

Lab 2: Image Processing Toolbox

Shido Nakajima

02/07/2023

02/08/2023

OBJECTIVE: The objective of this lab exercise is to get familiar with Image Processing Toolbox and become able to write MATLAB programs for image processing.

METHODS: In part 1 of the exercise, I created array data IR, IG, and IB, each for the RGB channels of the Cancer cells image. The RGB channels were loaded by setting each to be `I0(:, :, 1)`, with 1 for red, 2 for green, and 3 for blue. Then, I displayed all three of them on the same figure using `subplot(131)` to `(133)` and `imshow(IR)`, `IG`, and `IB`, respectively.

In part 2 of the exercise, I created a function with input variables called `filename` and `format`, with `filename` being the name of the image file, and `format` being either `bw` for binary, `ind` for indexed, and `gray` for grayscale. Within the function, I called `figure` to output the image on a different figure than from part 1. Then 4 if-else statements were used, each for `im2bw`, `rgb2ind`, `rgb2gray`, and last for throwing out exceptions.

RESULTS: Part 1 of the exercise resulted in a single figure with 3 images, each being the RGB channels of the cancer cells image (see figures 1-3 in the Appendix for the images).

Part 2 of the exercise resulted in a single image, with `format` specified by the function call within the script. The available formats of the output image are: “`bw`” for binary image, “`ind`” for indexed image, and “`gray`” for grayscale image (see figures 4-6 in the Appendix for the images). For all other inputs for the `format`, a blank figure opens up with the word “unavailable” being displayed within the command window. I saved each of the output images as TIFF files, as instructed in the lab.

CONCLUSION: This lab exercises showed that MATLAB has many useful functions for image manipulation and formatting. MATLAB is also capable of allowing each of the users to make their own functions, which can be very useful when conducting multiple complex manipulations within a single script.

APPENDIX:

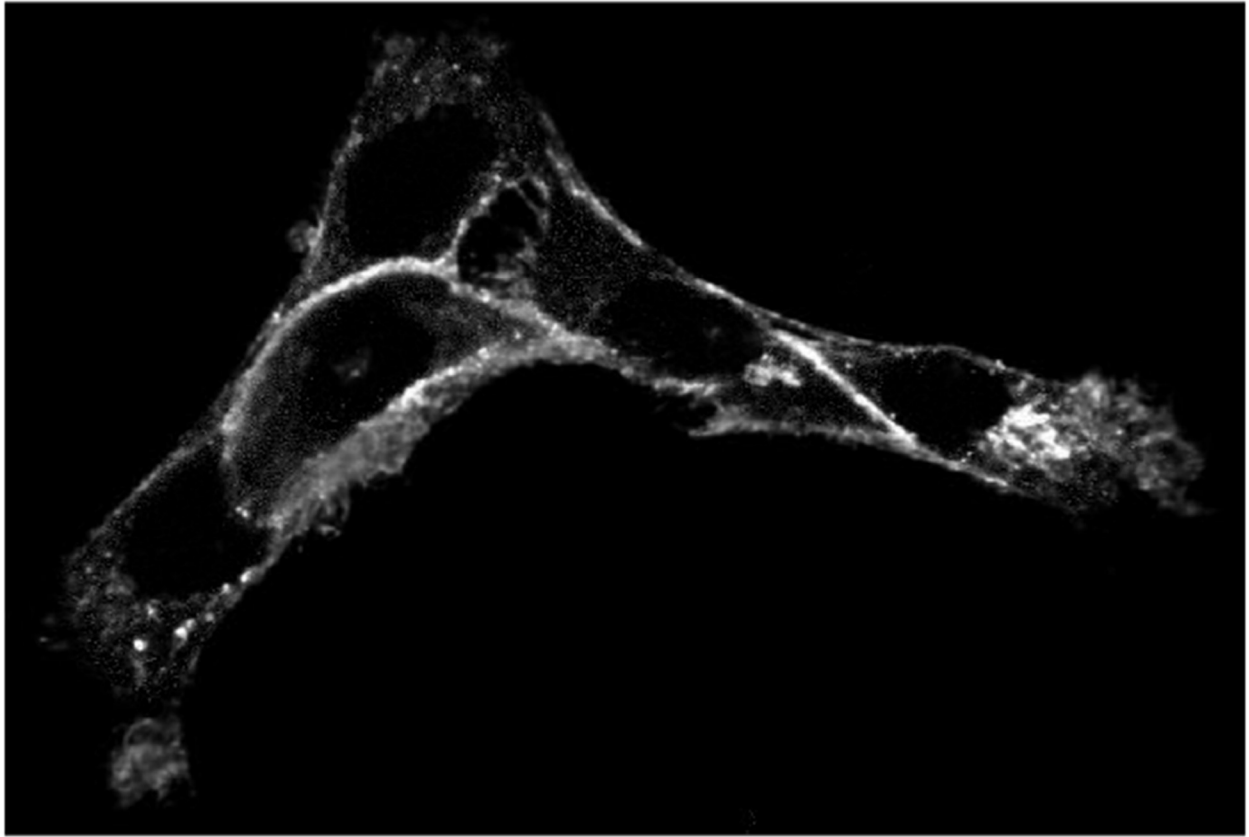


Figure 1: Red channel of cancer cell image.

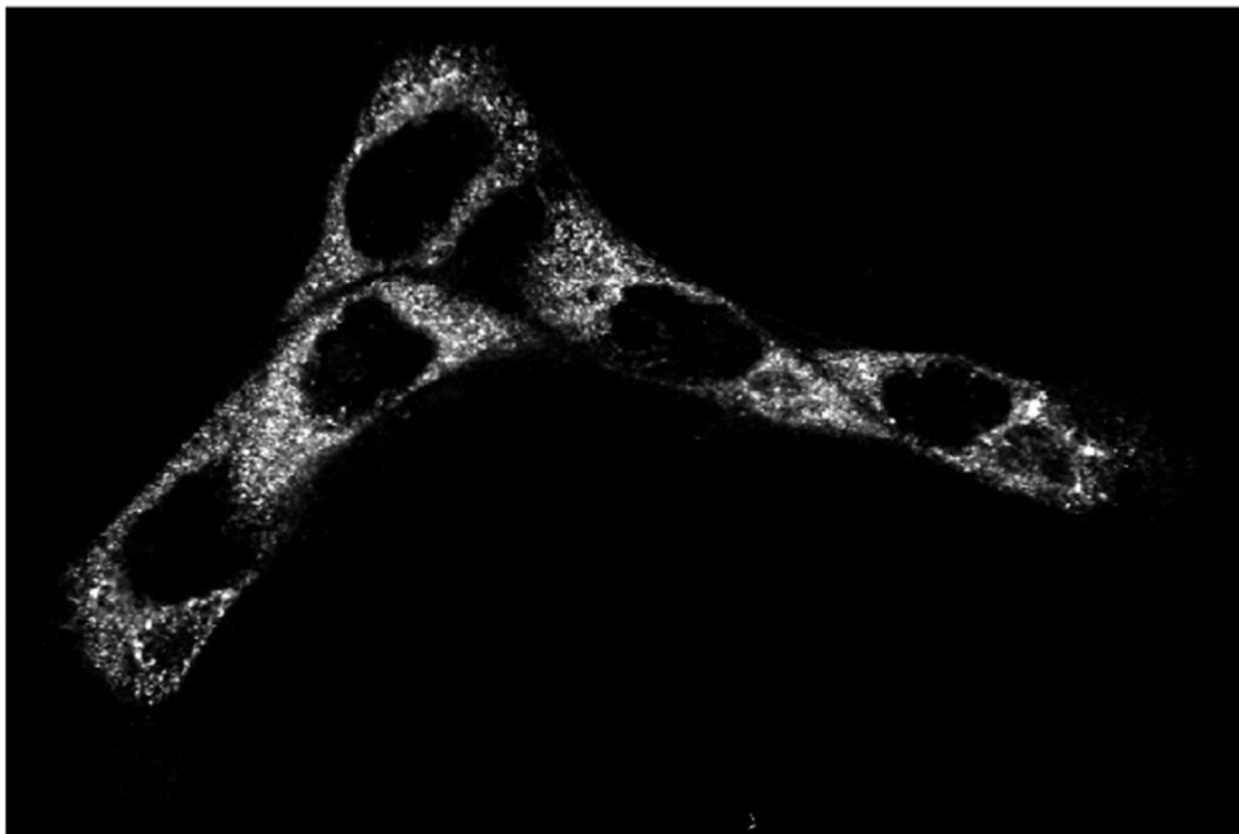


Figure 2: Green channel of cancer cell image.

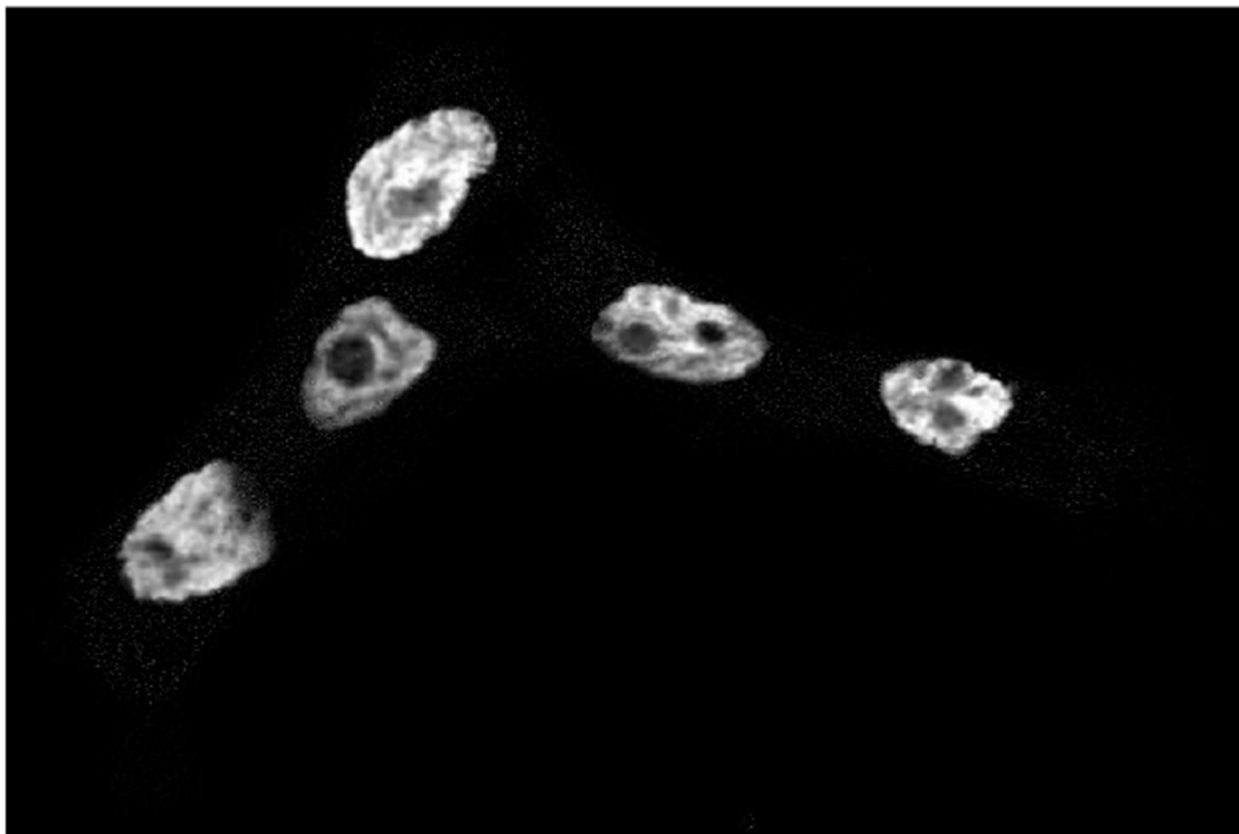


Figure 3: Blue channel of cancer cell image.

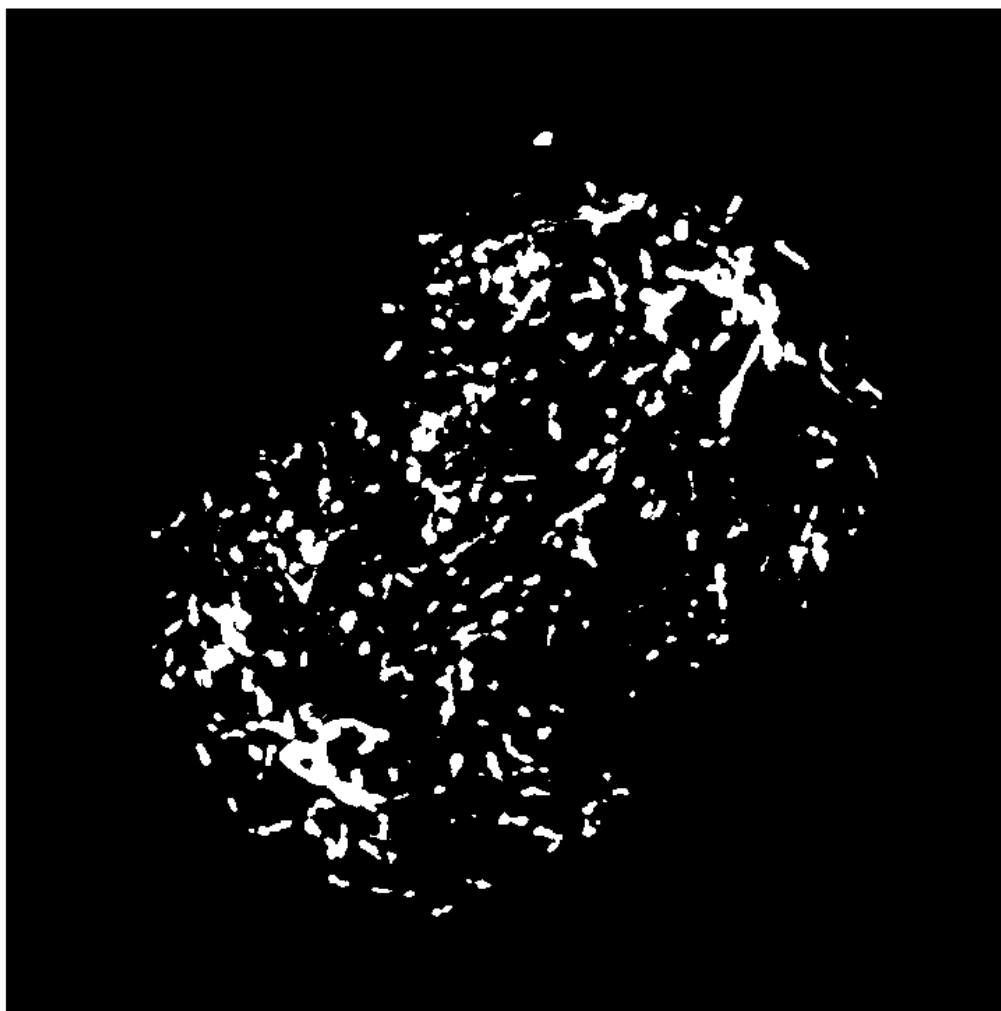


Figure 4: Binary image of dividing cancer cell image.

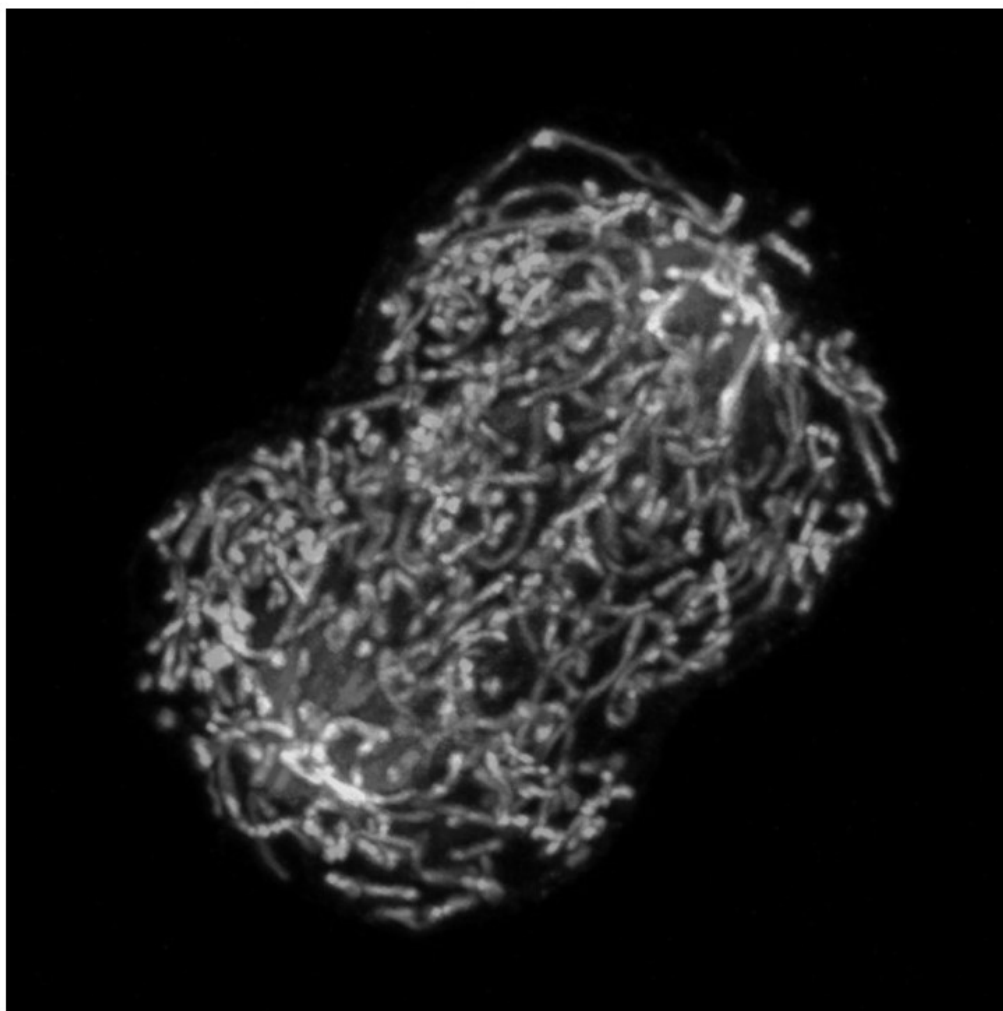


Figure 5: Grayscale image of dividing cancer cell image.

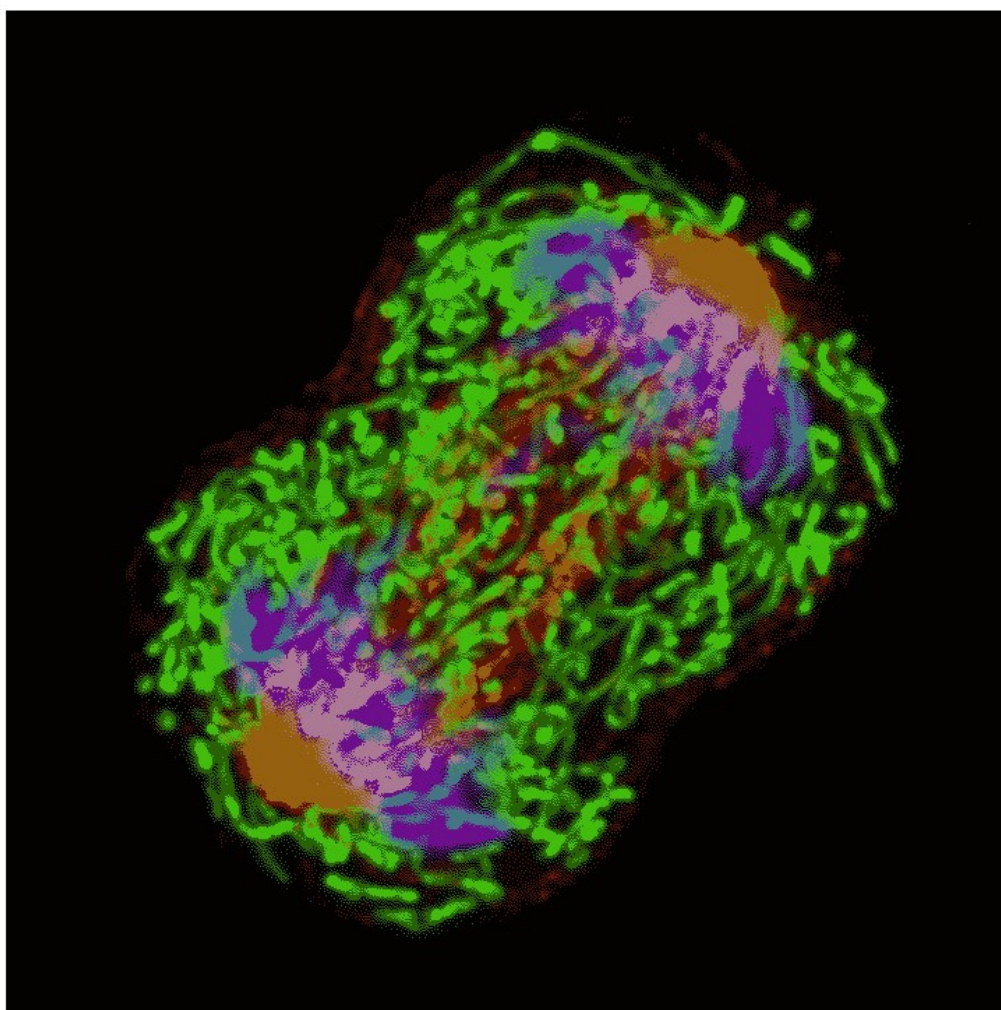


Figure 6: Indexed image of dividing cancer cell image.