



Sending Mixed Signals:

A study of the Melanocortin-One-Receptor

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Skin Pigmentation Variation

Skin pigmentation varies across ethnically diverse humans



Eumelanin VS Pheomelanin

Eumelanin
Brown/Black



Protection from
Ultraviolet Radiation
(UVR)



Pheomelanin
Red/Yellow

Mammalian Skin and
Hair Color Arises
from Melanin
Pigments

Tanning VS Burning

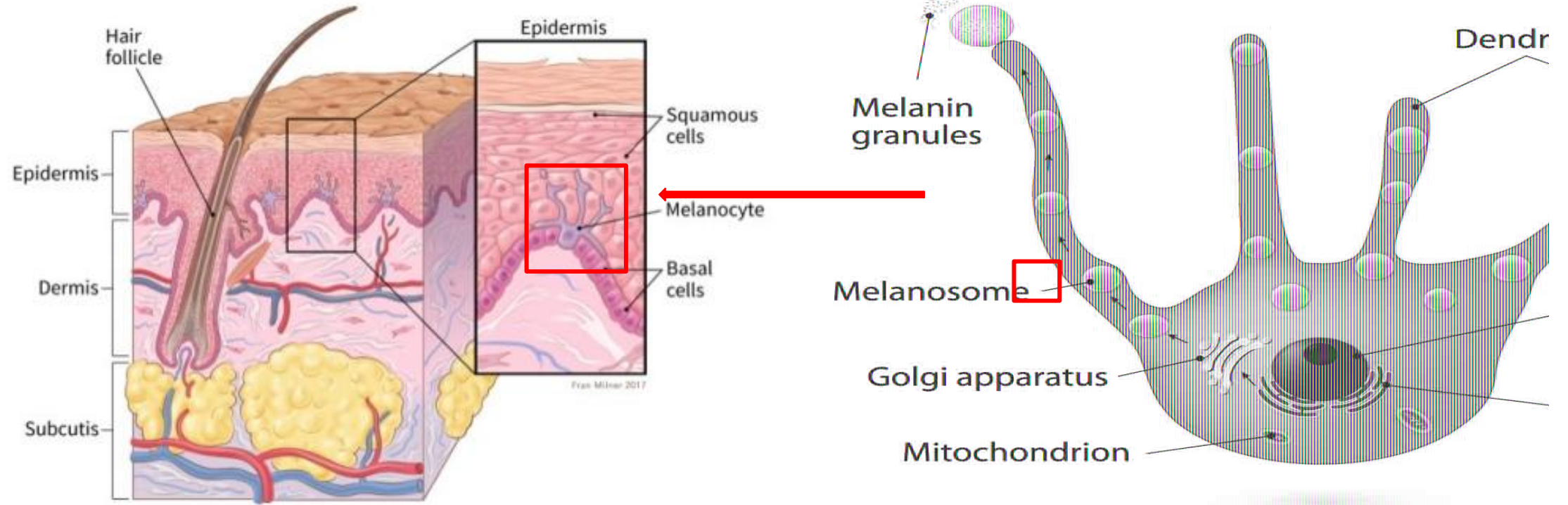


Skin Cancer



Skin cancer is the most common form of cancer according to World Health Organization (WHO).

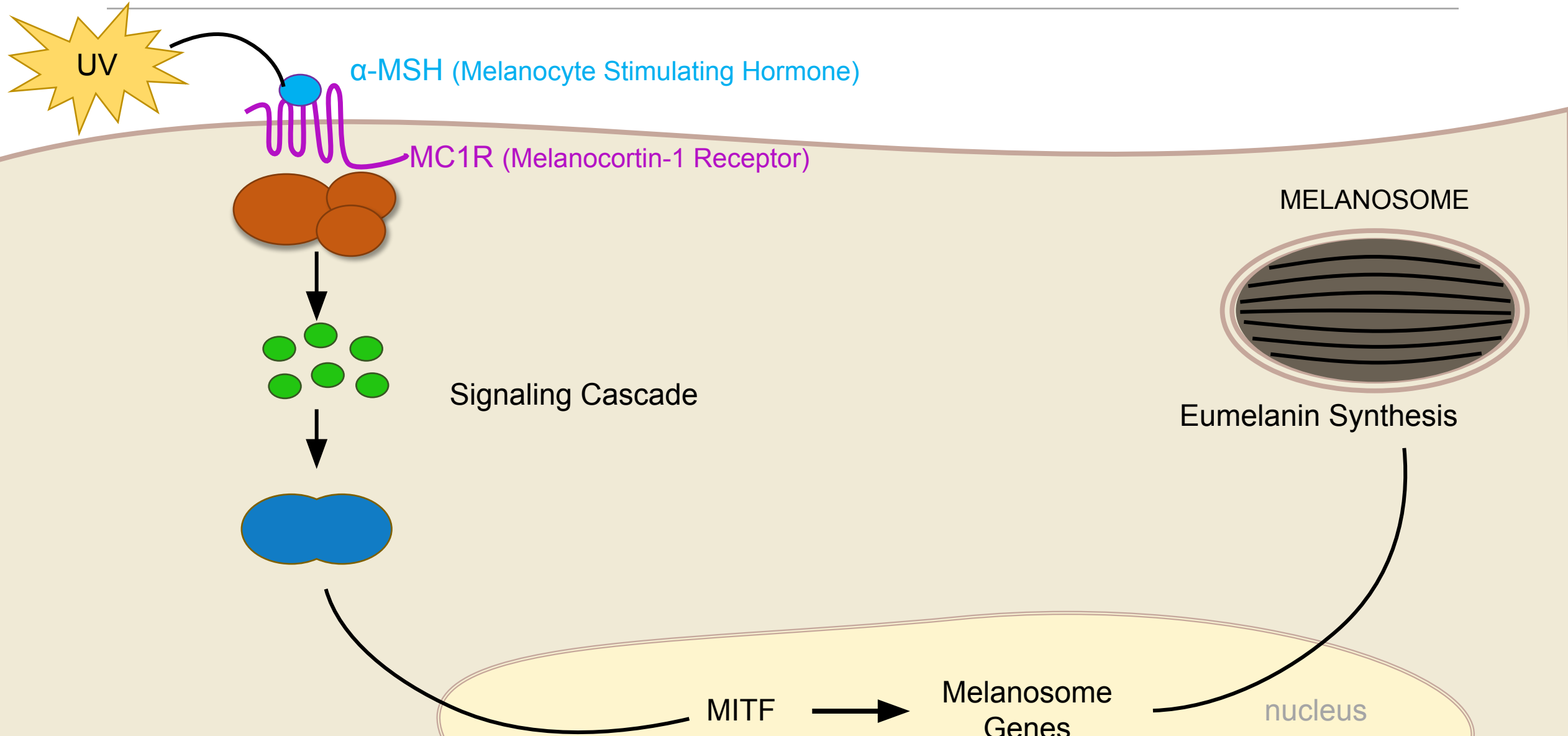
Melanocytes, Melanosomes, and Melanin, Oh My!



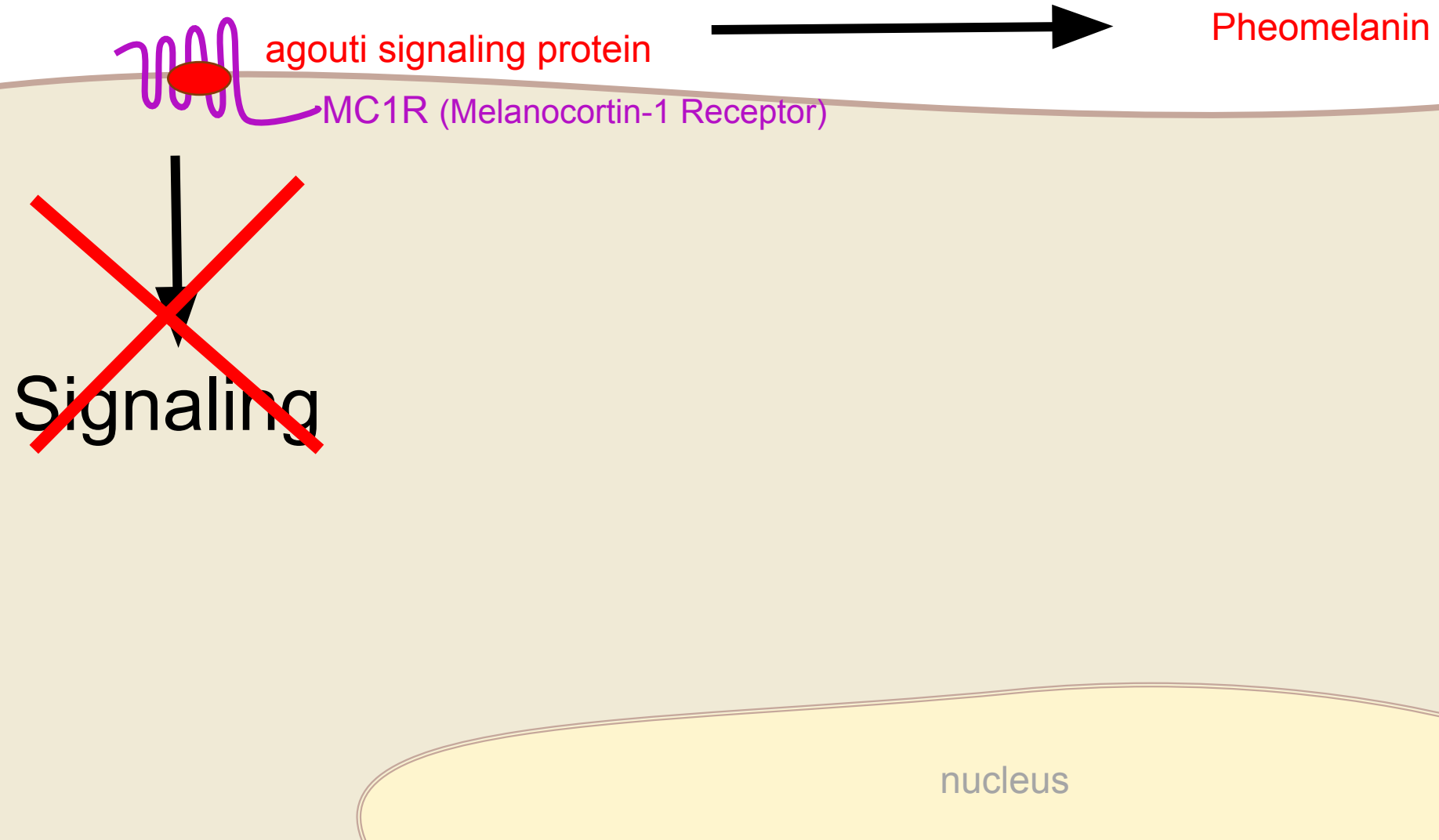
<https://www.cancer.org/cancer/melanoma-skin-cancer/about/what-is-melanoma.html>

http://www.thecosmeticchemist.com/education/skin_science/know_your_skin_cells_iii_the_melanocytes.htm

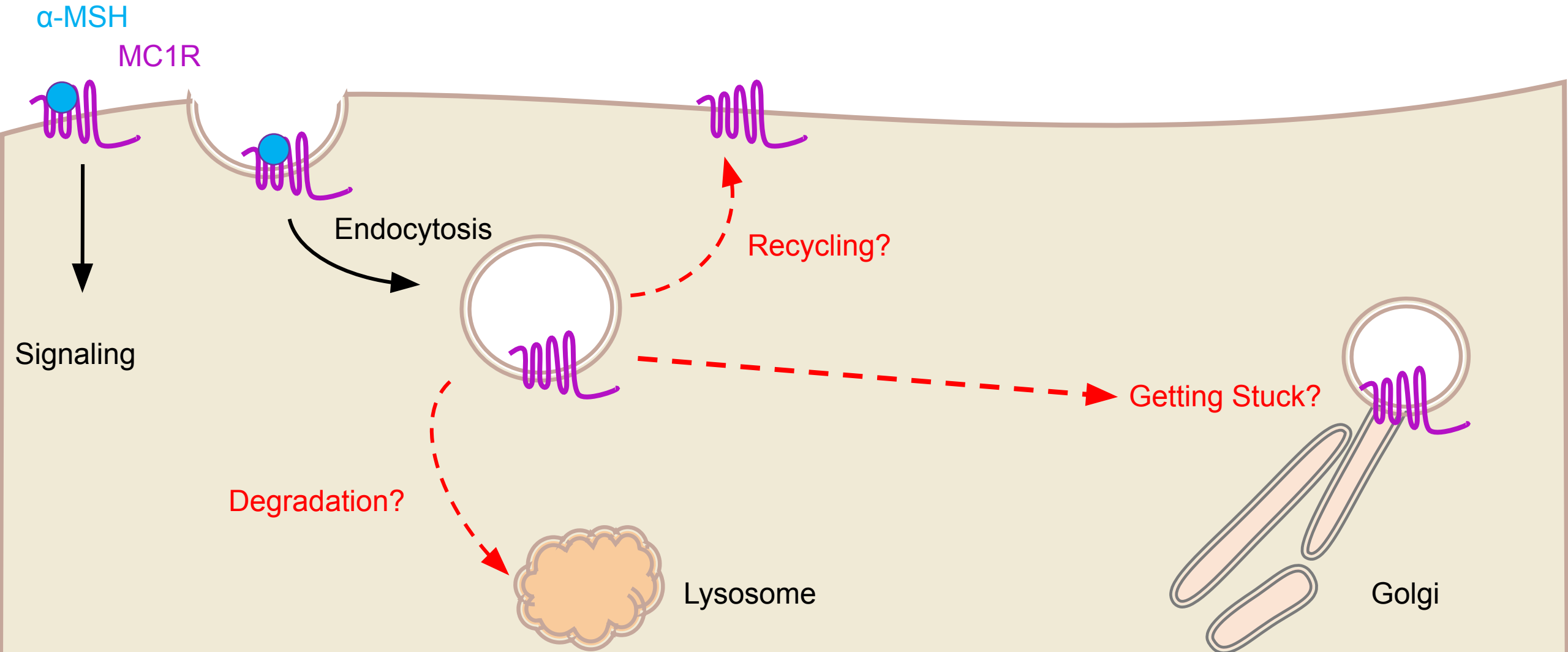
Eumelanin Synthesis



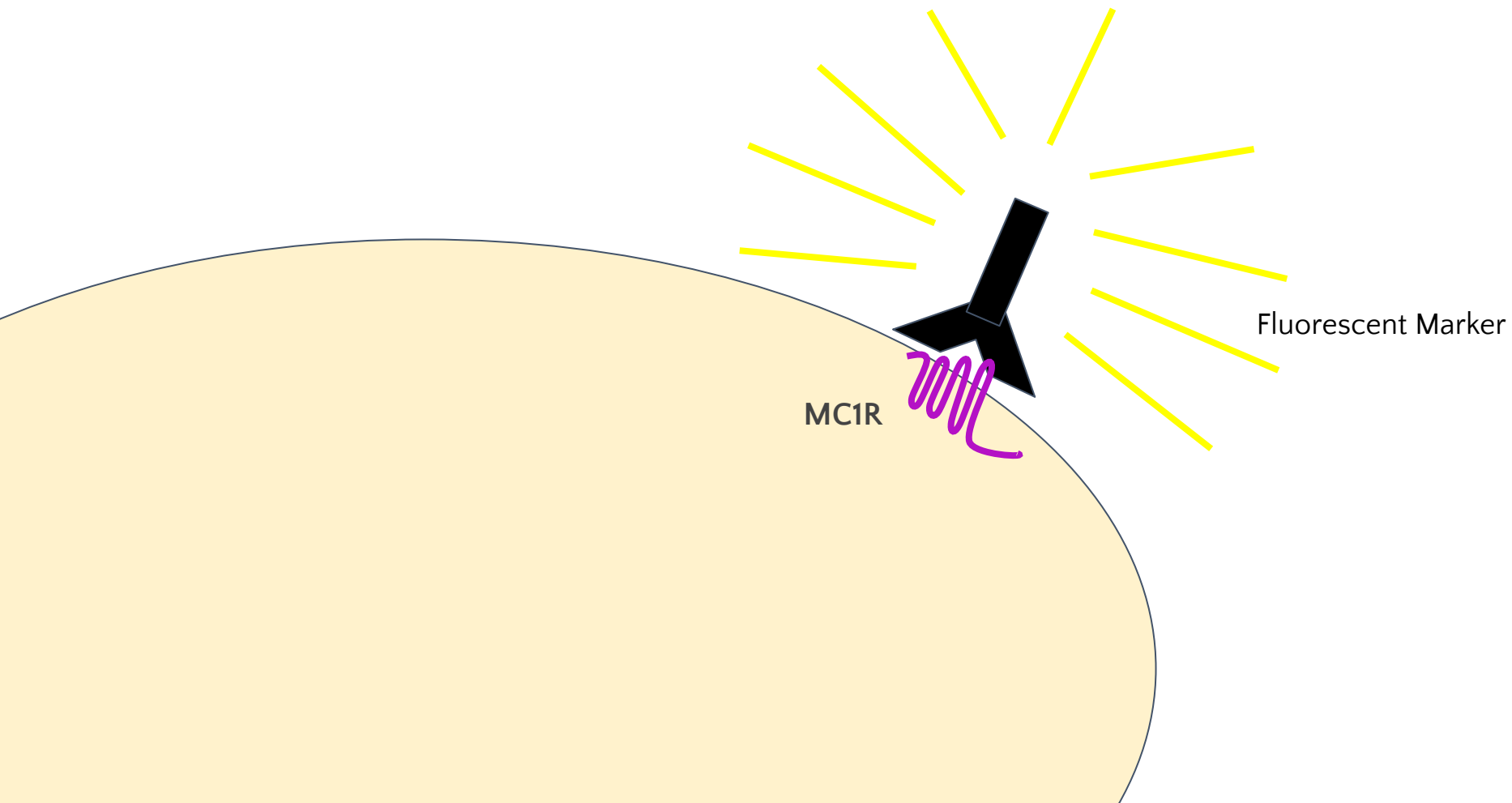
Pheomelanin Synthesis



What happens to MC1R?

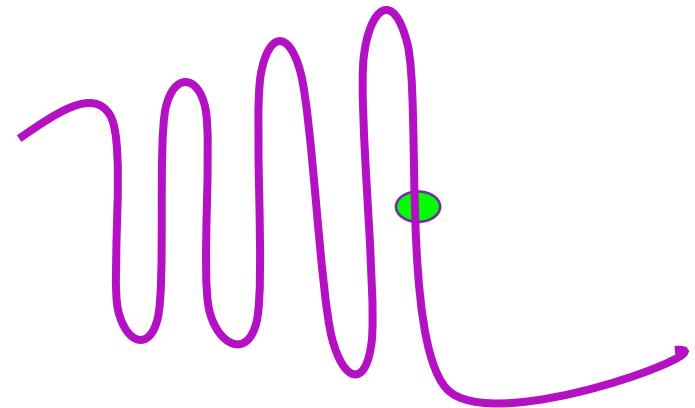
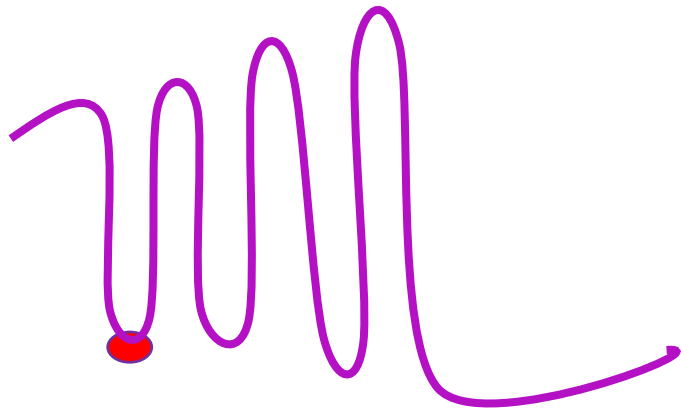


How does MC1R Trafficking Affect Surface Signals?



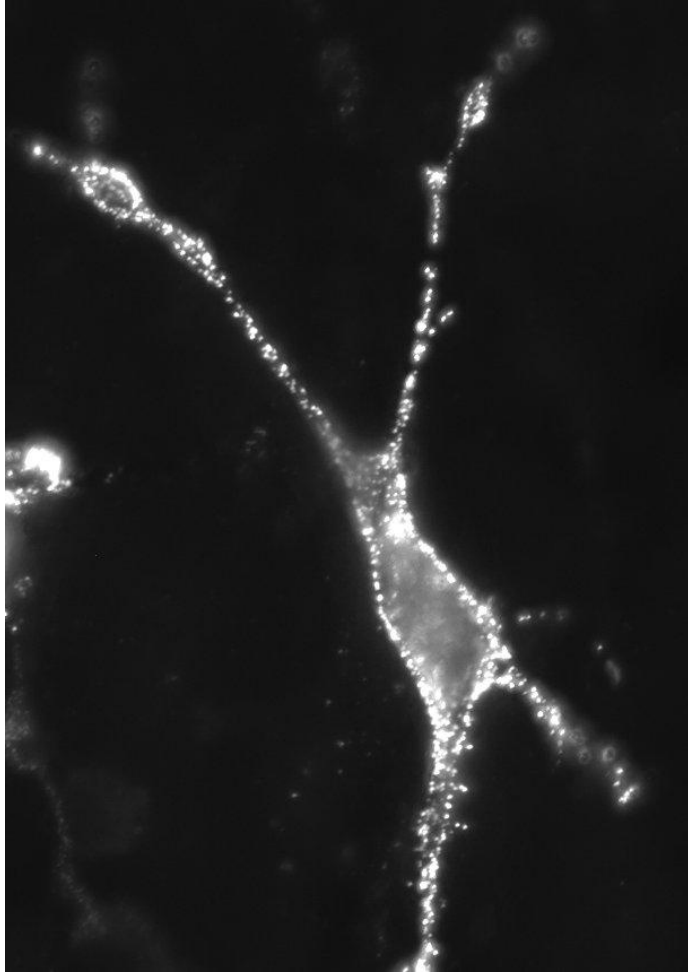
MC1R Mutations in HEK Cells

- Both mutants are associated with red hair, fair skin, and an increased risk of skin cancer (melanoma)
- **R151C** shows lower surface levels
- **D294H** shows higher surface levels

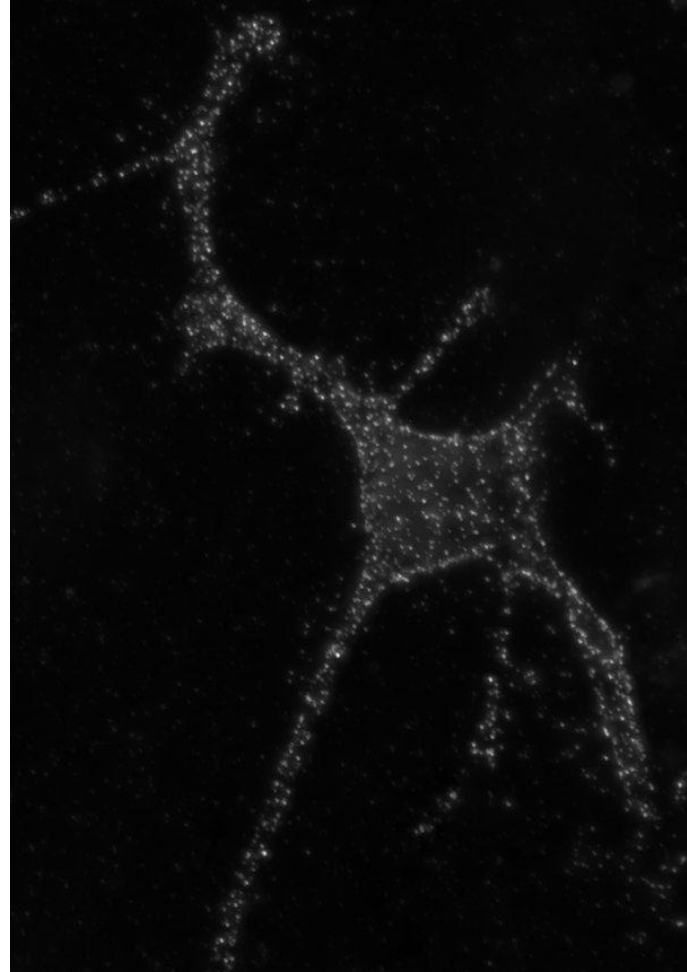


How do Mutations in MC1R affect Surface Levels?

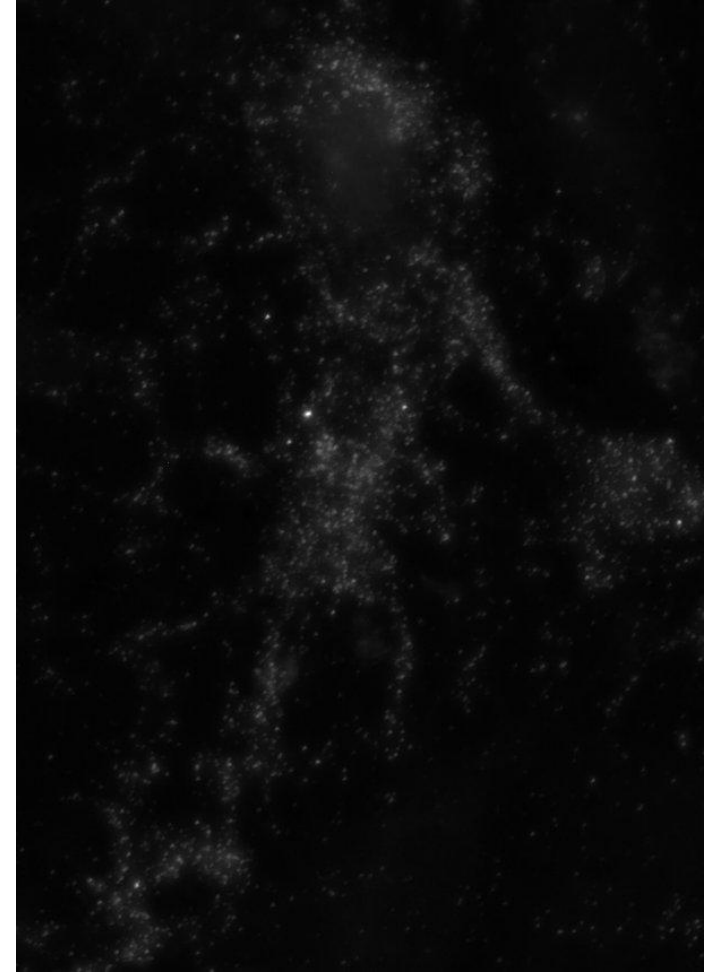
D294H



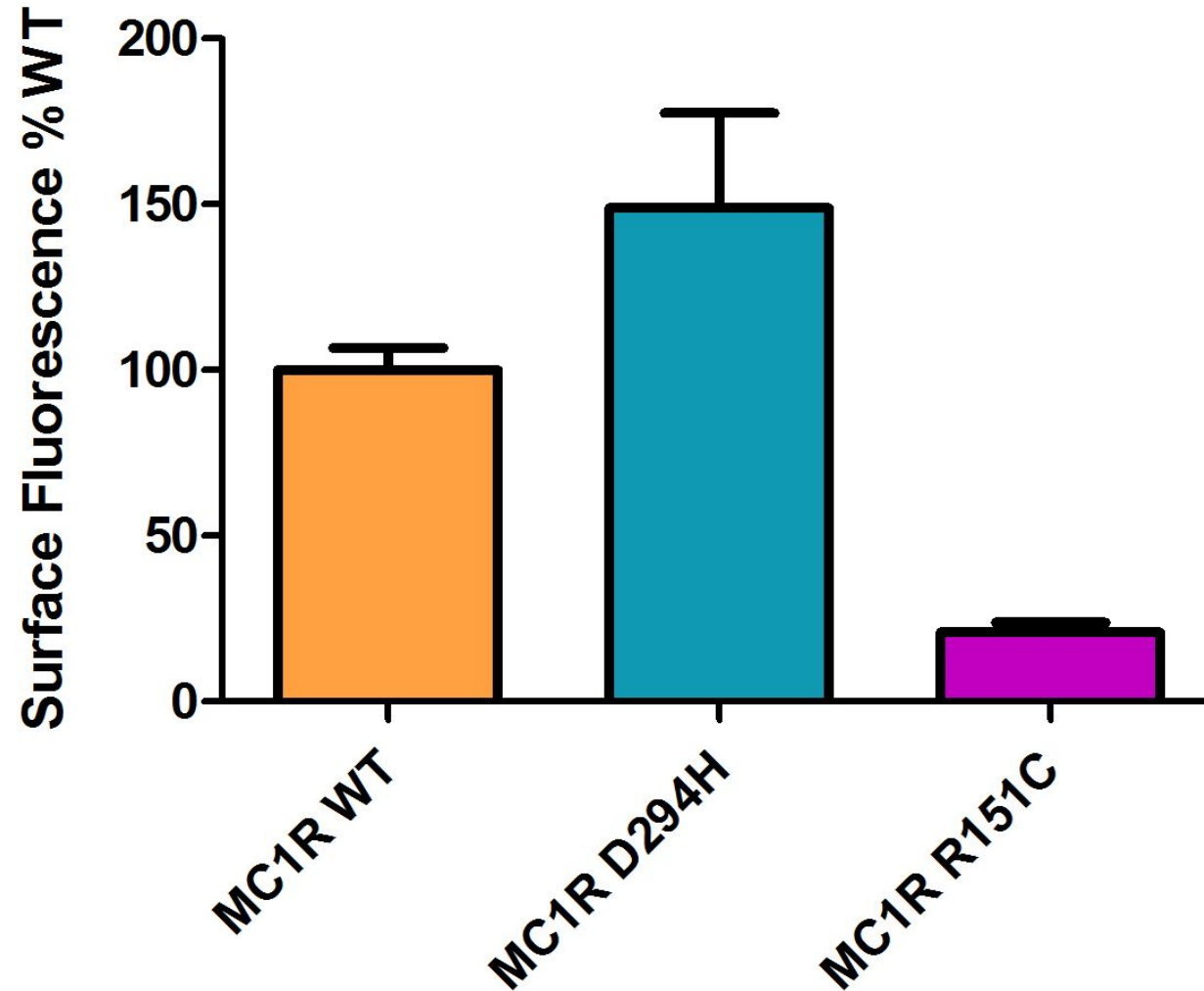
Wild Type



R151C



How do Mutations in MC1R affect Surface Levels?



Future Directions

- Is endocytosis required for MC1R signaling to increase expression of pigment genes?
- How do these mutations affect receptor localization within the cell and how does this impact signaling?
- Could MC1R signaling occur in other locations in the cell besides the cell membrane?

POP QUIZ!!!

Which of the following should you be doing this summer?

- A. Sun-burning
- B. Sun-bathing
- C. Sun-tanning
- D. None of the above- WEAR SUNSCREEN!!!!



Works cited

Nawrat, Allie. Skin Cancer Awareness Month: Overcoming Drug Resistance in Skin Cancer. 8 May 2019, www.pharmaceutical-technology.com/features/skin-cancer-prevention-treatments-drug-resistance/.

“Skin Cancer Facts & Statistics.” *The Skin Cancer Foundation*, The Skin Cancer Foundation, 10 July 2020, www.skincancer.org/skin-cancer-information/skin-cancer-facts/.

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