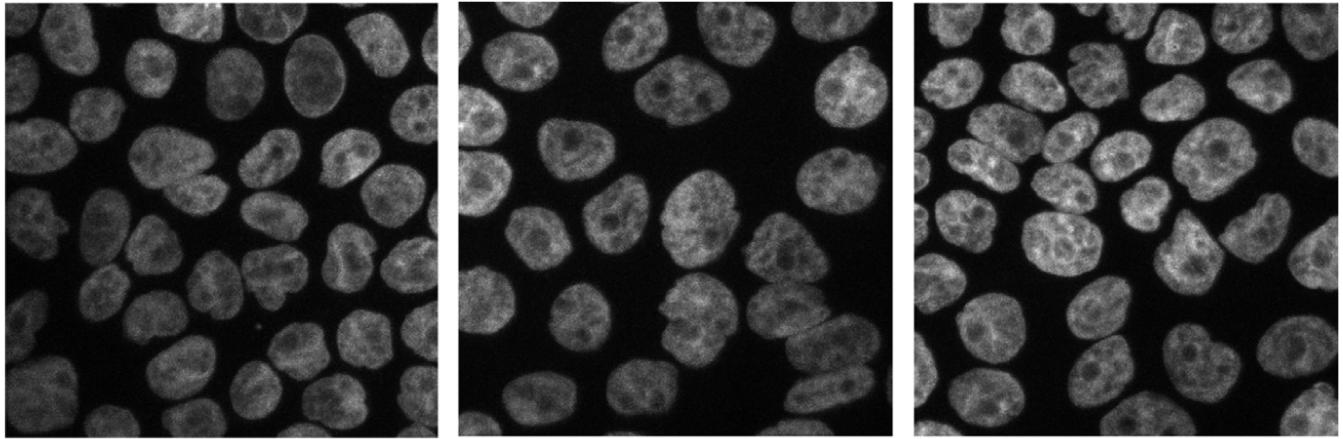


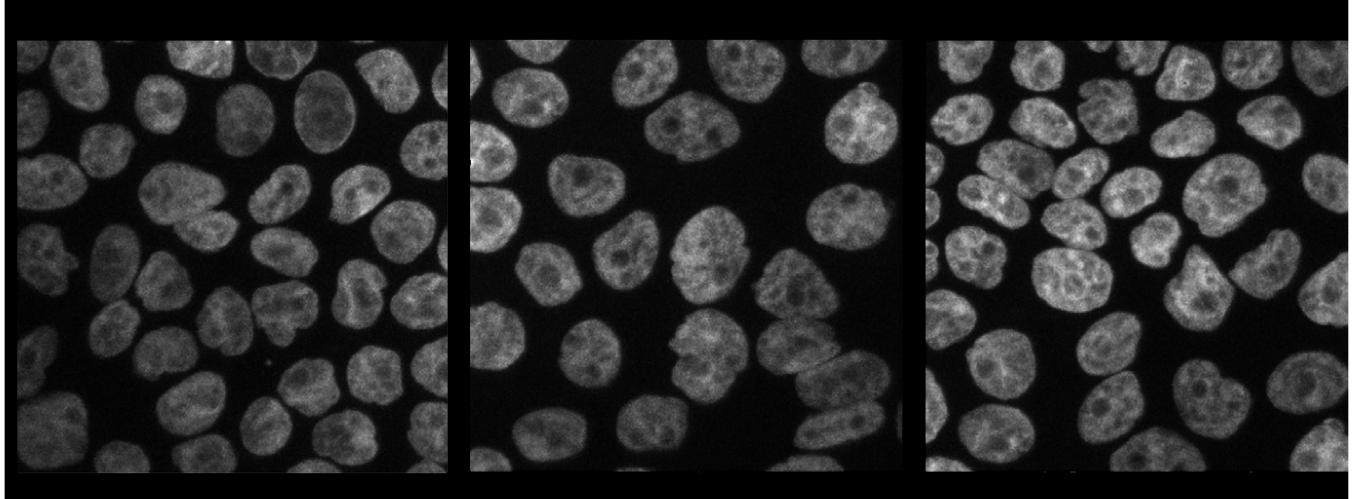
# Segmentació de la imatge

## Watershed

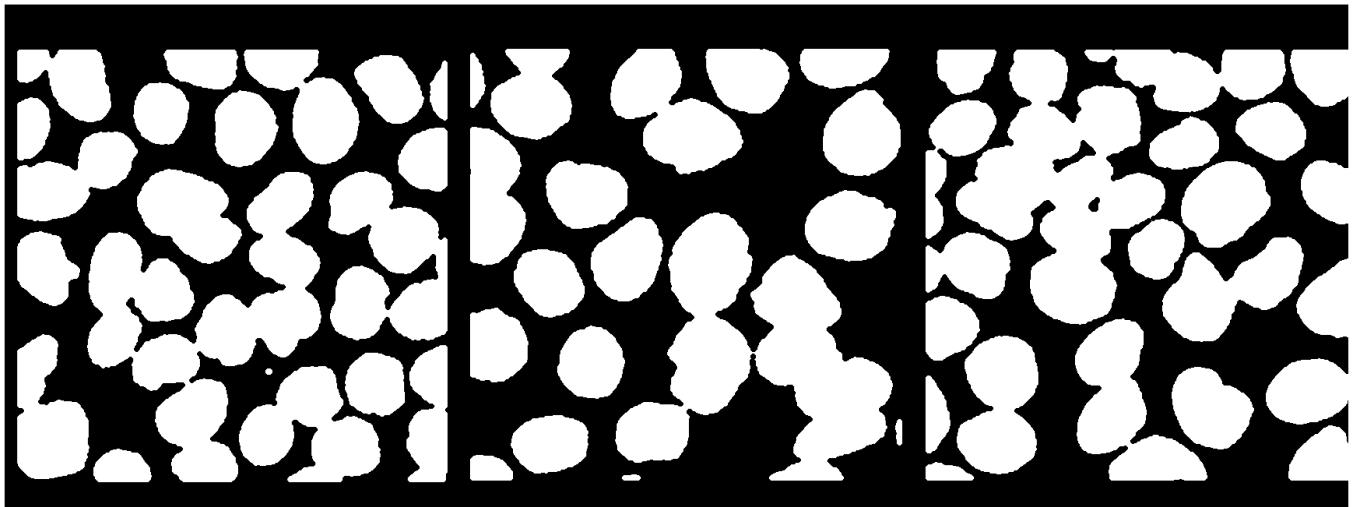
```
I = rgb2gray(imread("cellsegmentationcompetition.png"));
imshow(I);
```



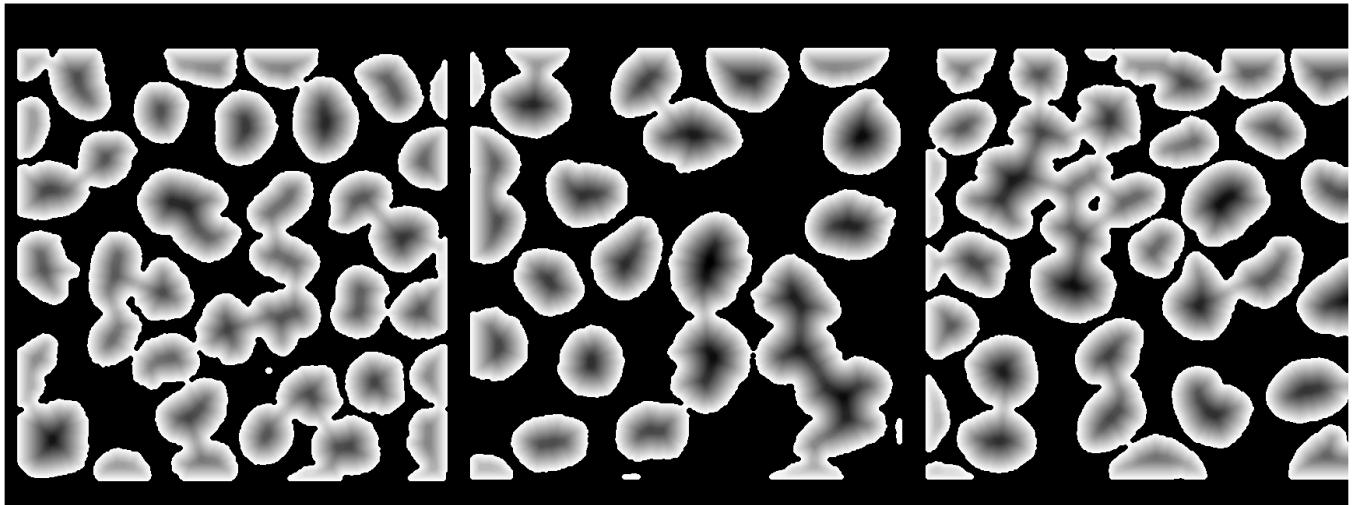
```
% eliminar marcs
IB = I > 250;
SB = false(size(I));
SB(:,1) = true;
SB(:,end) = true;
SB(1,:) = true;
SB(end,:) = true;
RB = imreconstruct(SB,IB);
RB = imdilate(RB,ones(6,6));
I(RB) = 0;
imshow(I);
```



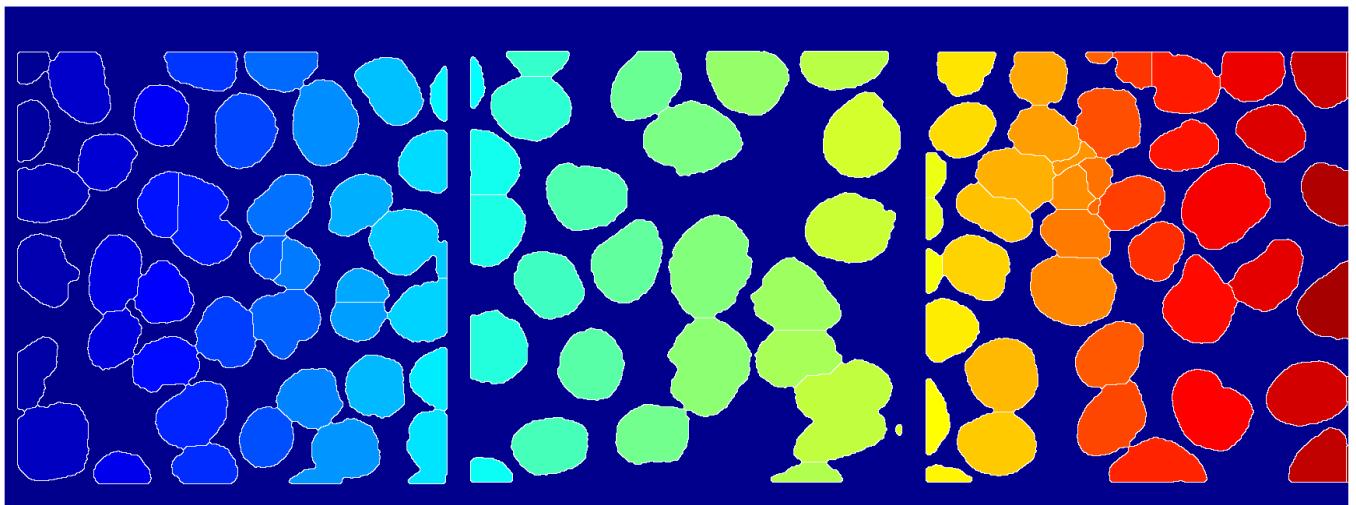
```
% preprocesat (filtrat)
OI = imopen(I, strel('disk',4));
CI = imclose(OI, strel('disk',4));
BW = CI > 16;
imshow(BW);
```



```
% segmentació per watershed
DT = -bwdist(not(BW)); % transformada de distància
DT(not(BW)) = -Inf; % no aplicar watershed al background
DT = imclose(DT, strel('disk',4)); % eliminem pous petits
imshow(DT,[]);
```

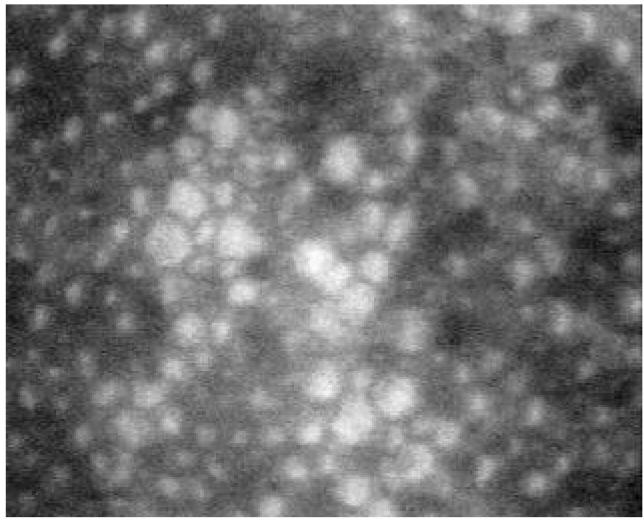


```
L = watershed(DT);  
imshow(label2rgb(L));
```

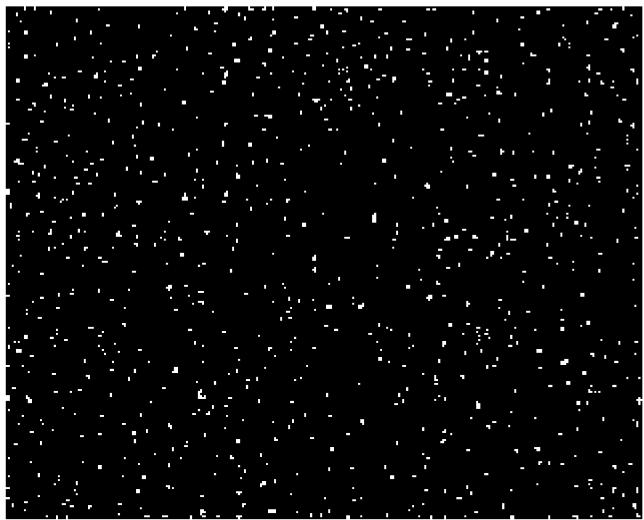


## Exercici: segmentar

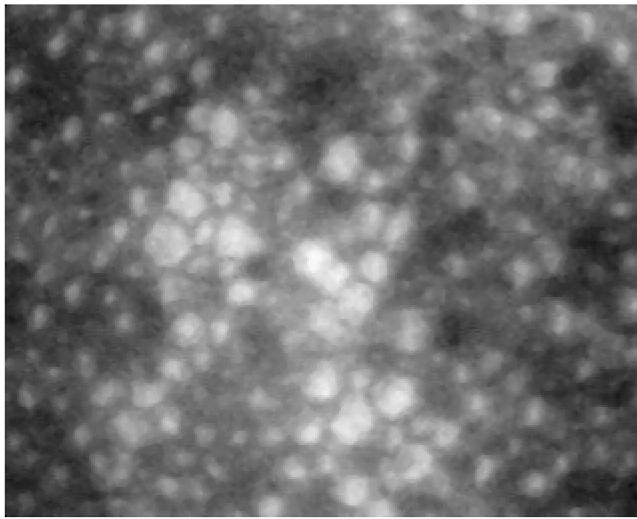
```
I = imread('cornea.tif');  
imshow(I);
```



```
% Màxims regionals  
I = medfilt2(I, [3, 3]);  
MARK_C = imregionalmax(I);  
imshow(MARK_C);
```

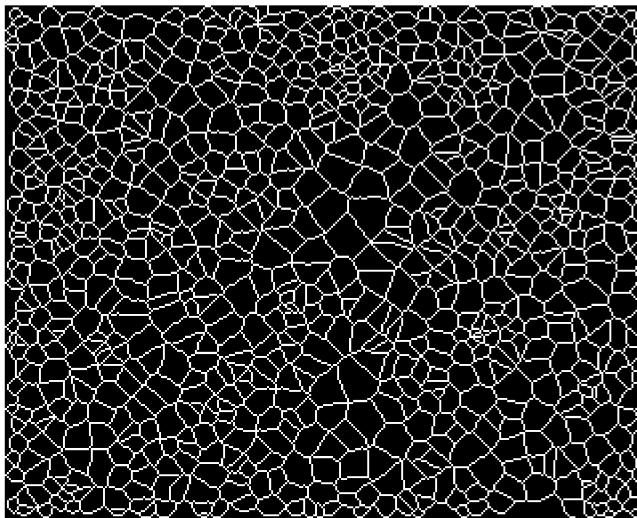


```
% imatge reconstruccio  
IREC = imreconstruct(I.*uint8(MARK_C),I);  
imshow(IREC);
```



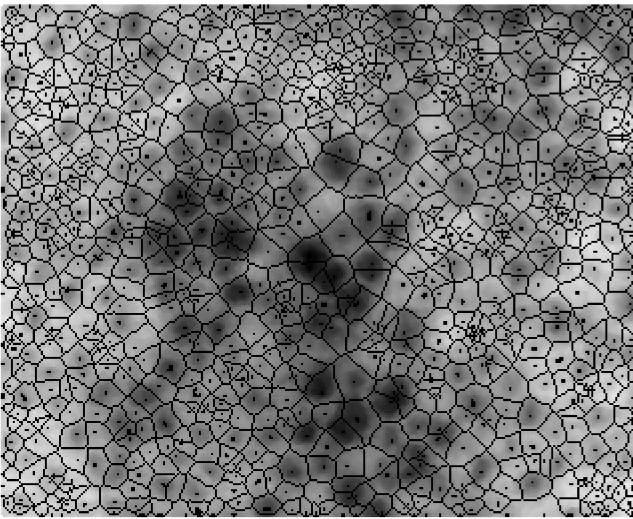
```
% SKIZ
```

```
SK = bwske1(not(MARK_C));
MARK_B = bwmorph(SK, 'spur', Inf);
MARK_B = MARK_B & not(bwhitmiss(MARK_B, [-1,-1,-1;-1,1,-1;-1,-1,-1]));
imshow(MARK_B);
```

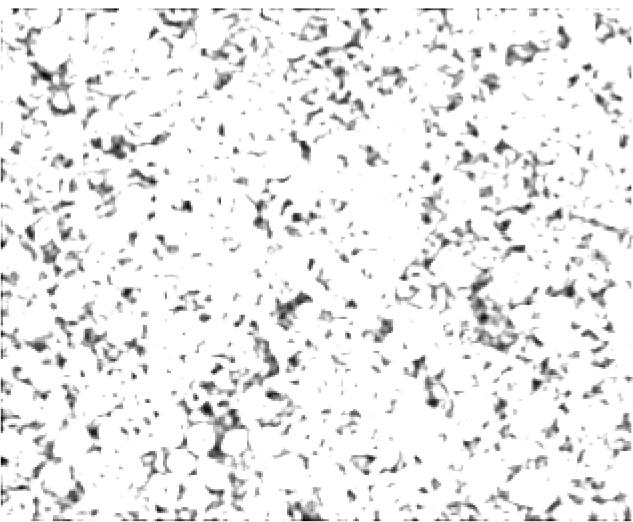


```
% Imatge de marques
```

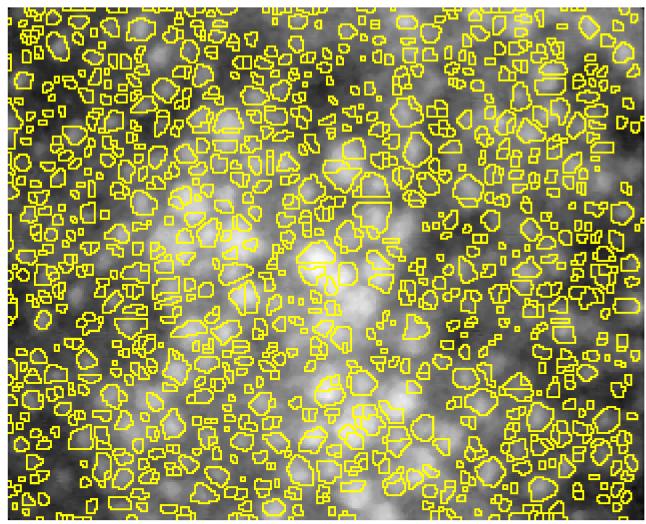
```
MARKERS = (255-I) .* uint8(not(MARK_B)) .* uint8(not(MARK_C));
imshow(MARKERS);
```



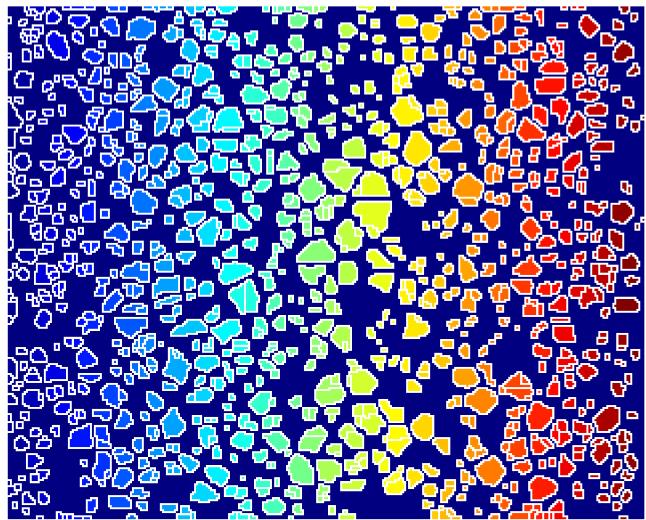
```
% Imatge gradient  
G = uint8(imgradient(IREC));  
G = imfilter(G, ones(3,3));  
imshow(G,[]);
```



```
% watershed  
WS = watershed(double(G).*double(MARKERS));  
IB = WS == 0;  
RGB = imoverlay(I, IB);  
imshow(RGB);
```



```
imshow(label2rgb(WS));
```



## K-Means

```
% reduir el nombre de colors d'una imatge  
I = imread("nenufar.jpg");  
imshow(I);
```



```
R = I(:,:,1);
G = I(:,:,2);
B = I(:,:,3);
O = [R(:),G(:),B(:)];
[C Cen] = kmeans(double(O), 15);
[f c p] = size(I);
C = reshape(C,[f c]);
imshow(label2rgb(C));
```

