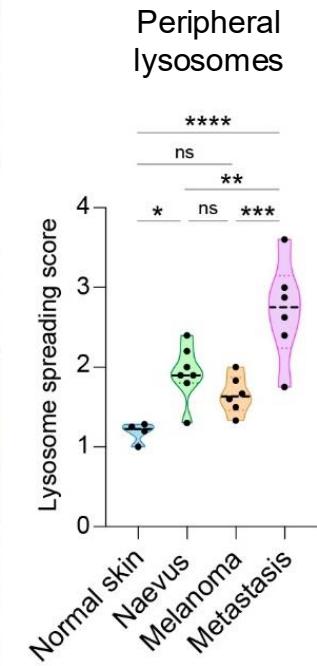
CellProfiler™
cell image analysis software

Patient tumor biopsies

Immunofluorescence



Aggressive cells = scattered lysosomes



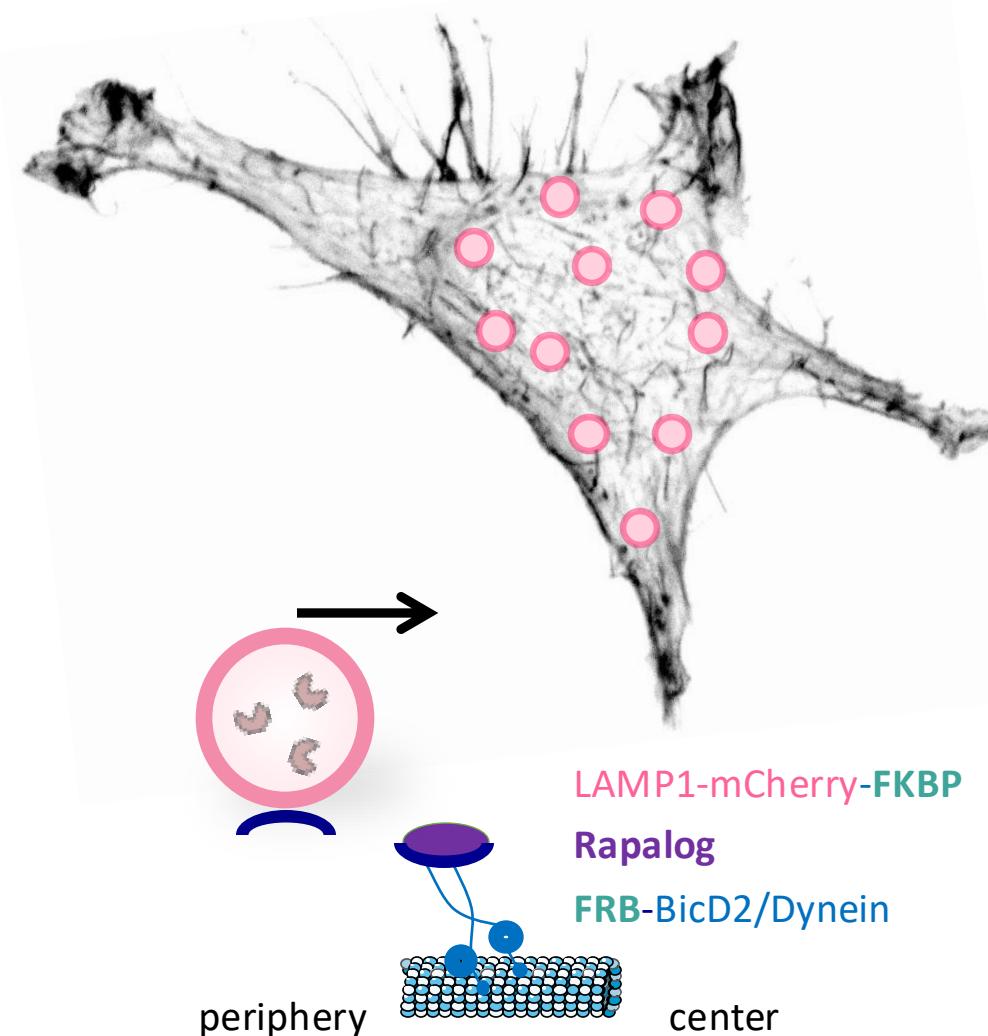
Lysosomes are repositioned to cell periphery
during melanoma progression

Melanoma invasiveness

Peripheral
lysosomes

Tuning lysosome positioning to study its impact on cell invasiveness

Mechanism of lysosome clustering

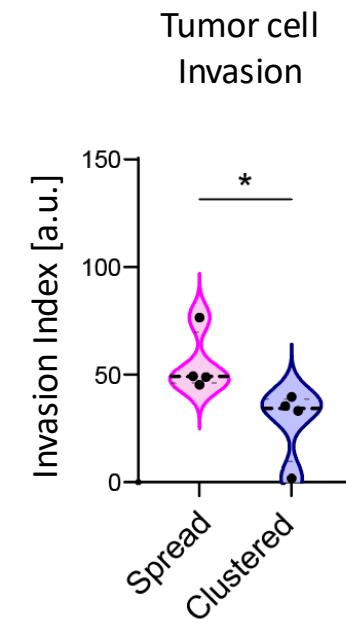
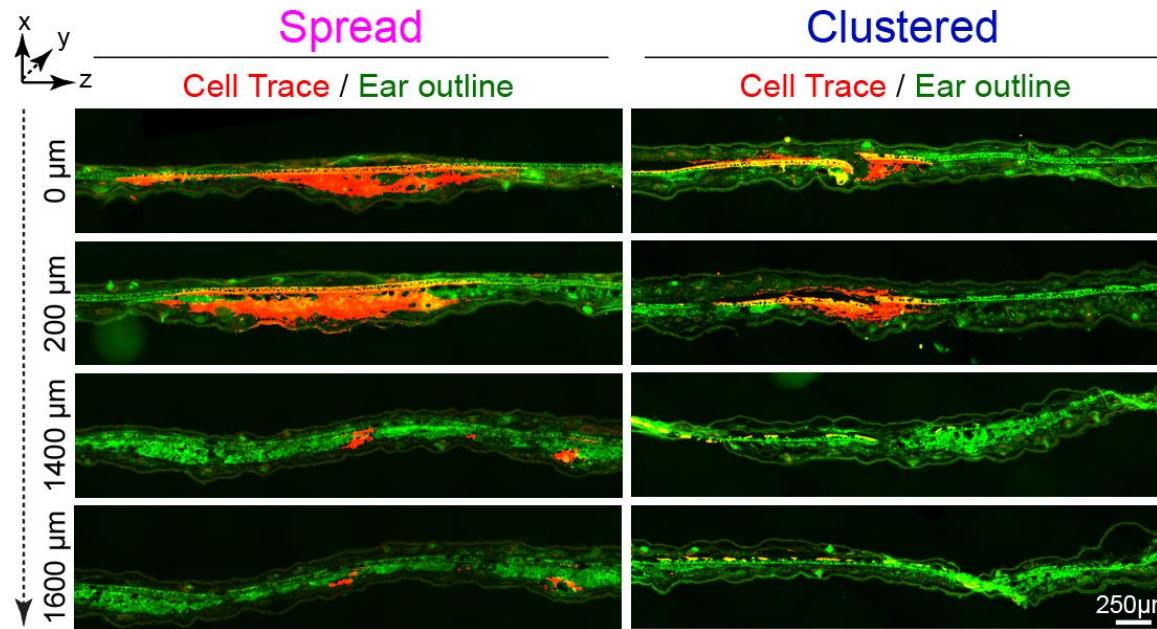
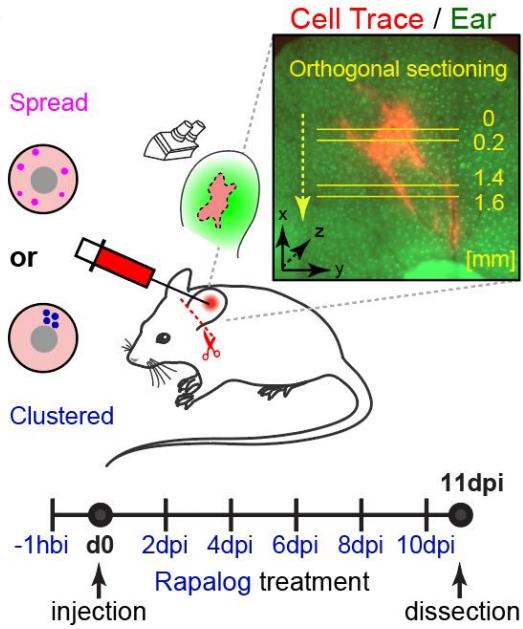


In vivo implications of lysosome re-positioning



Intra-dermal injection of melanoma cells in mouse ear

A

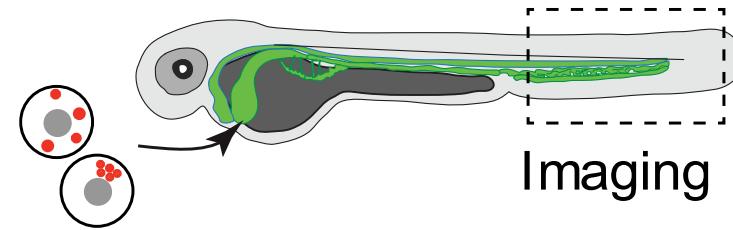


In vivo evidence: Peripheral lysosomes promote local cell invasion

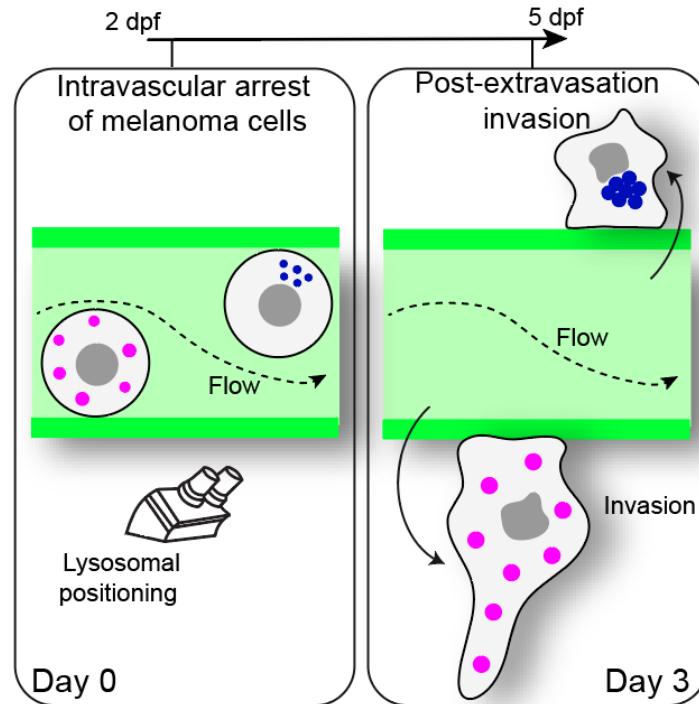
In vivo implications of lysosome re-positioning



Zebrafish model: experimental metastasis



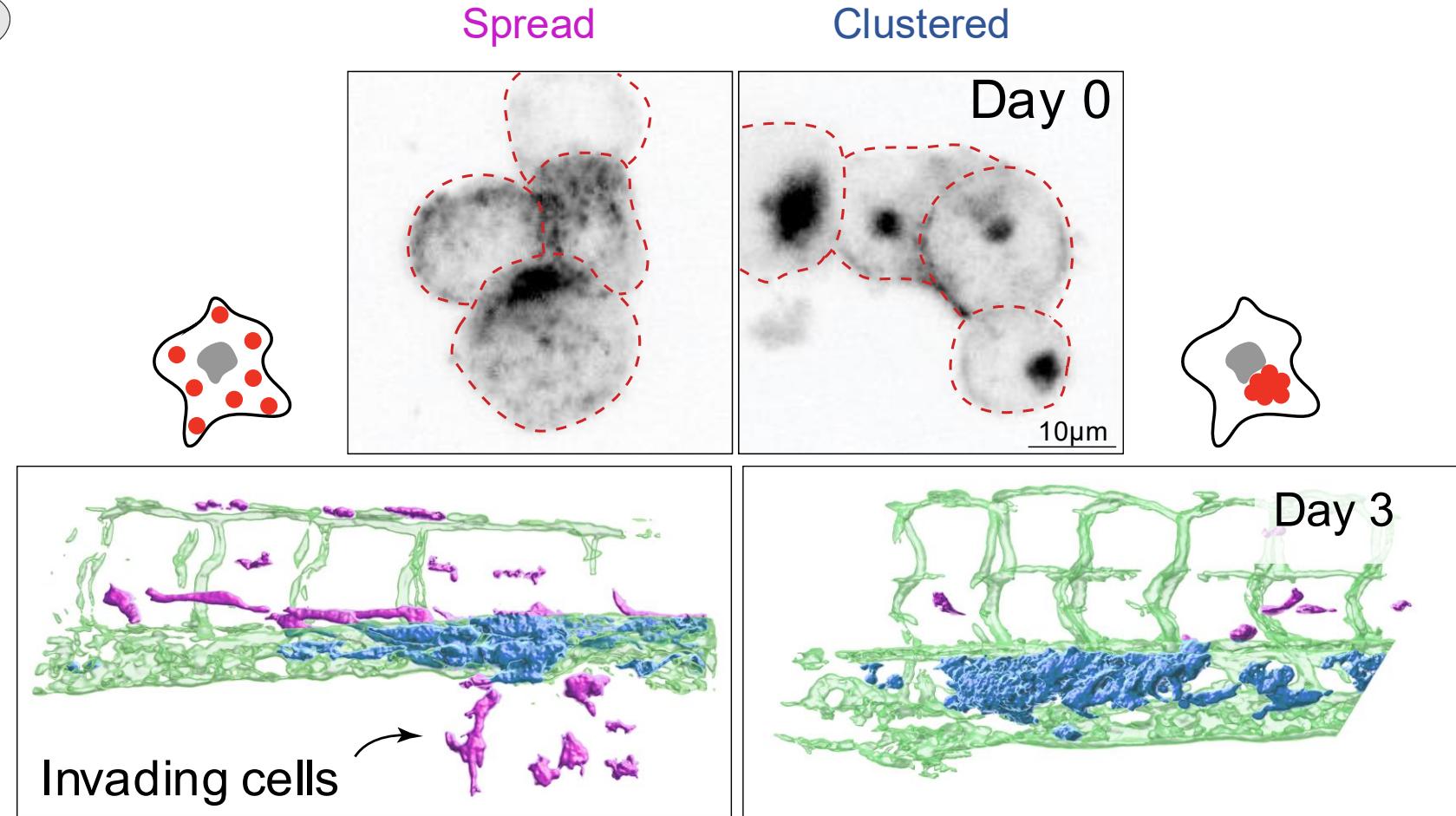
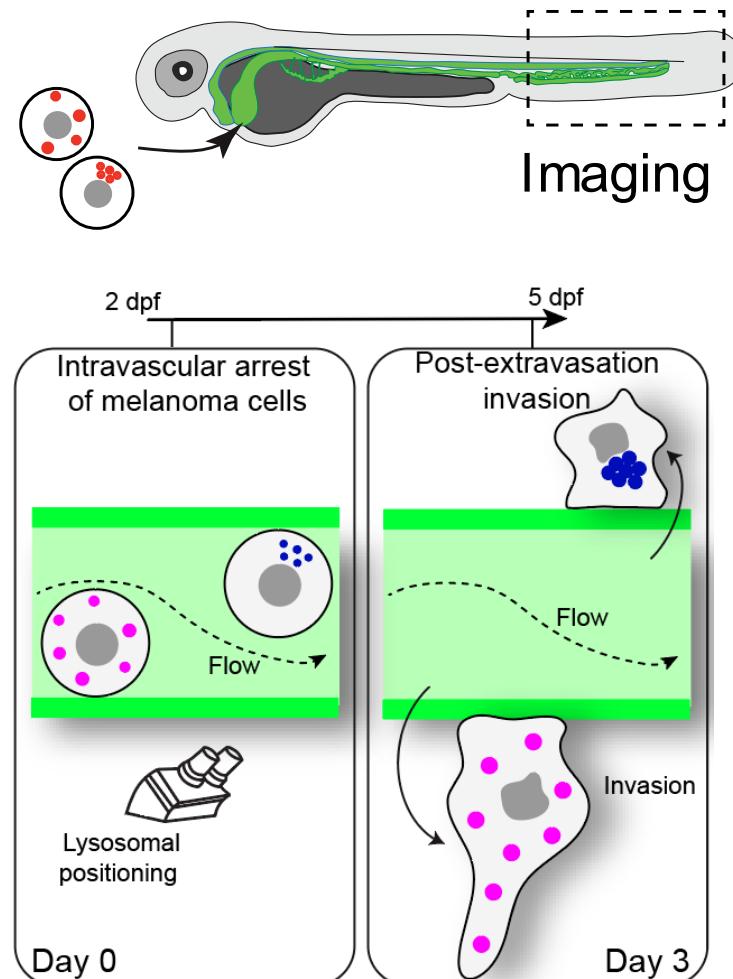
Imaging



In vivo implications of lysosome re-positioning



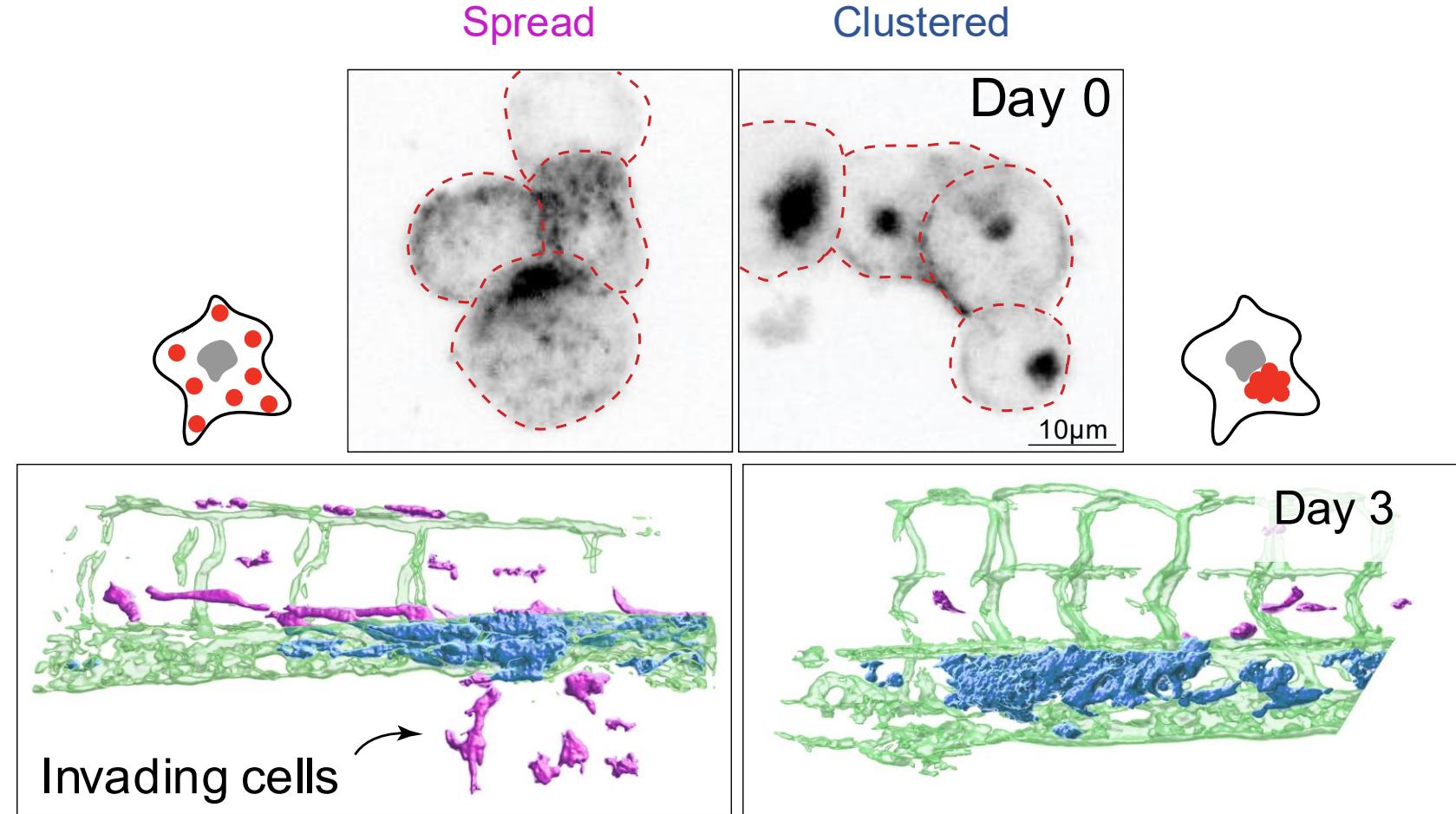
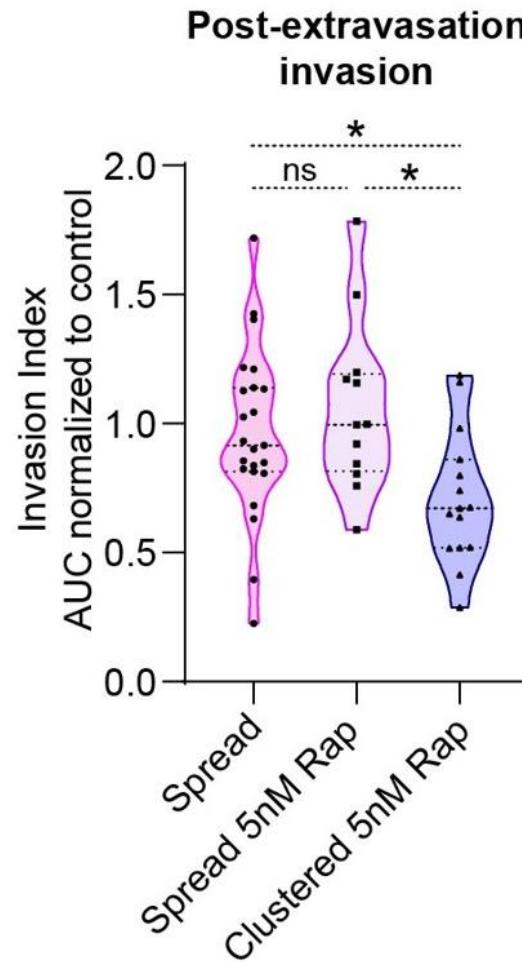
Zebrafish model: experimental metastasis



In vivo implications of lysosome re-positioning



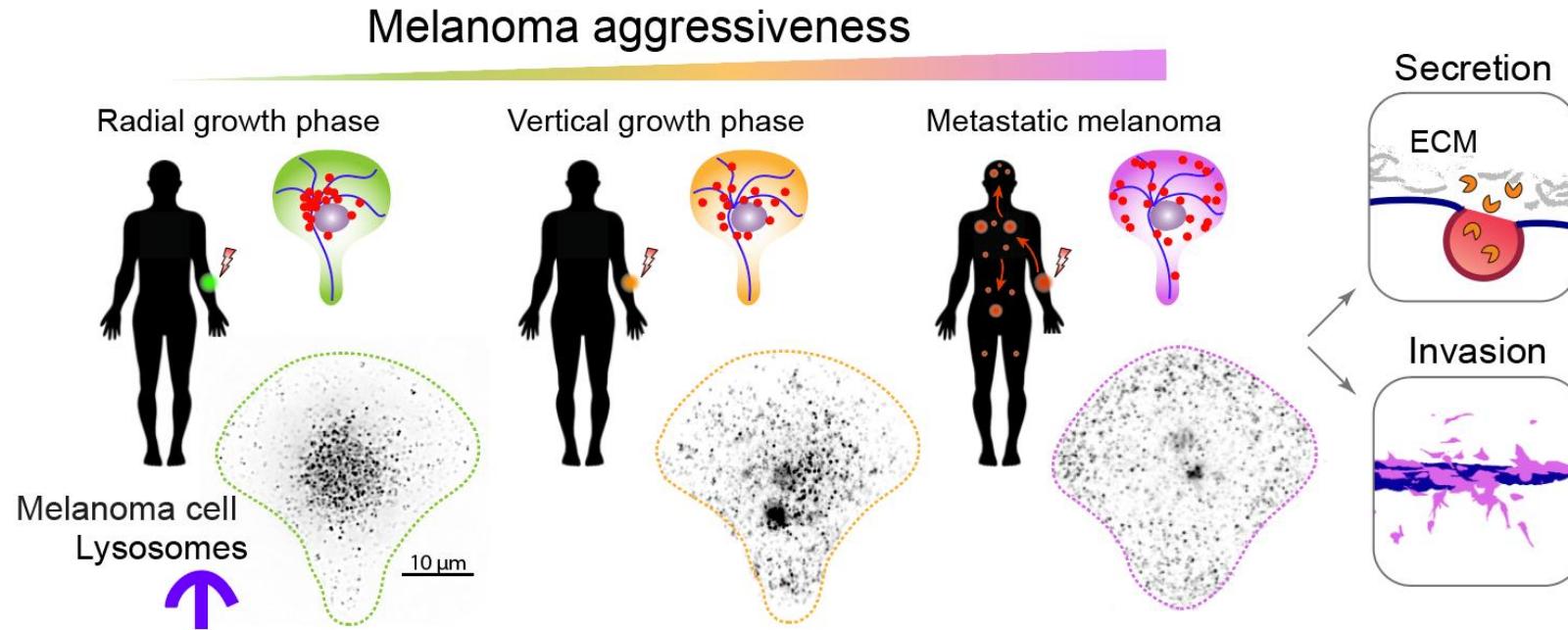
Zebrafish model: experimental metastasis



Peripheral lysosomes have causal role in cell invasion

Conclusions & Perspectives

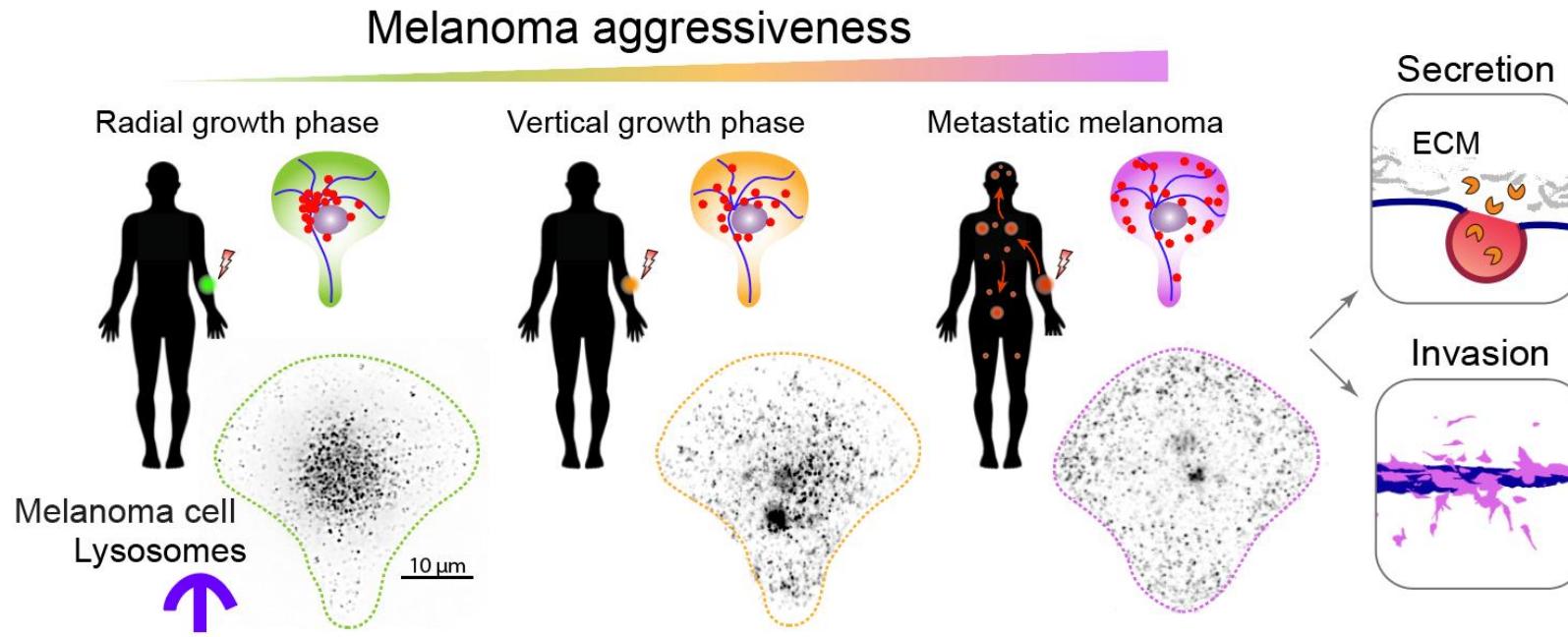
TAKE HOME MESSAGE:



Lysosomes are re-positioned towards **cell periphery** in invasive melanoma
→ increased cell secretion, matrix degradation and invasion

Conclusions & Perspectives

TAKE HOME MESSAGE:

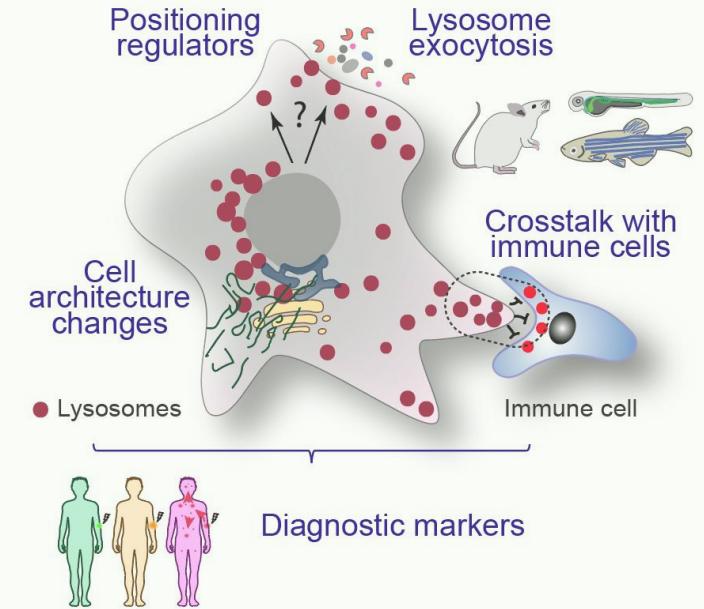


Lysosomes are re-positioned towards **cell periphery** in invasive melanoma
→ increased cell secretion, matrix degradation and invasion

Jerabkova-Roda et al. *Nature Communications*, 2025

FUTURE DIRECTIONS:

Melanoma cell adaptation



Potential for **diagnostic/prognostic marker** of metastatic melanoma

Early melanoma detection
saves lives

Acknowledgements



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[Dermatology Clinic, Strasbourg](#)
Dan Lipsker, Lea Scheid

[NanoTumor consortium](#)
Kristine Schauer
Philippe Ronde

[Imaging platforms: France Bioimaging](#)
CRBS PIC-STRa, IGBMC QuEST,
PICT-IBiSA Curie

Genomax sequencing platform
LSMBO Proteomics facility

Thank you for your attention!  KatkaJerabkova

