

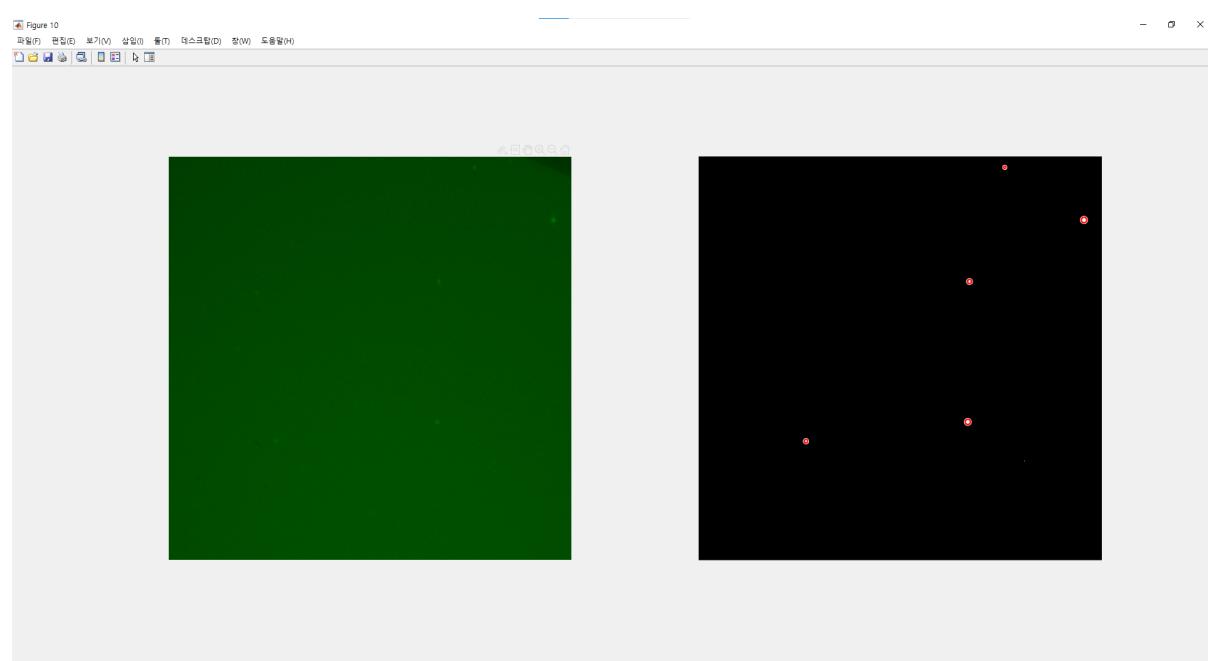
# 20220216 10x

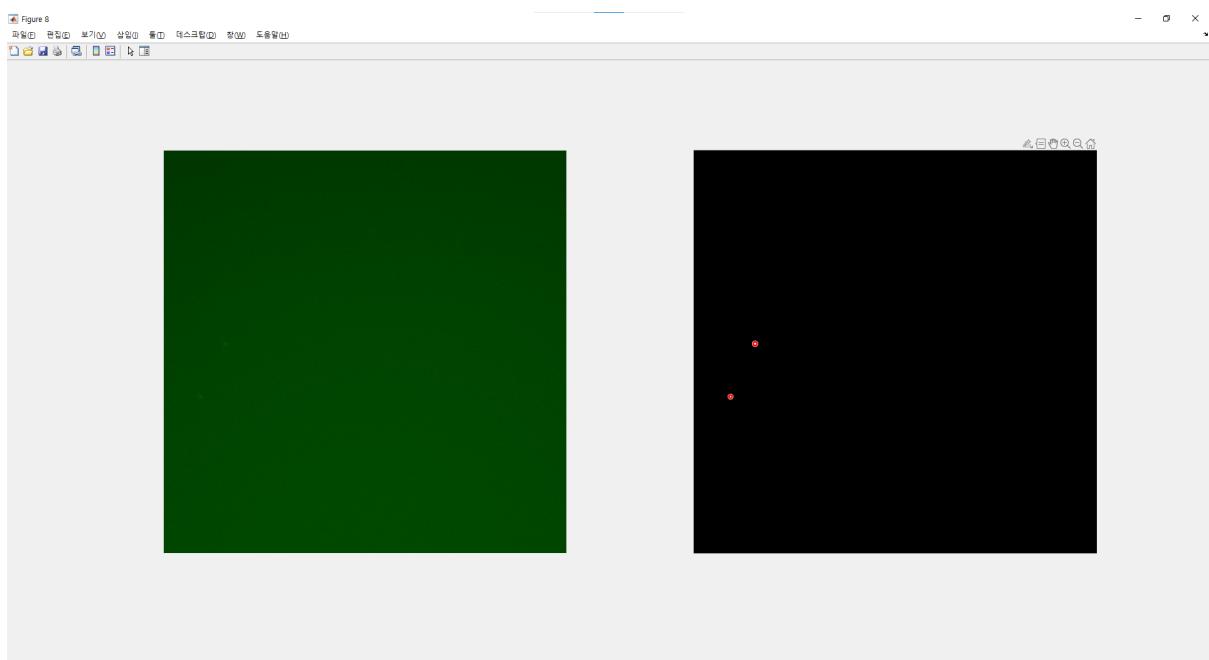
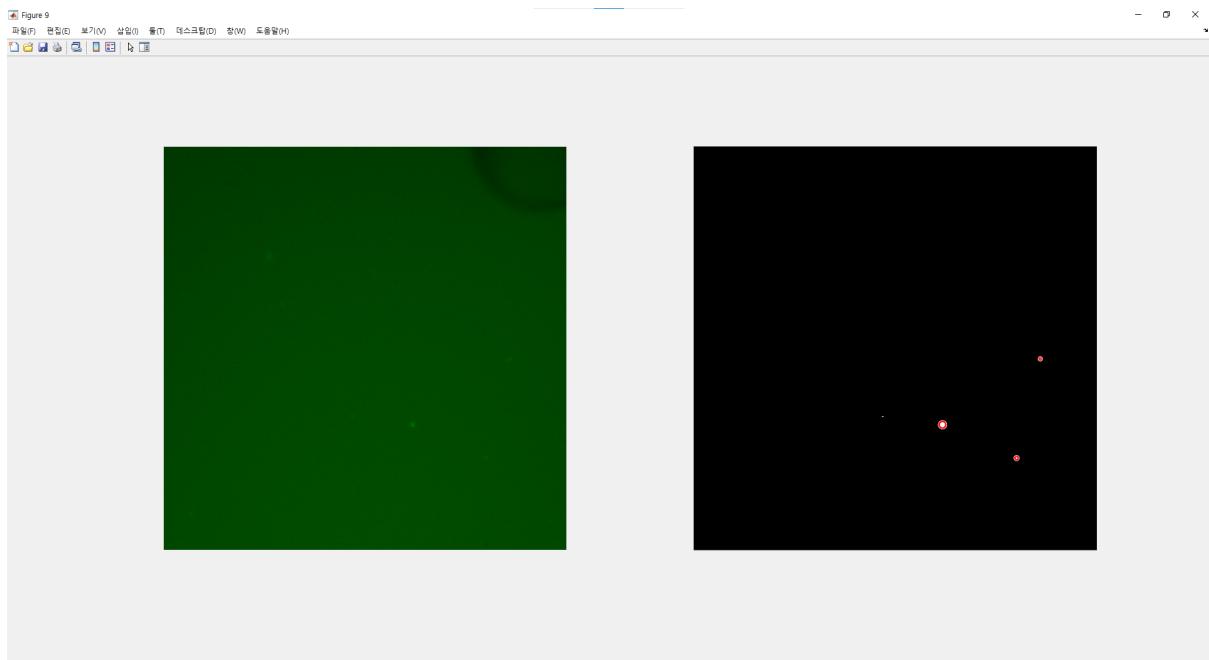
## 총평

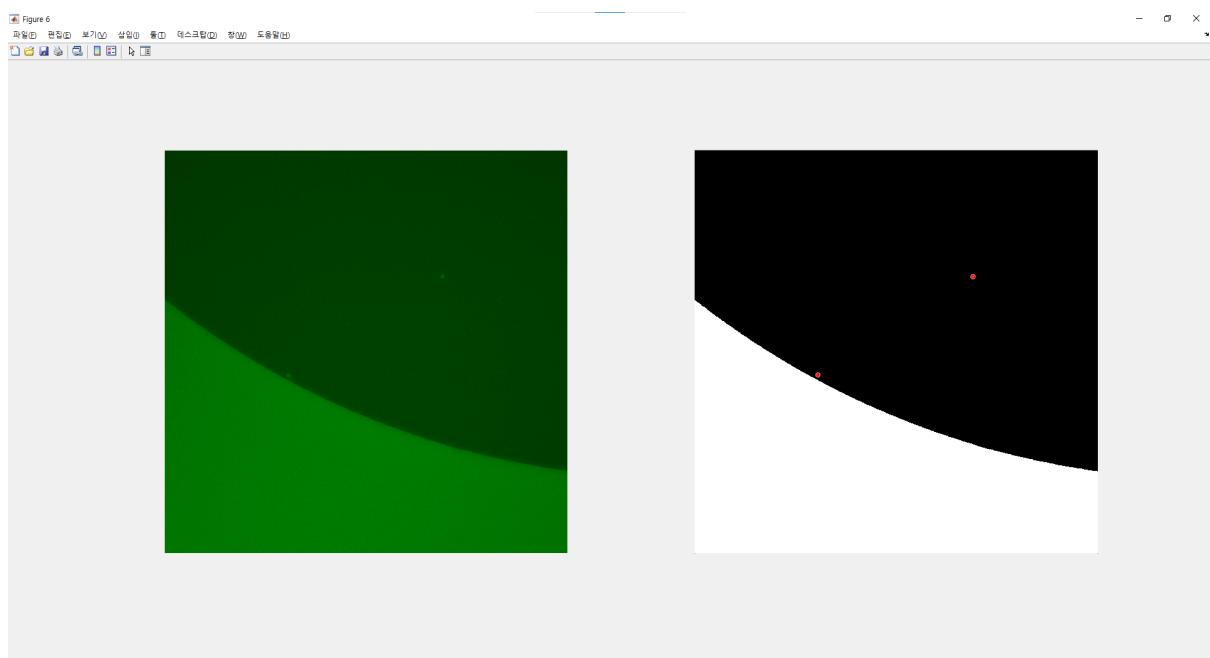
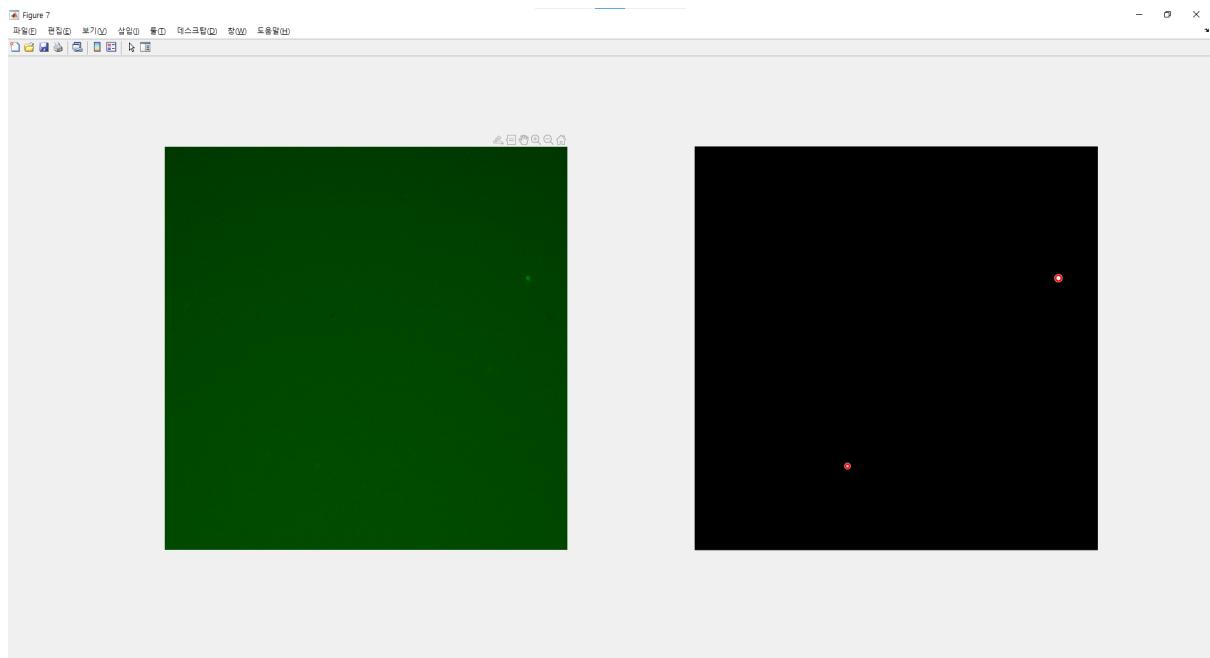
- 10x 형광 이미지의 경우 background를 조금 더 낮추거나 Image pre-processing 기법을 도입하면 가능성이 있을 것으로 예상됨.
- 10x Bright field 이미지의 경우 입자의 수 (밀도)를 낮추거나 이미지의 품질을 조금만 더 향상시키면 가능성이 있을 것으로 보이지만, 형광에 비해 정확도가 낮을 것으로 예상됨.

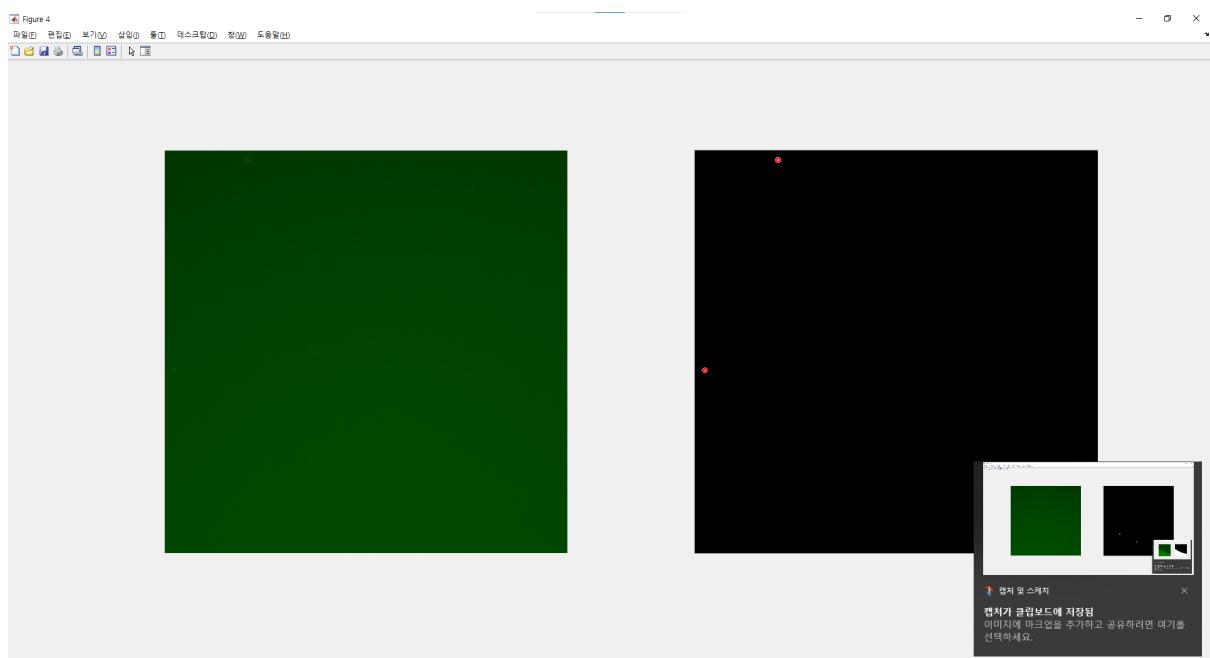
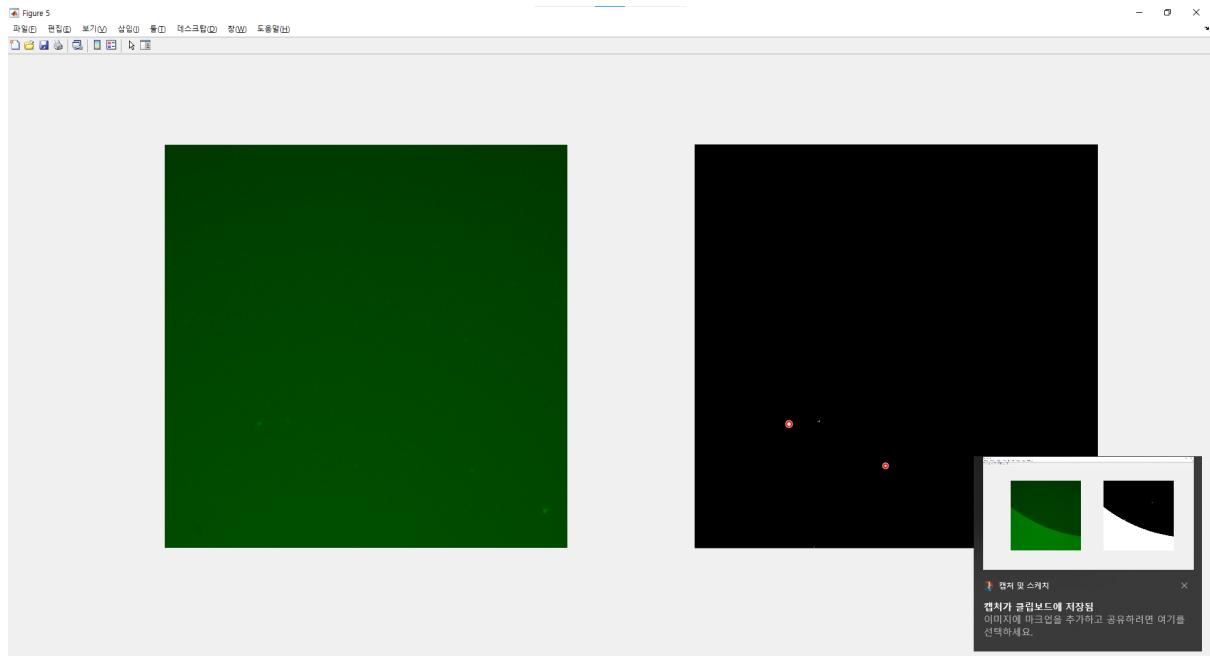
## 10x Result (D:\Users\user\Desktop\Cell image\20220215\_iMeasy100)

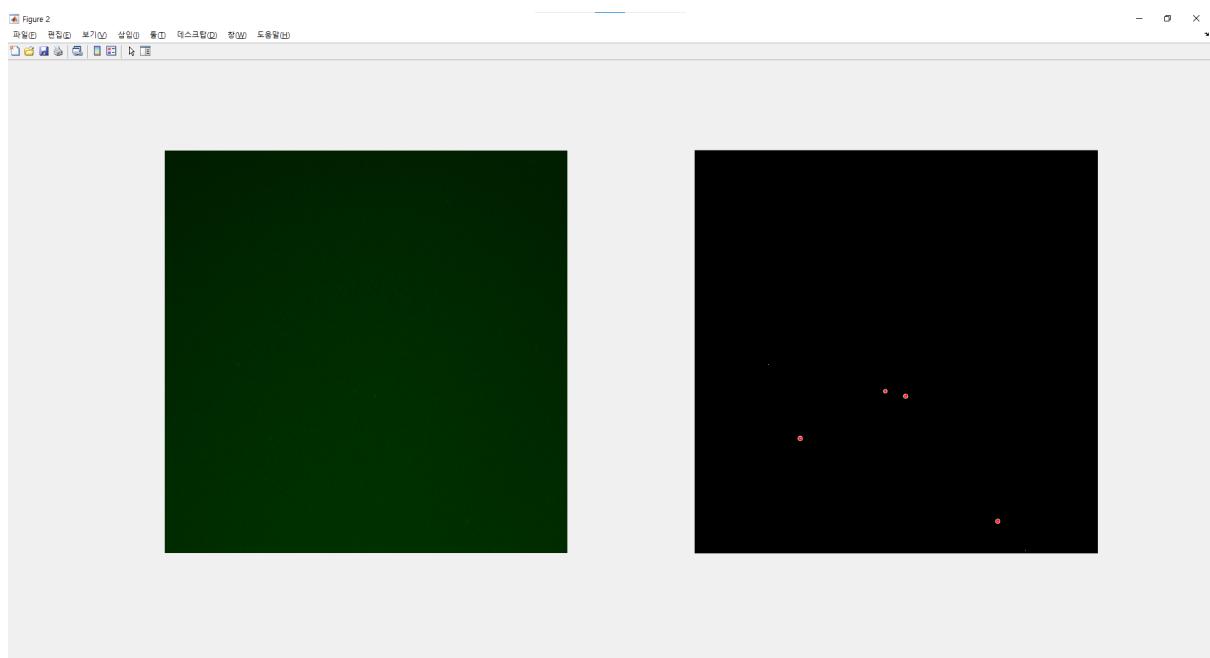
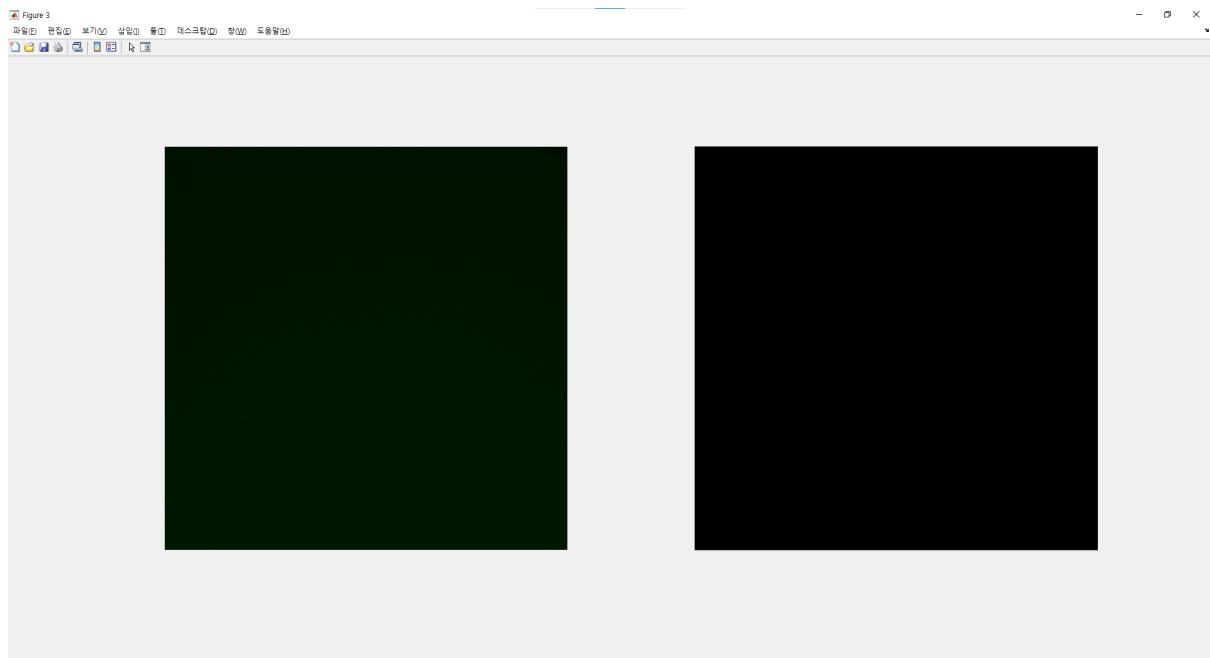
```
Img name : 10_FM.png / circles : 0
Img name : 1_FM.png / circles : 4
Img name : 2_FM.png / circles : 0
Img name : 3_FM.png / circles : 2
Img name : 4_FM.png / circles : 4
Img name : 5_FM.png / circles : 2
Img name : 6_FM.png / circles : 2
Img name : 7_FM.png / circles : 2
Img name : 8_FM.png / circles : 3
Img name : 9_FM.png / circles : 5
```

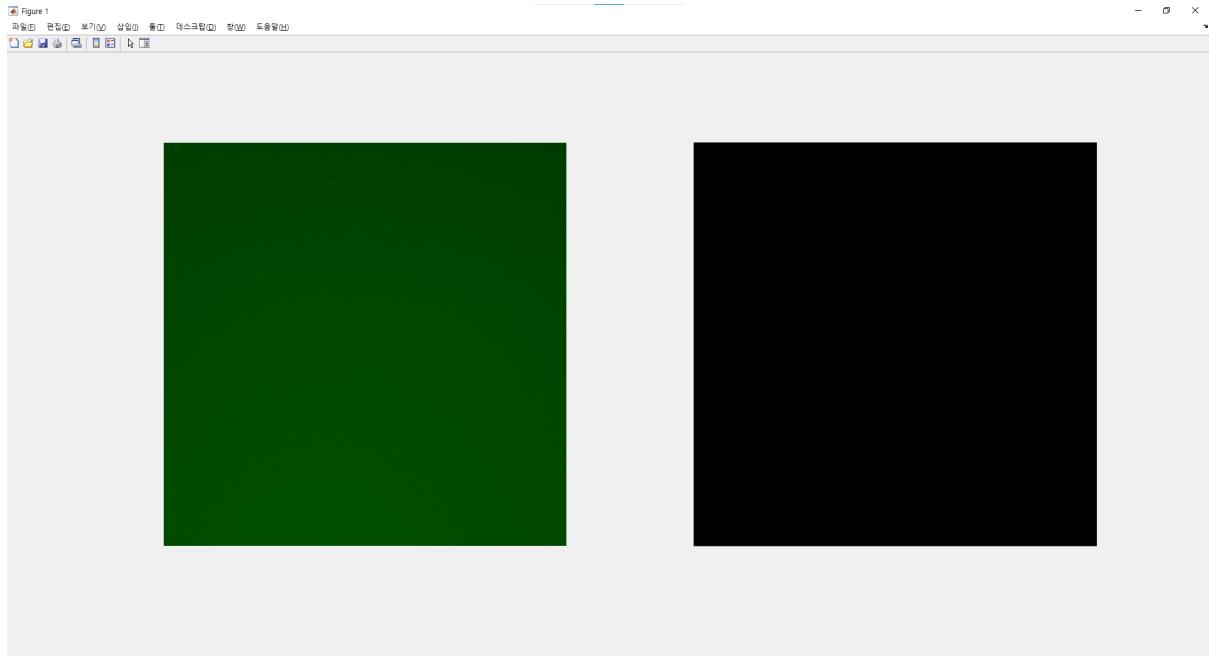












```
clear
close all

% folderName = 'D:\Users\user\Desktop\Cell image\10-Feb-2022 13-43-06\Grp1-U1(1)'; % 20X
folderName = 'D:\Users\user\Desktop\Cell image\20220215_iMeasy100';
% folderName = 'D:\Users\user\Desktop\Cell image\Cell image\4X mix'; % 4X
listDir = dir(folderName);
nameList = {listDir.name};
listFile = nameList([listDir.isdir] == 0);
listFM = listFile(contains(listFile, 'FM'));

img = cell(length(listFM), 1);

for i = 1:length(listFM)
    img{i} = imread(fullfile(folderName, listFM{i}));
    figure(i); subplot(1, 2, 1); imshow(img{i});
    try
        img{i} = rgb2gray(img{i});
    end

    % Image Brightness
    img{i} = img{i} - mean(img{i}, 'all');

    % WBC_Min = 5; WBC_Max = 50;
    WBC_Min = 5; WBC_Max = 500;
    MalScan_WBC_Thr = 0.03;

    BW = imbinarize(medfilt2(img{i}), MalScan_WBC_Thr);
    figure(i); subplot(1, 2, 2); imshow(BW);
    label = bwlabel(BW);
    stats = regionprops(BW, 'Area');
    idx = find([stats.Area]>WBC_Min&[stats.Area]<WBC_Max);
    BW2 = ismember(label, idx);
    stats2 = regionprops(BW2, 'Centroid', 'MajorAxisLength', 'MinorAxisLength');
```

```

centers = cat(1, stats2.Centroid);
MajorAxisLength = cat(1, stats2.MajorAxisLength);
MinorAxisLength = cat(1, stats2.MinorAxisLength);
diameters = mean([MajorAxisLength, MinorAxisLength], 2);
radii = diameters/2;
numbers = length(radii);

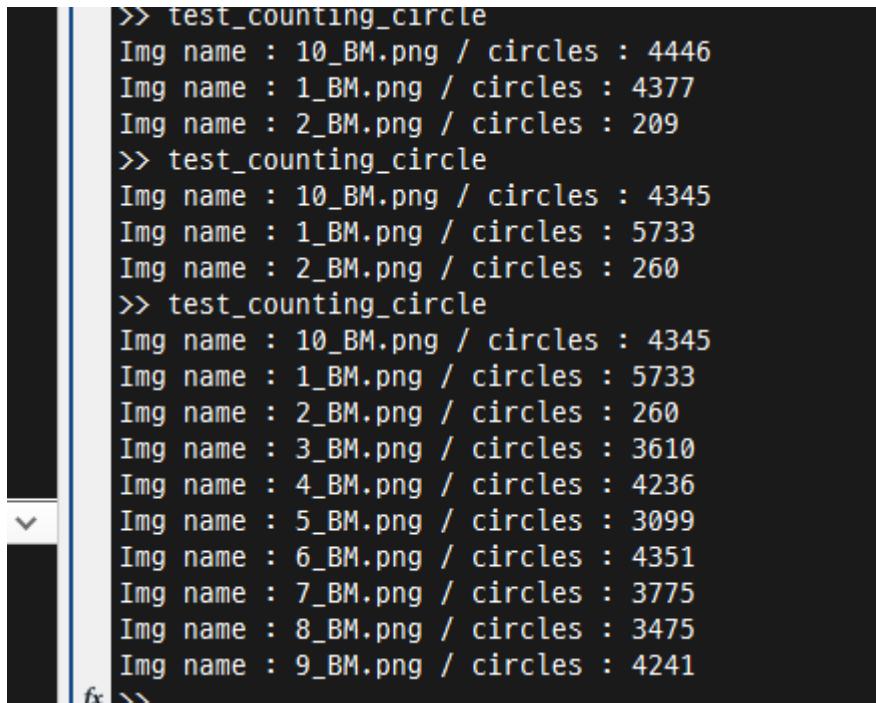
viscircles(centers, radii+1, 'Color', 'Red');

fprintf('Img name : %s / circles : %d\n', listFM{i}, numbers)

end

```

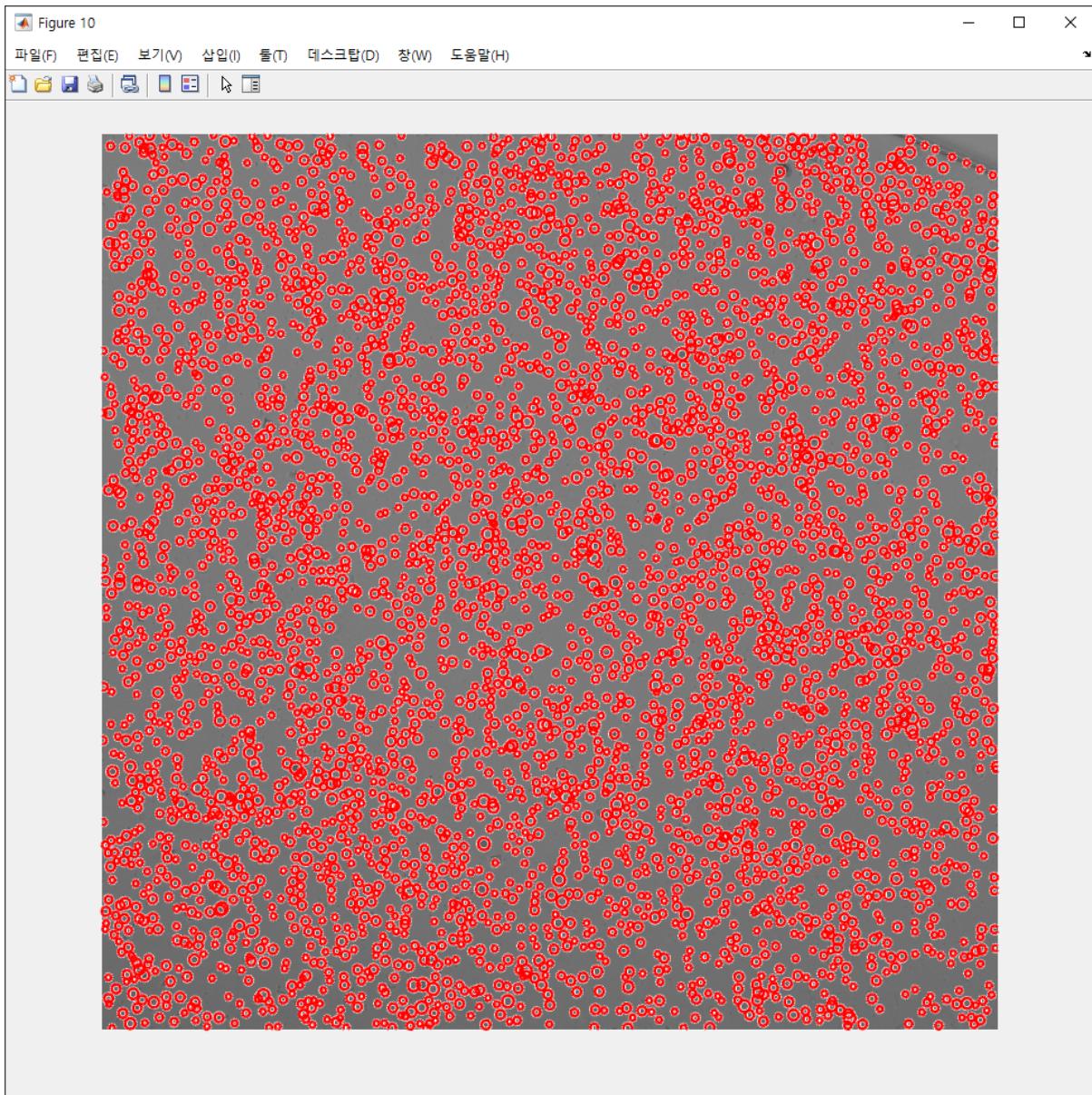
## Bright Field (find circles)

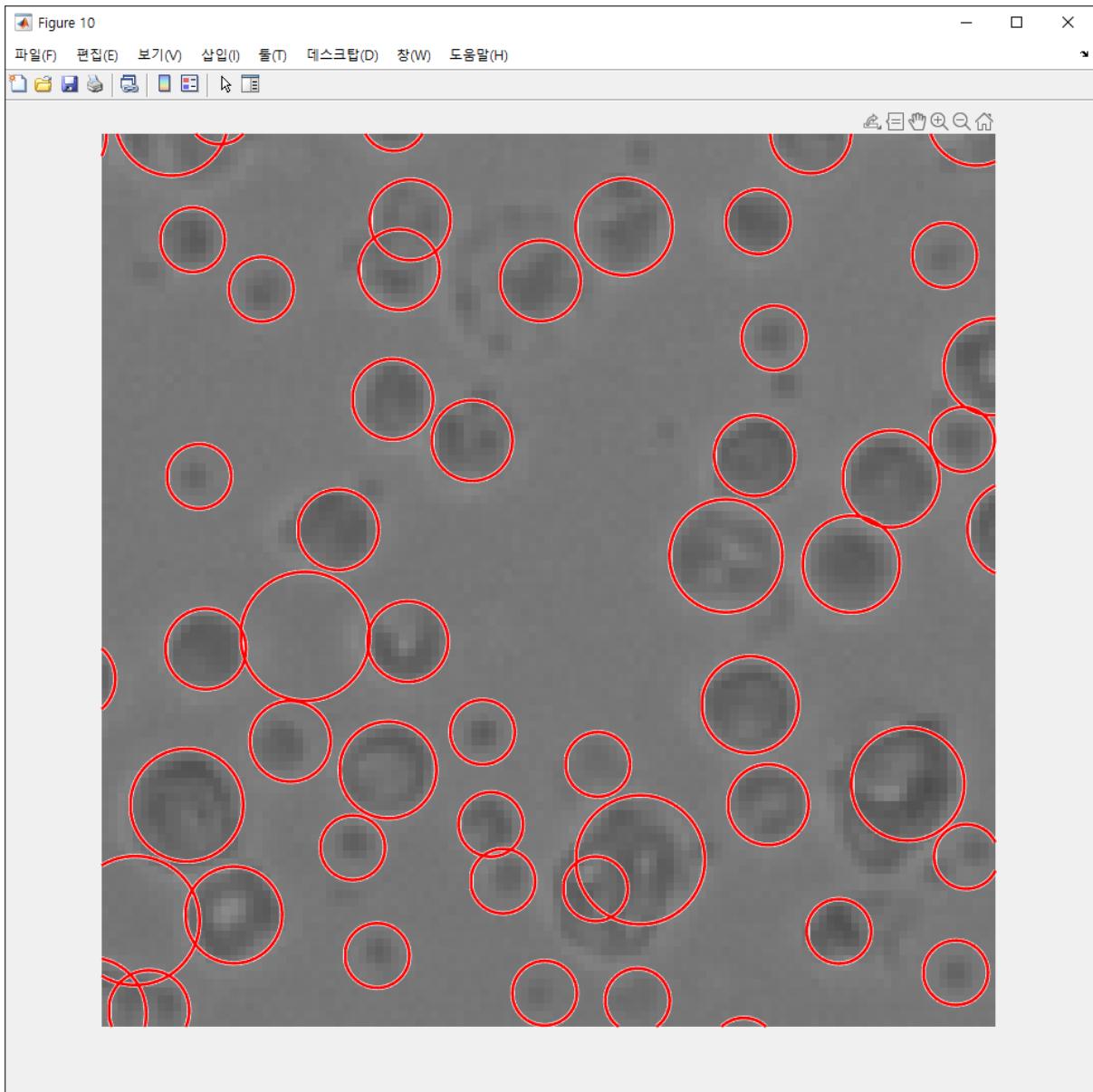


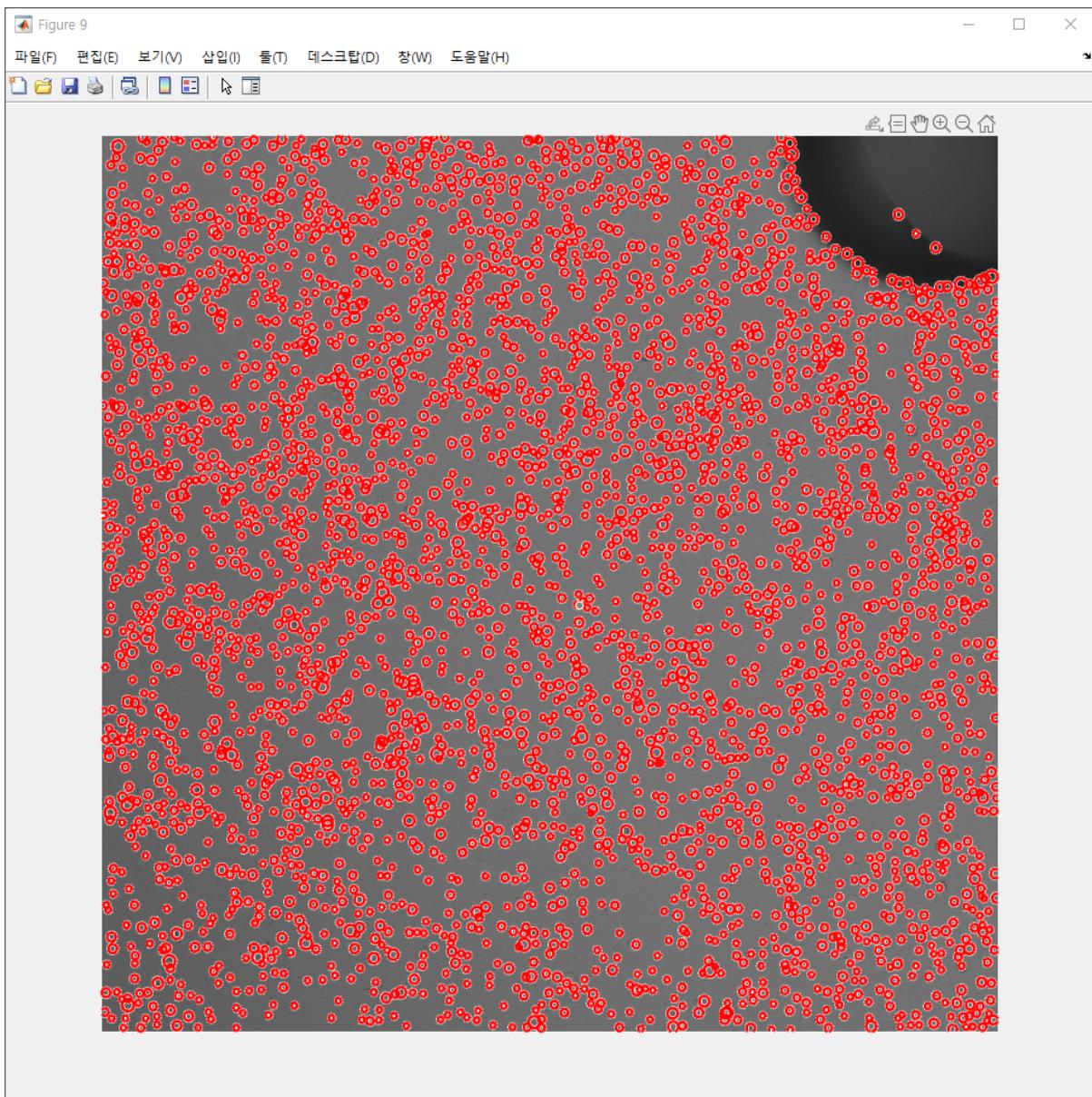
```

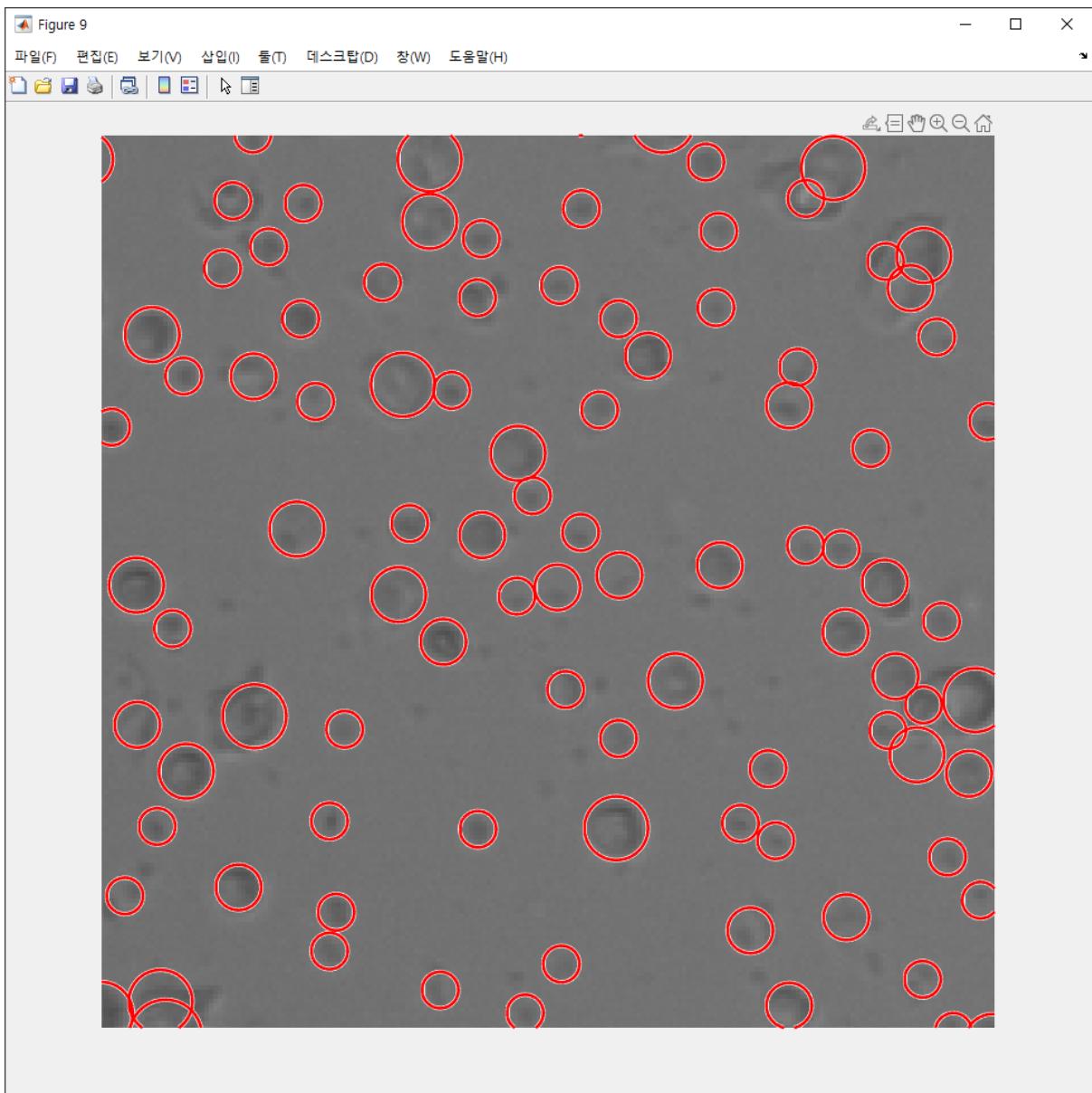
>> test_counting_circle
Img name : 10_BM.png / circles : 4446
Img name : 1_BM.png / circles : 4377
Img name : 2_BM.png / circles : 209
>> test_counting_circle
Img name : 10_BM.png / circles : 4345
Img name : 1_BM.png / circles : 5733
Img name : 2_BM.png / circles : 260
>> test_counting_circle
Img name : 10_BM.png / circles : 4345
Img name : 1_BM.png / circles : 5733
Img name : 2_BM.png / circles : 260
Img name : 3_BM.png / circles : 3610
Img name : 4_BM.png / circles : 4236
Img name : 5_BM.png / circles : 3099
Img name : 6_BM.png / circles : 4351
Img name : 7_BM.png / circles : 3775
Img name : 8_BM.png / circles : 3475
Img name : 9_BM.png / circles : 4241

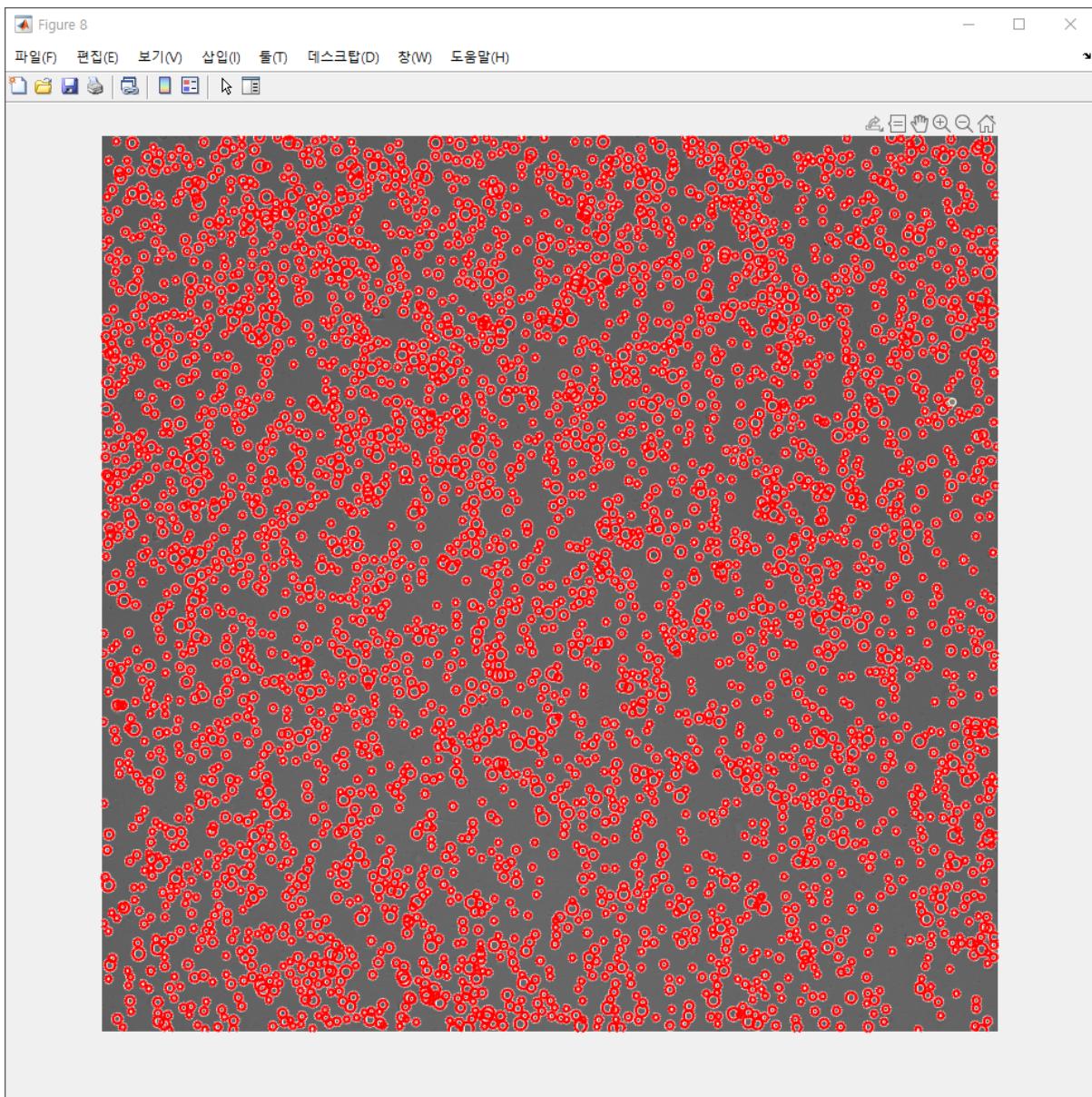
```

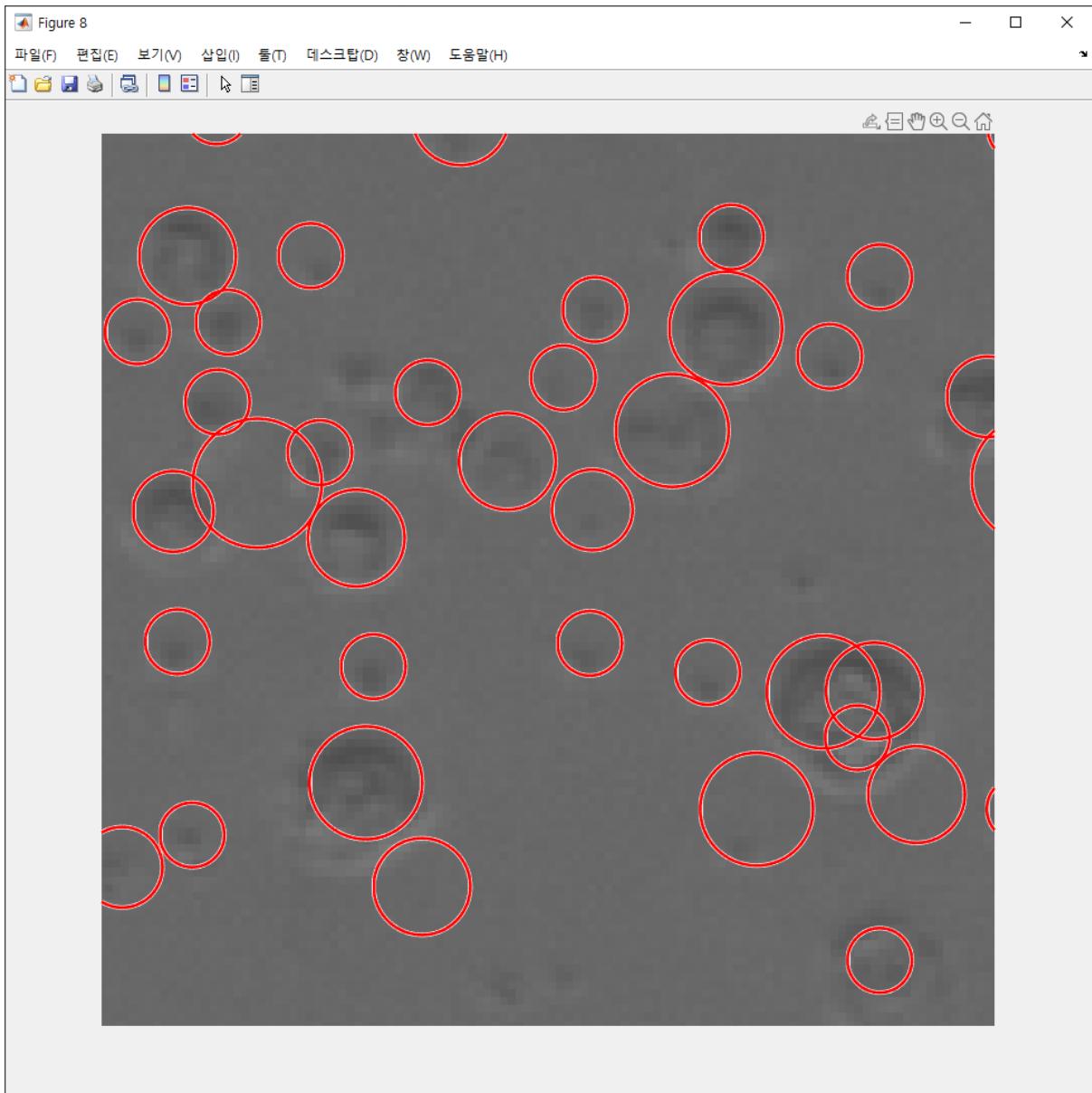


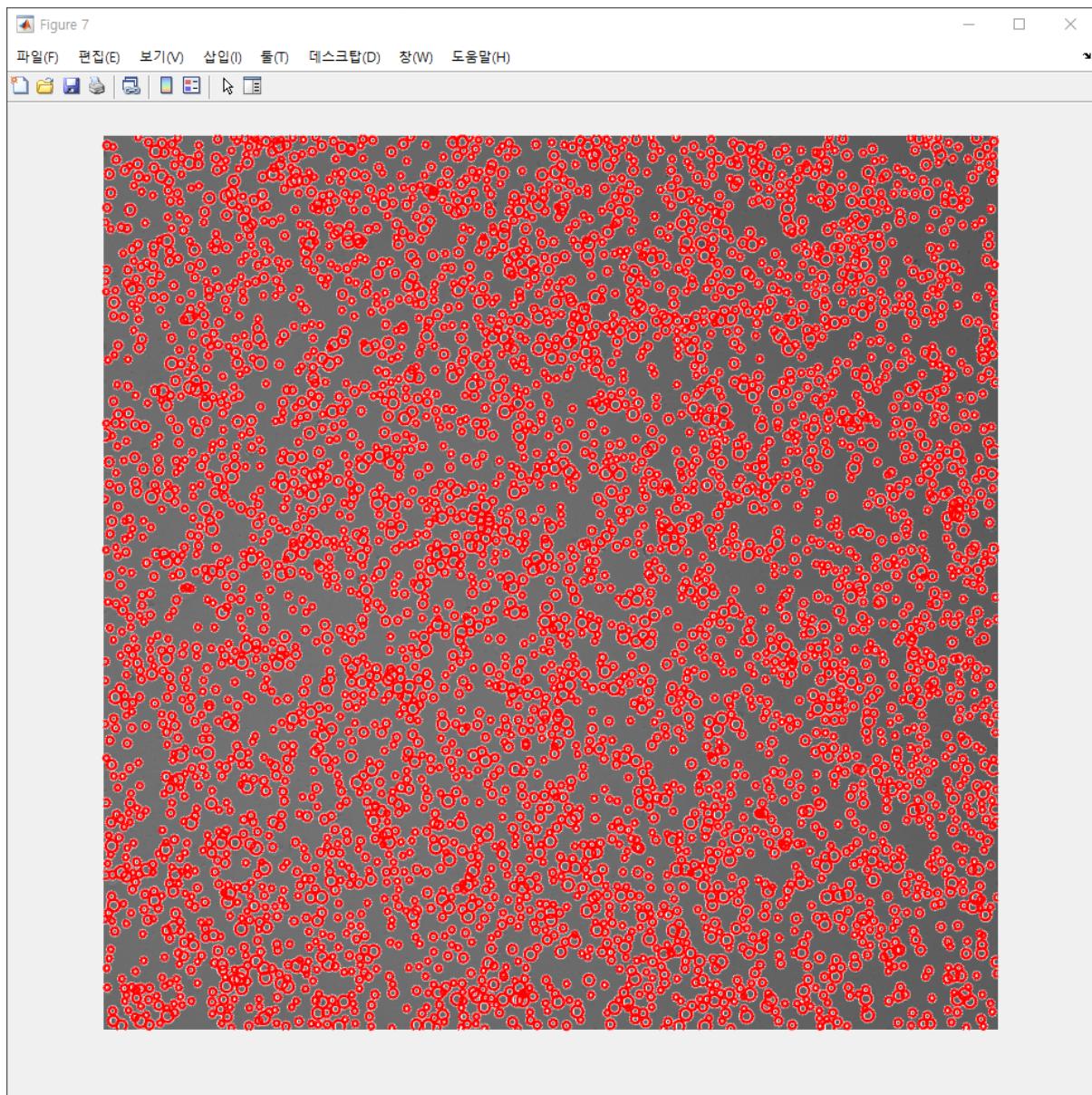


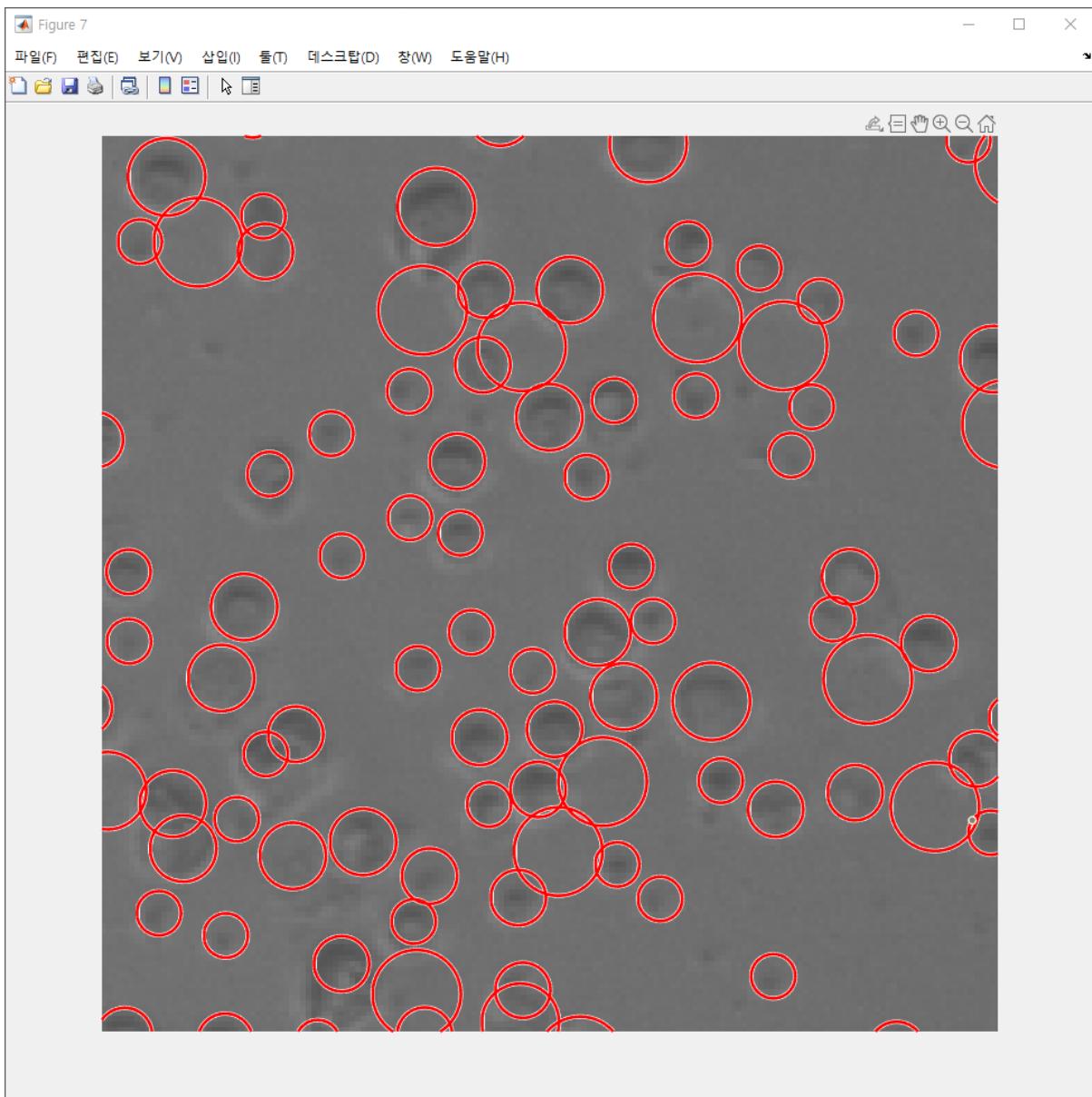


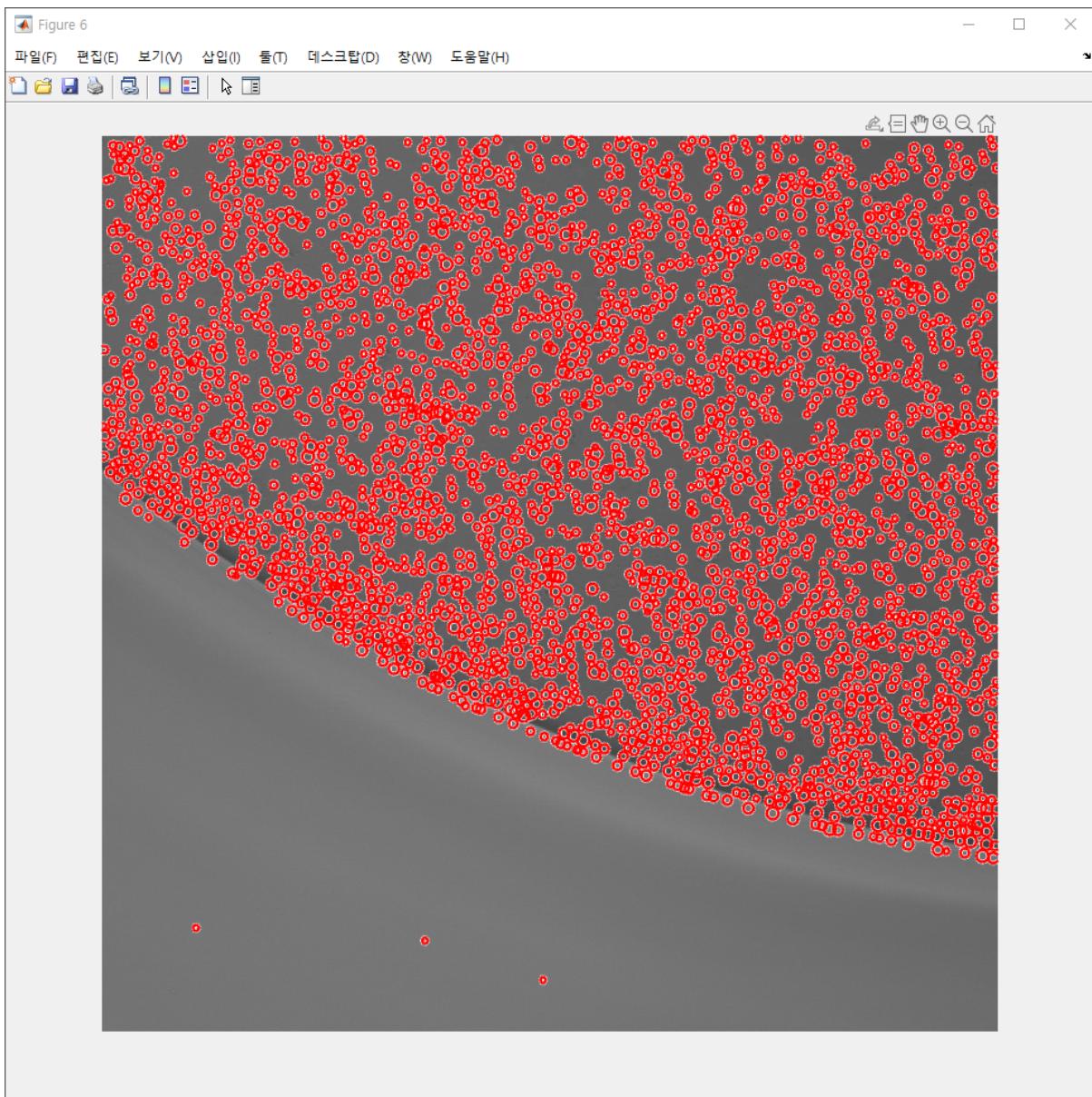


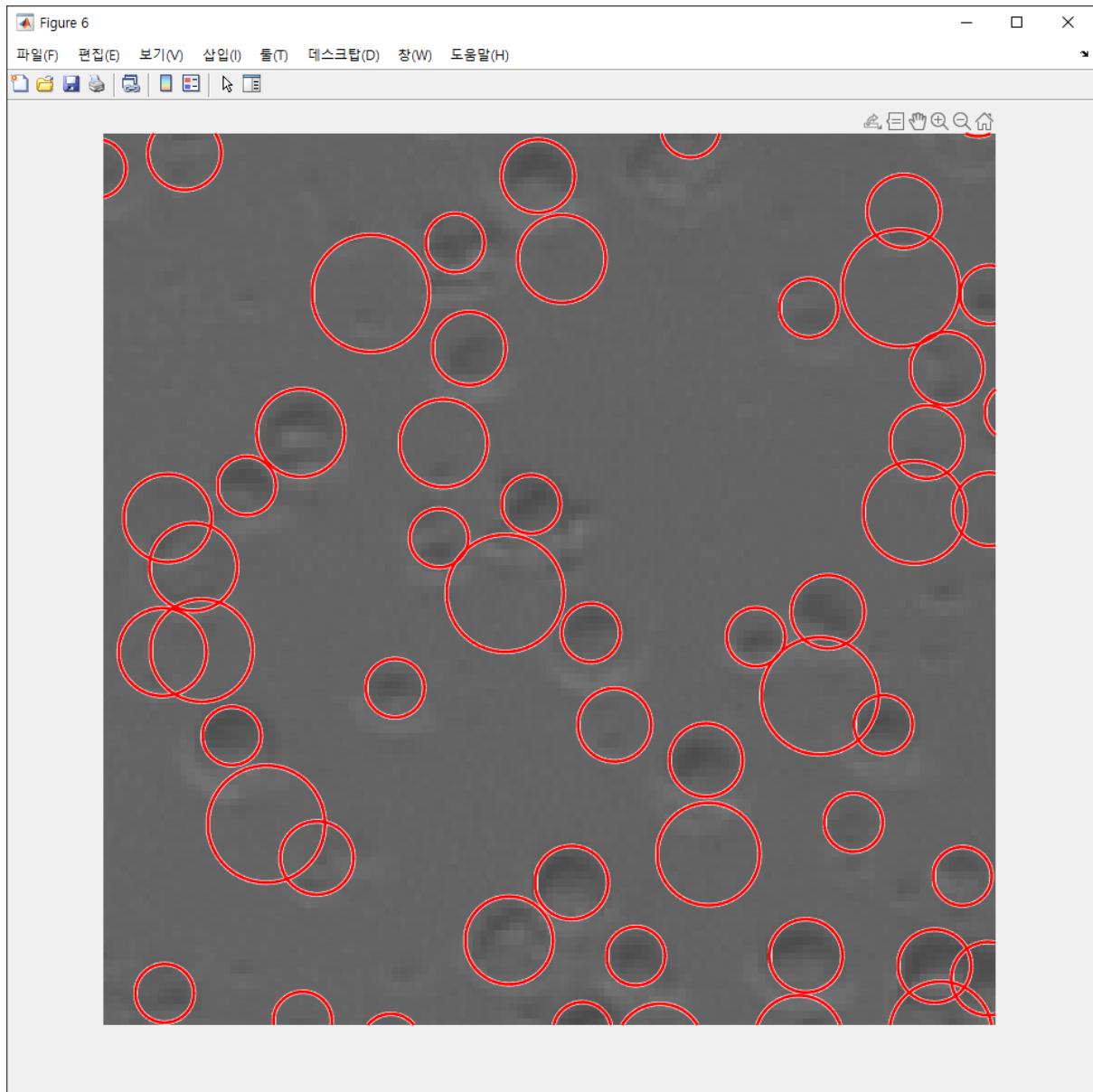


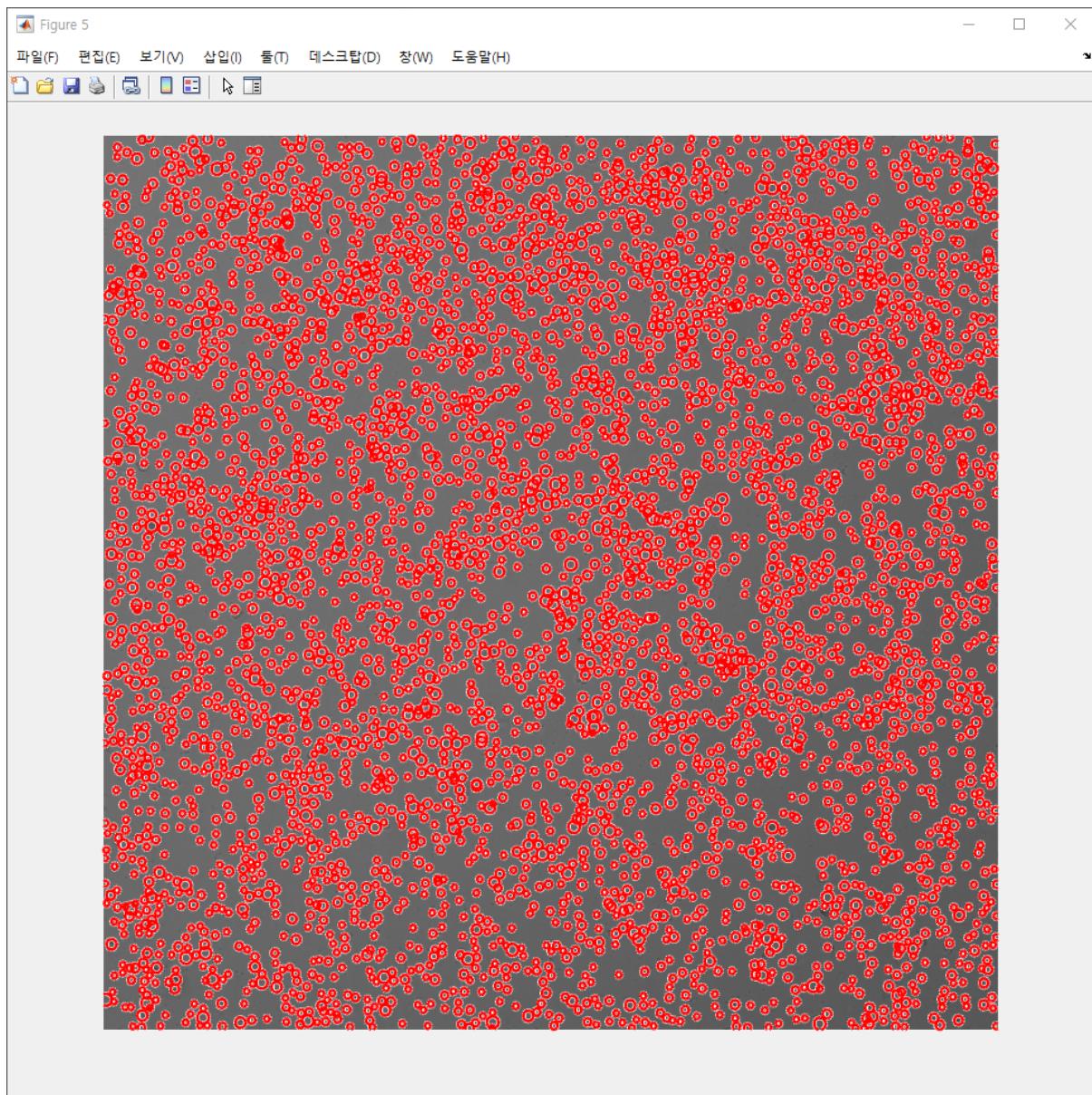


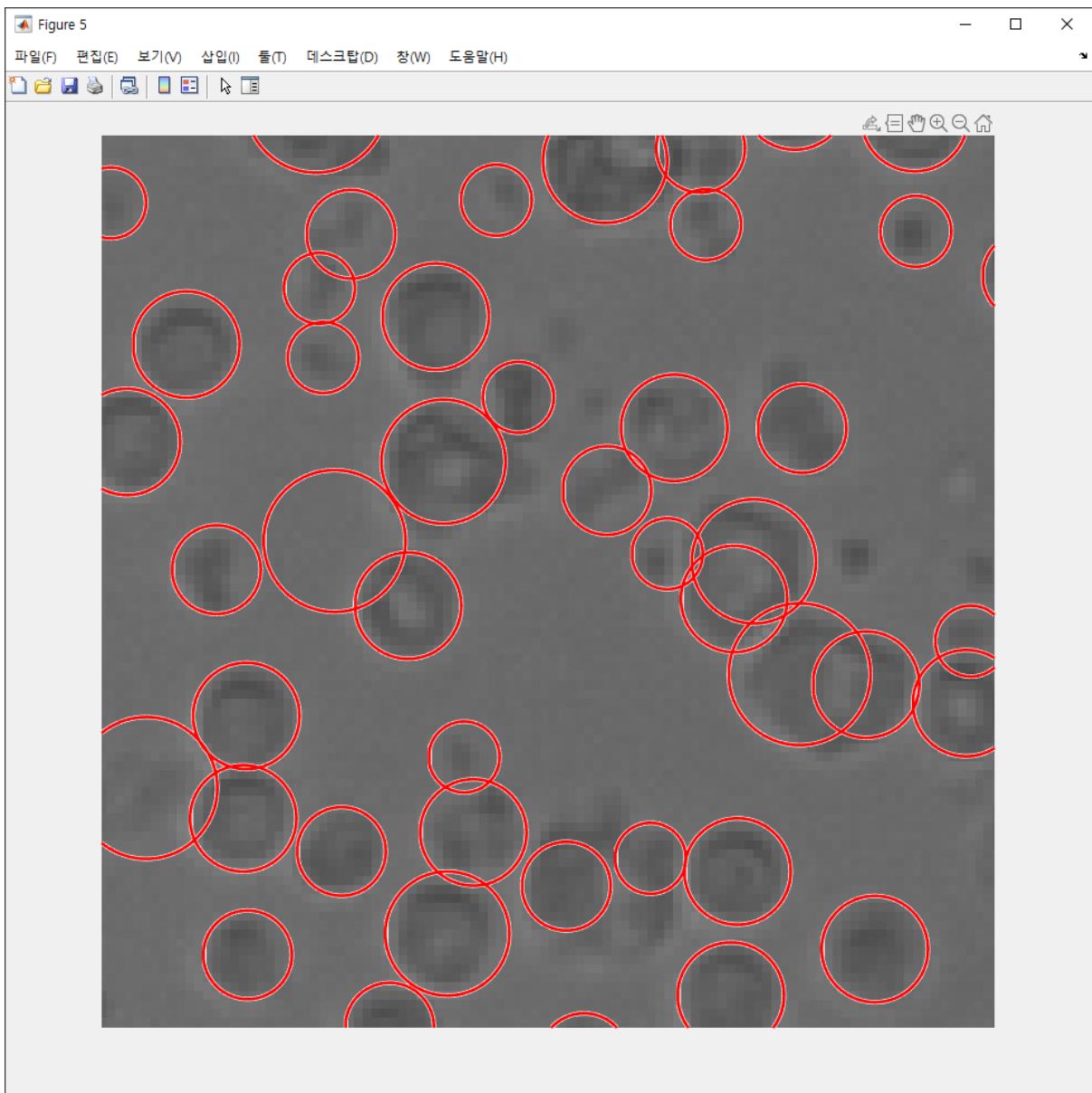


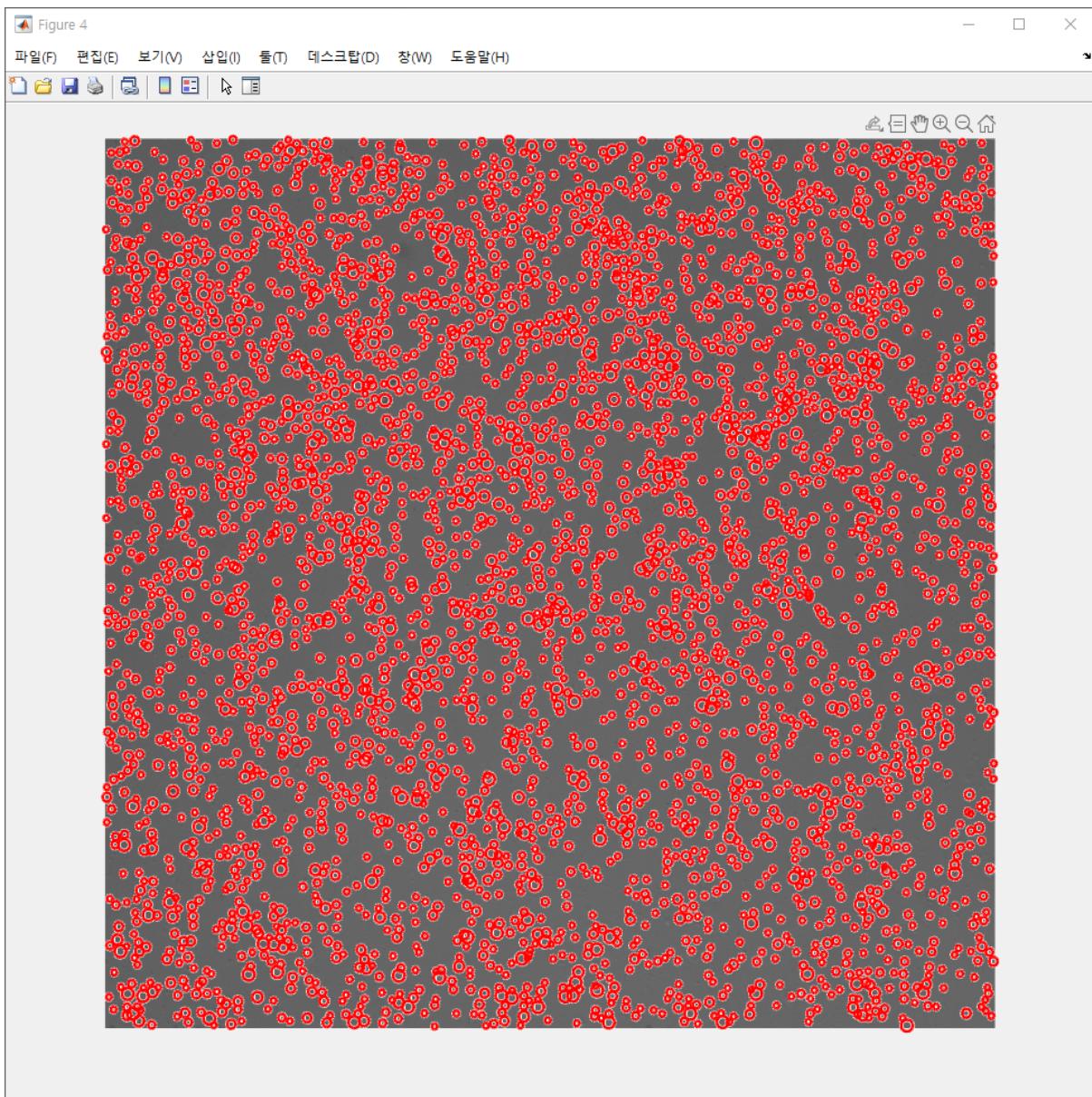


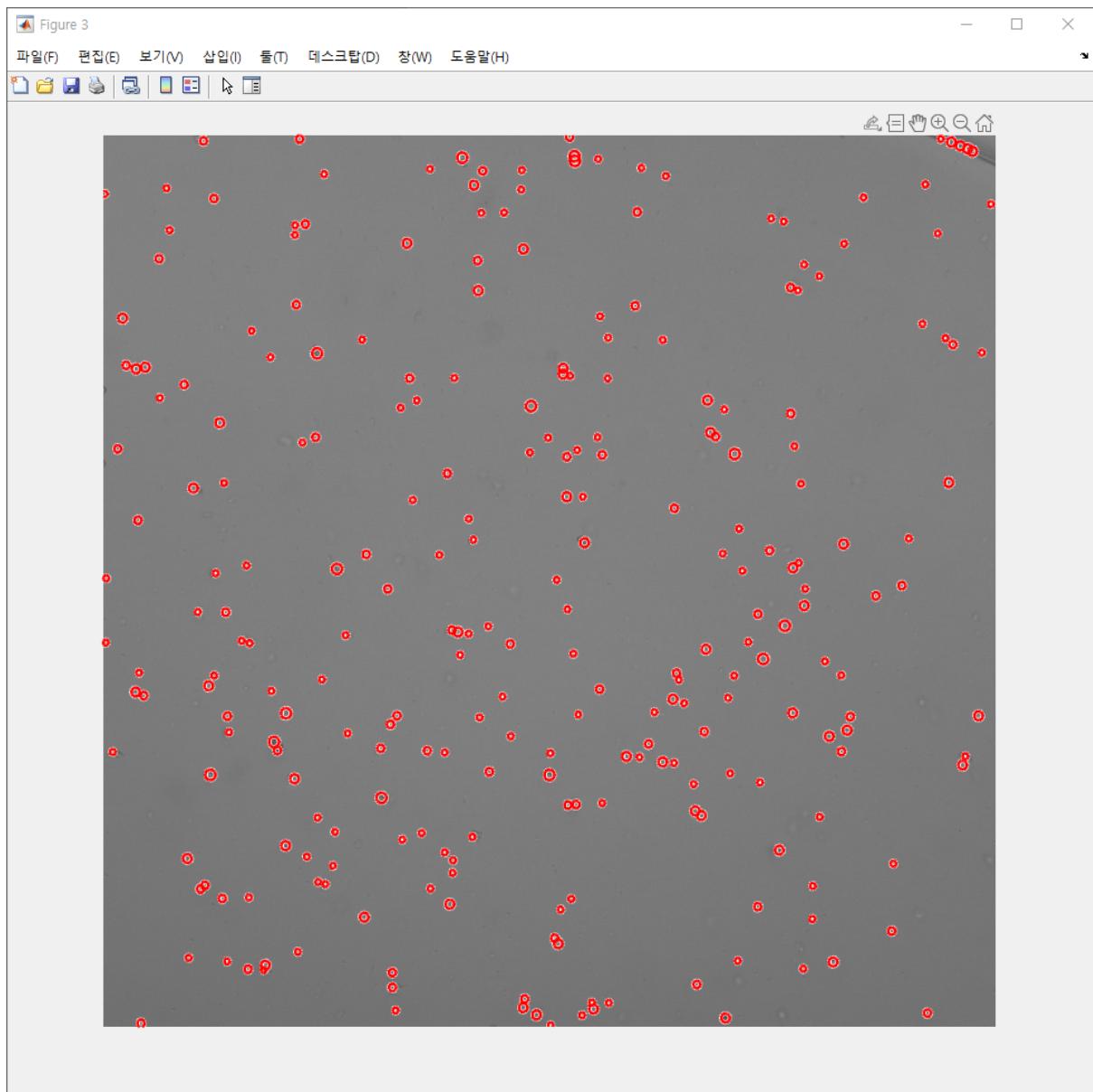


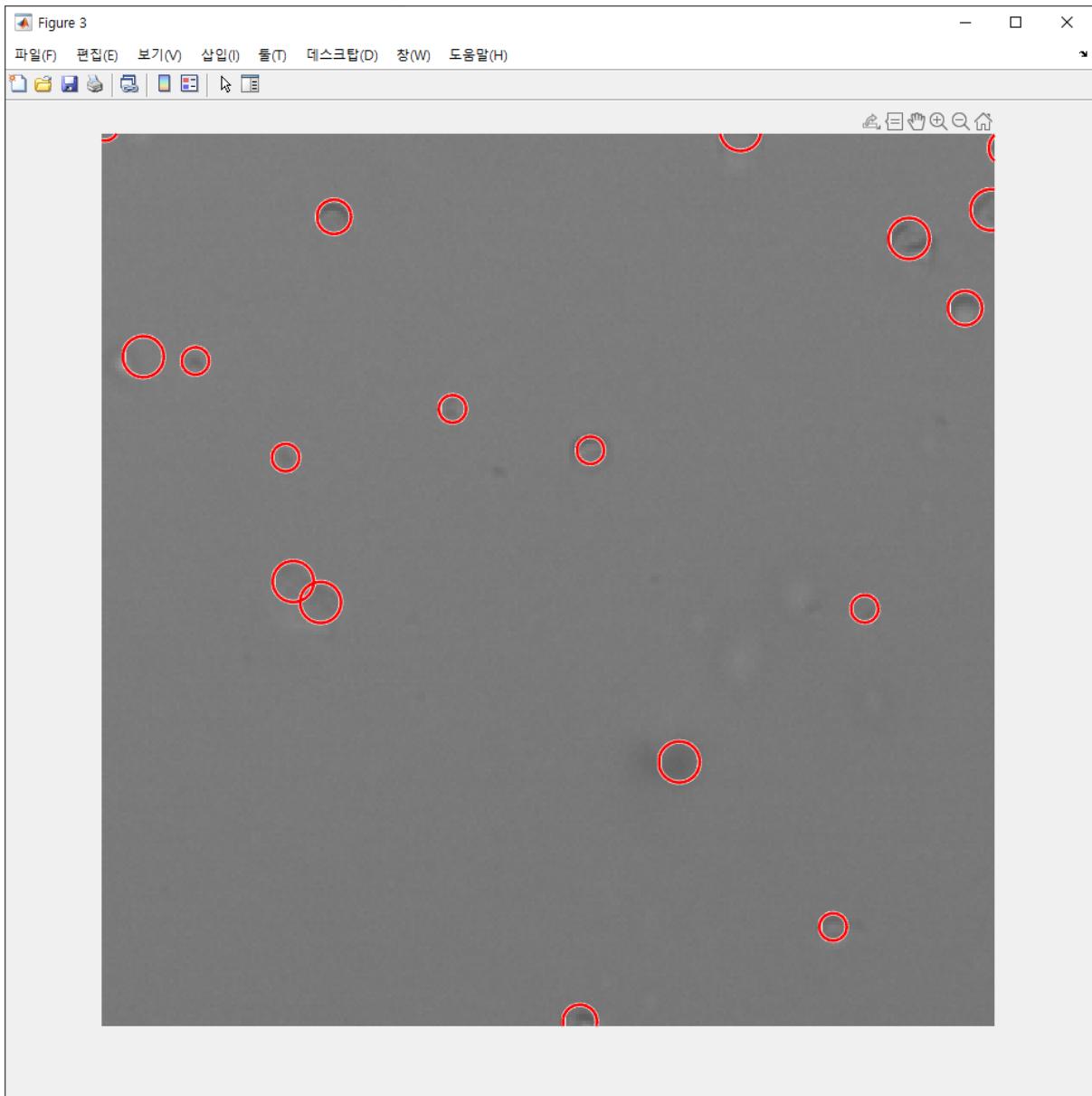


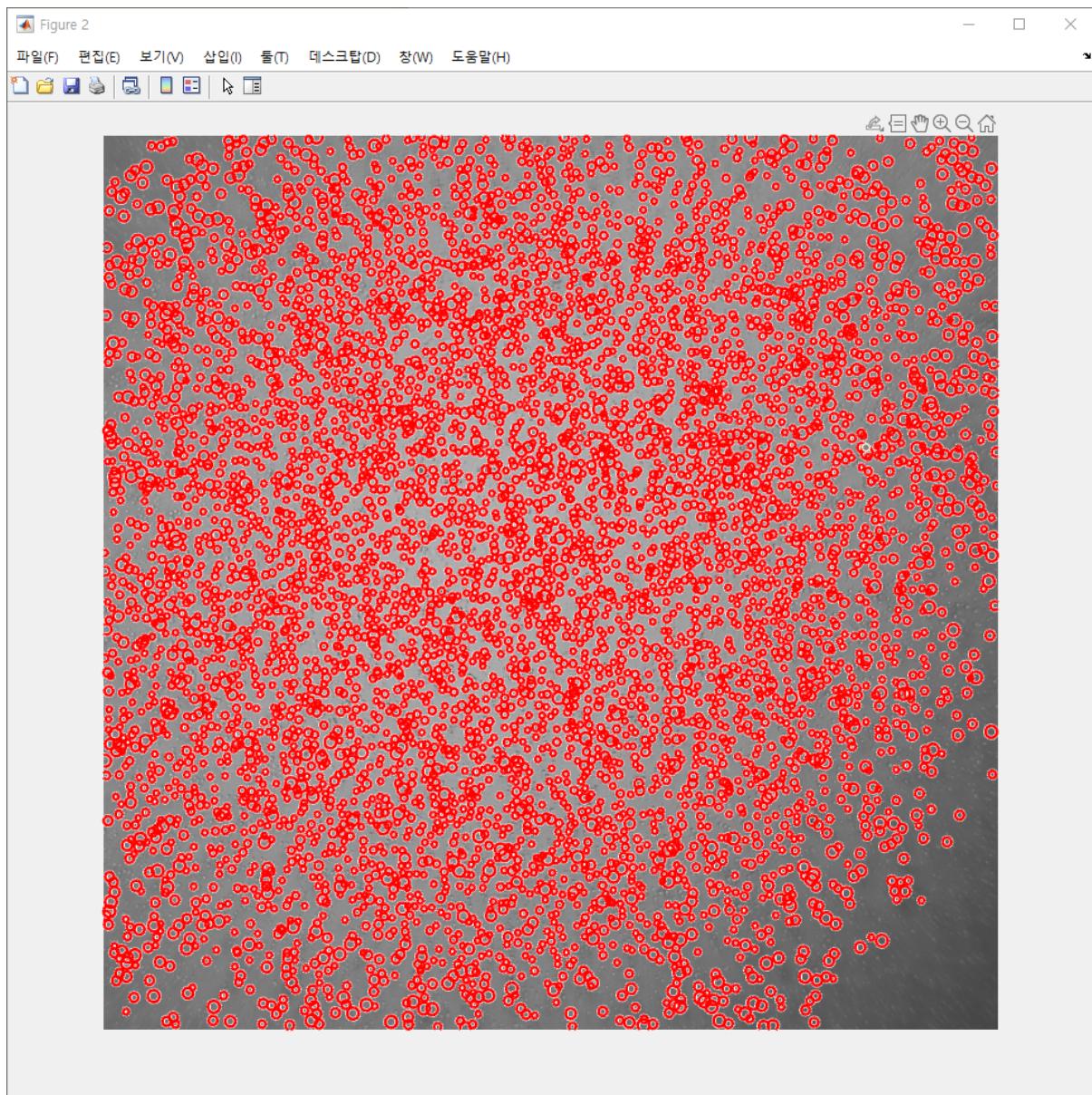


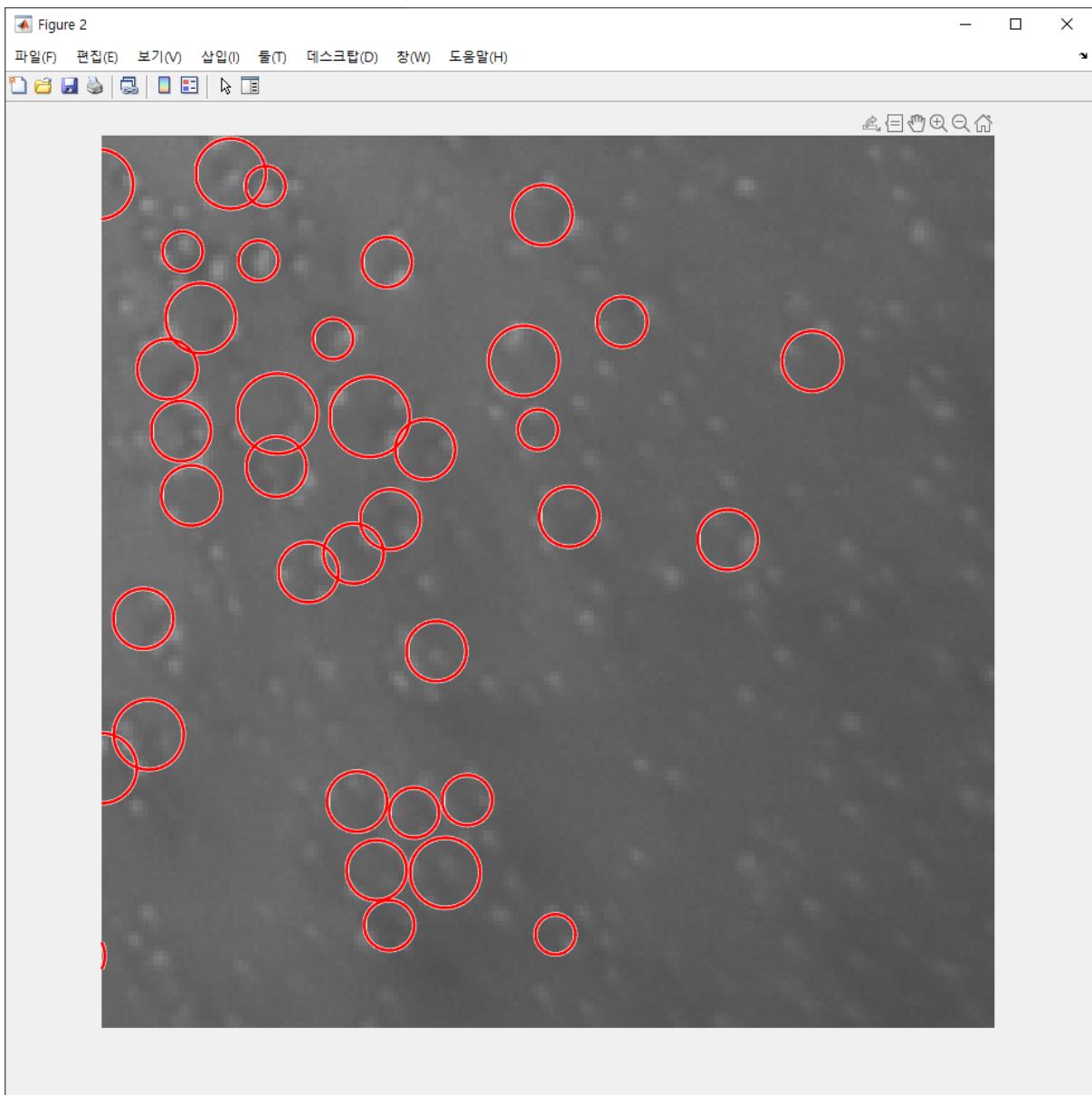


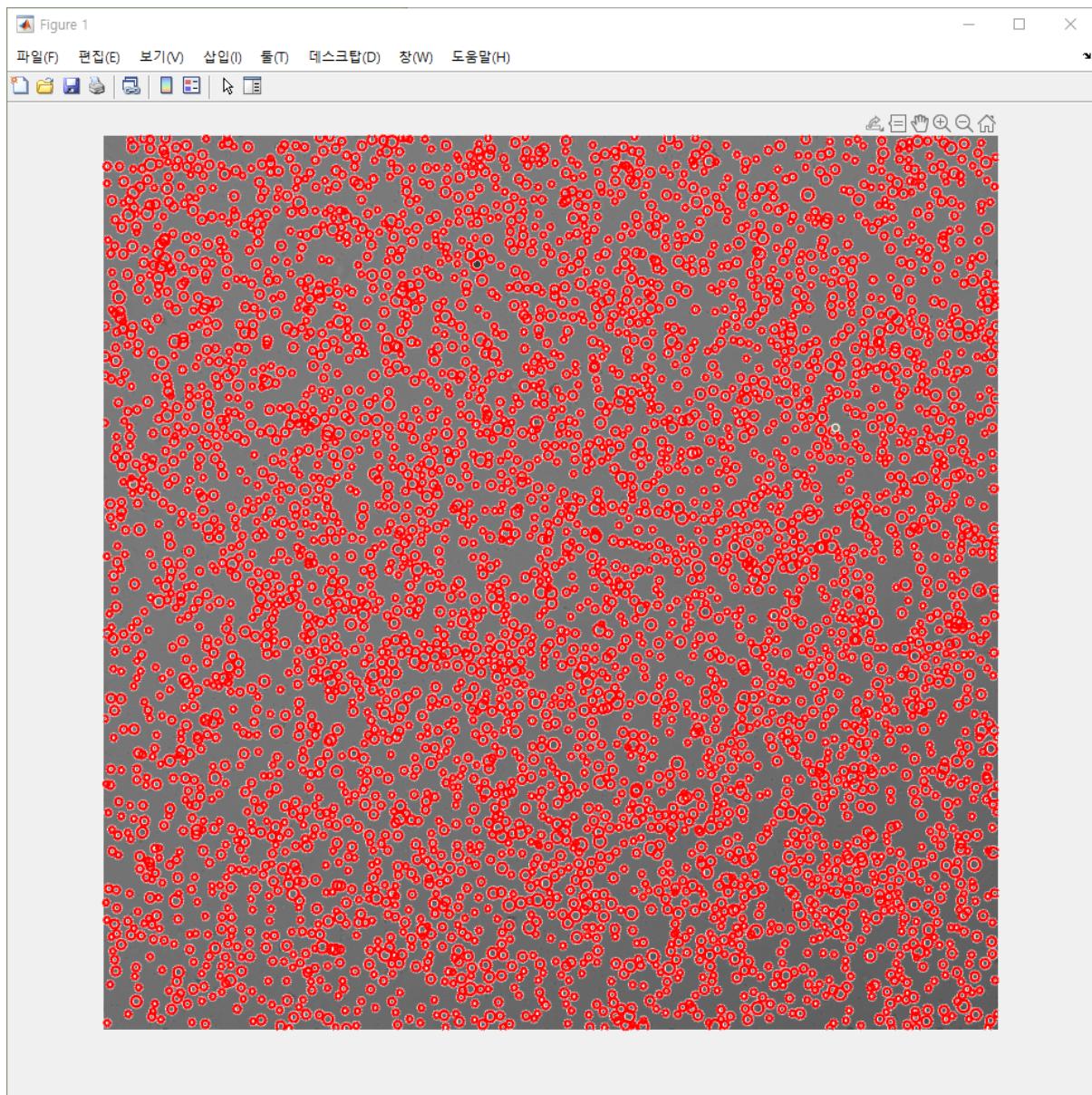


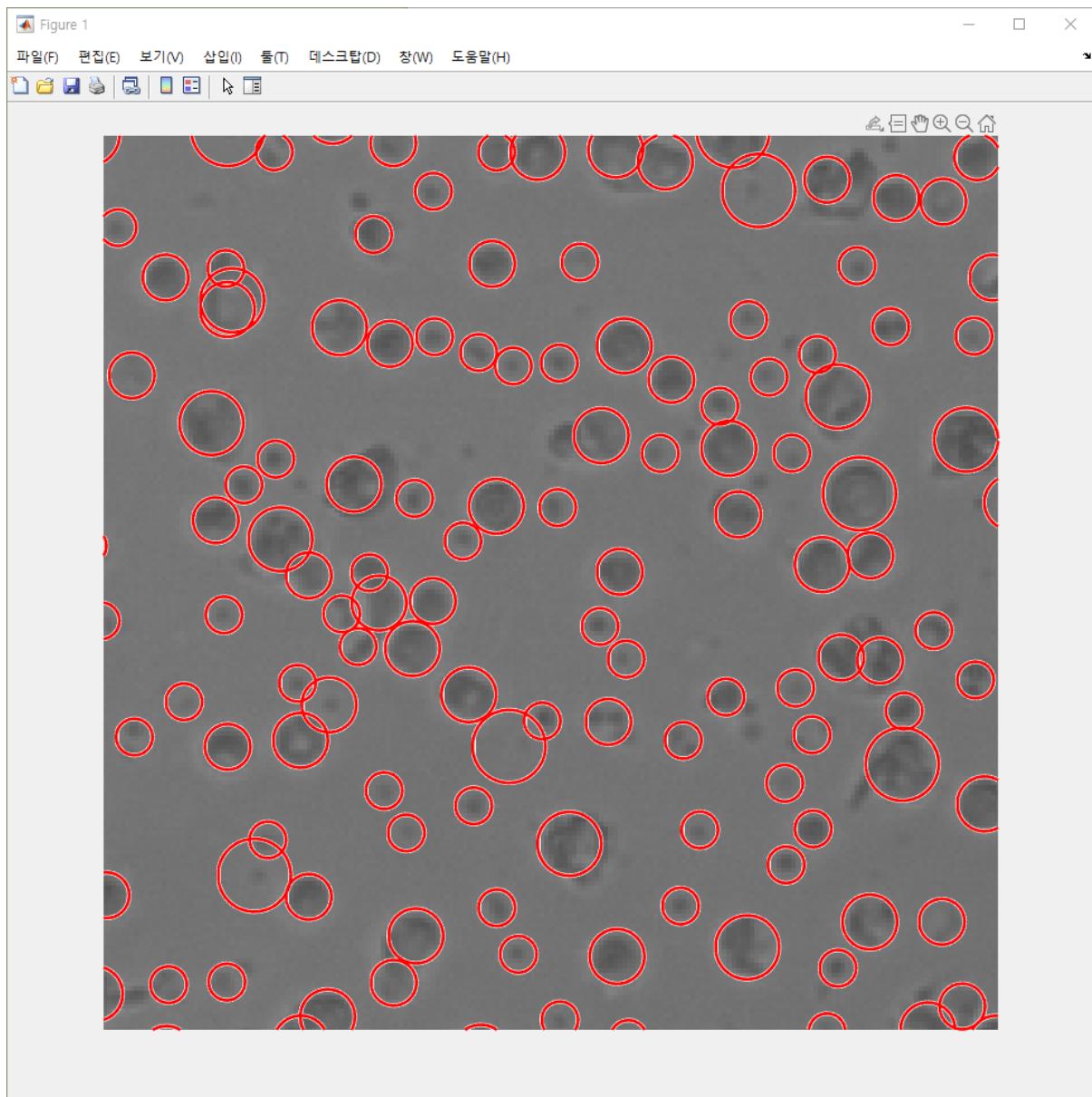












```
clear
close all
warning off

% folderName = 'D:\Users\user\Desktop\Cell image\10-Feb-2022 13-43-06\Grp1-U1(1)'; % 20X
folderName = 'D:\Users\user\Desktop\Cell image\20220215_iMeasy100';
% folderName = 'D:\Users\user\Desktop\Cell image\Cell image\4X mix'; % 4X
listDir = dir(folderName);
nameList = {listDir.name};
listFile = nameList([listDir.isdir] == 0);
listFM = listFile(contains(listFile, 'BM'));

img = cell(length(listFM), 1);

for i = 1:round(length(listFM)/1)
    img{i} = imread(fullfile(folderName, listFM{i}));
    figure(i); imshow(img{i});
```

```

try
    img{i} = rgb2gray(img{i});
end

%     Image Brightness
%     img{i} = img{i} - mean(img{i}, 'all');

%     figure(i); subplot(1, 2, 2); imshow(img{i});
radiusRange = [3 7];
[centers, radii] = imfindcircles(img{i},...
    radiusRange, ...
    'ObjectPolarity', 'dark',...
    'Sensitivity', 0.95, ...
    'EdgeThreshold', 0.1, ...
    'Method', 'TwoStage');
[centers, radii] = imfindcircles(img{i},...
    radiusRange, ...
    'ObjectPolarity', 'dark',...
    'Sensitivity', 0.9, ...
    'EdgeThreshold', 0.01, ...
    'Method', 'PhaseCode');

viscircles(centers, radii+1, 'Color', 'Red');
pause(0.01)

fprintf('Img name : %s / circles : %d\n', listFM{i}, length(radii))

end

```