

▼ fsl Test notebook for Aubreville EDA, 09/30/2022

```
from google.colab import drive
drive.mount('/content/drive')
```

Mounted at /content/drive

```
!apt-get install openslide-tools python3-openslide
Reading package lists...
Unpacking python-werkzeug (0.14.1+dfsg1-1ubuntu0.1) ...
Selecting previously unselected package python-flask.
Preparing to unpack .../18-python-flask_0.12.2-3ubuntu0.1_all.deb ...
Unpacking python-flask (0.12.2-3ubuntu0.1) ...
Selecting previously unselected package python3-pil:amd64.
Preparing to unpack .../19-python3-pil_5.1.0-1ubuntu0.7_amd64.deb ...
Unpacking python3-pil:amd64 (5.1.0-1ubuntu0.7) ...
Selecting previously unselected package python3-openslide.
Preparing to unpack .../20-python3-openslide_1.1.1-2ubuntu4_amd64.deb ...
Unpacking python3-openslide (1.1.1-2ubuntu4) ...
Selecting previously unselected package python-openslide-examples.
Preparing to unpack .../21-python-openslide-examples_1.1.1-2ubuntu4_all.deb ...
Unpacking python-openslide-examples (1.1.1-2ubuntu4) ...
Selecting previously unselected package python-openssl.
Preparing to unpack .../22-python-openssl_17.5.0-1ubuntu1_all.deb ...
Unpacking python-openssl (17.5.0-1ubuntu1) ...
Selecting previously unselected package python-pkg-resources.
Preparing to unpack .../23-python-pkg-resources_39.0.1-2_all.deb ...
Unpacking python-pkg-resources (39.0.1-2) ...
Selecting previously unselected package python-pyinotify.
Preparing to unpack .../24-python-pyinotify_0.9.6-1_all.deb ...
Unpacking python-pyinotify (0.9.6-1) ...
Selecting previously unselected package python-simplejson.
Preparing to unpack .../25-python-simplejson_3.13.2-1_amd64.deb ...
Unpacking python-simplejson (3.13.2-1) ...
Selecting previously unselected package python3-olefile.
Preparing to unpack .../26-python3-olefile_0.45.1-1_all.deb ...
Unpacking python3-olefile (0.45.1-1) ...
Setting up python-idna (2.6-1) ...
Setting up python-simplejson (3.13.2-1) ...
Setting up libjs-jquery (3.2.1-1) ...

Setting up python-asn1crypto (0.24.0-1) ...
Setting up python3-pil:amd64 (5.1.0-1ubuntu0.7) ...
Setting up python-blinker (1.4+dfsg1-0.1) ...
Setting up python3-olefile (0.45.1-1) ...
Setting up python-colorama (0.3.7-1) ...
Setting up python-pkg-resources (39.0.1-2) ...
Setting up python-markupsafe (1.0-1build1) ...
Setting up python-werkzeug (0.14.1+dfsg1-1ubuntu0.1) ...
Setting up python-pyinotify (0.9.6-1) ...
Setting up python-cffi-backend (1.11.5-1) ...
Setting up python-six (1.11.0-2) ...
Setting up libopenslide0 (3.4.1+dfsg-2) ...
Setting up openslide-tools (3.4.1+dfsg-2) ...
Setting up python-enum34 (1.1.6-2) ...
Setting up javascript-common (11) ...
Setting up python-itsdangerous (0.24+dfsg1-2) ...
Setting up python-ipaddress (1.0.17-1) ...
Setting up python-jinja2 (2.10-1ubuntu0.18.04.1) ...
Setting up python-click (6.7-3) ...
Setting up python3-openslide (1.1.1-2ubuntu4) ...
Setting up python-cryptography (2.1.4-1ubuntu1.4) ...
Setting up python-flask (0.12.2-3ubuntu0.1) ...
Setting up python-openssl (17.5.0-1ubuntu1) ...
Setting up python-openslide-examples (1.1.1-2ubuntu4) ...
Processing triggers for man-db (2.8.3-2ubuntu0.1) ...
Processing triggers for libc-bin (2.27-3ubuntu1.5) ...
```

```
!python -m pip install -U SlideRunner
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting SlideRunner
  Downloading SlideRunner-2.0-py3-none-any.whl (511 kB)
     ██████████ | 511 kB 15.1 MB/s
```

```

Requirement already satisfied: shapely>=1.6.4 in /usr/local/lib/python3.7/dist-packages (from SlideRunner) (1.8.4)
Collecting PyQt5>=5.5.0
  Downloading PyQt5-5.15.7-cp37abi3-manylinux1_x86_64.whl (8.4 MB)
    |██████████| 8.4 MB 39.2 MB/s
Requirement already satisfied: matplotlib>=2.0.0 in /usr/local/lib/python3.7/dist-packages (from SlideRunner) (3.2.2)
Requirement already satisfied: numpy>=1.13 in /usr/local/lib/python3.7/dist-packages (from SlideRunner) (1.21.6)
Collecting rollbar>=0.14
  Downloading rollbar-0.16.3-py3-none-any.whl (98 kB)
    |██████████| 98 kB 5.5 MB/s
Collecting pydicom>=1.4.1
  Downloading pydicom-2.3.0-py3-none-any.whl (2.0 MB)
    |██████████| 2.0 MB 53.6 MB/s
Requirement already satisfied: openslide-python>=1.1.1 in /usr/lib/python3/dist-packages (from SlideRunner) (1.1.1)
Requirement already satisfied: opencv-python>=3.1.0 in /usr/local/lib/python3.7/dist-packages (from SlideRunner) (4.6.0.66)
Requirement already satisfied: pyparsing!=2.0.4,!>2.1.2,!>2.1.6,>=2.0.1 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=2.0.0->SlideRunner)
Requirement already satisfied: python-dateutil>=2.1 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=2.0.0->SlideRunner)
Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=2.0.0->SlideRunner) (0.1)
Requirement already satisfied: kiwisolver>=1.0.1 in /usr/local/lib/python3.7/dist-packages (from matplotlib>=2.0.0->SlideRunner)
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.7/dist-packages (from kiwisolver>=1.0.1->matplotlib>=2.0.0->SlideRunner)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.7/dist-packages (from python-dateutil>=2.1->matplotlib>=2.0.0->SlideRunner)
Requirement already satisfied: requests>=0.12.1 in /usr/local/lib/python3.7/dist-packages (from rollbar>=0.14->SlideRunner) (2.2)
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.7/dist-packages (from requests>=0.12.1->rollbar>=0.14)
Requirement already satisfied: urllib3!=1.25.0,!>1.25.1,<1.26,>=1.21.1 in /usr/local/lib/python3.7/dist-packages (from requests>=0.12.1->rollbar>=0.14)
Requirement already satisfied: chardet<4,>=3.0.2 in /usr/local/lib/python3.7/dist-packages (from requests>=0.12.1->rollbar>=0.14)
Requirement already satisfied: idna<3,>=2.5 in /usr/local/lib/python3.7/dist-packages (from requests>=0.12.1->rollbar>=0.14->SlideRunner)
Collecting PyQt5-Qt5>=5.15.0
  Downloading PyQt5_Qt5-5.15.2-py3-none-manylinux2014_x86_64.whl (59.9 MB)
    |██████████| 59.9 MB 1.2 MB/s
Collecting PyQt5-sip<13,>=12.11
  Downloading PyQt5_sip-12.11.0-cp37-cp37m-manylinux1_x86_64.whl (344 kB)
    |██████████| 344 kB 58.0 MB/s
Installing collected packages: PyQt5-sip, PyQt5-Qt5, rollbar, pyqt5, pydicom, SlideRunner
Successfully installed PyQt5-Qt5-5.15.2 PyQt5-sip-12.11.0 SlideRunner-2.0 pydicom-2.3.0 pyqt5-5.15.7 rollbar-0.16.3

```

▼ Published Canine Data

Use the **MEL sqlite db** from the published canine paper to look at some annotated image patches from for example, canine slide #2:

```

# set path to local canine data:
path_can = 'drive/MyDrive/sam/code/dat/'

# load published MEL sqlite db:
from SlideRunner.dataAccess.database import Database

DB = Database().open(path_can + 'annot/MITOS_WSI_CMC_MEL.sqlite')

# look at canine slide #2/21, which is the first WSI in the published train set:
slideid = DB.findSlideWithFilename(path_can + 'WSI/a8773be388e12df89edd.svs','')
DB.loadIntoMemory(slideid)

# according to the paper, slide #2 should have 64 MF, 204 MLF annotations in the
# MEL sqlite db (total of 268 annotations):
print(len(DB.annotations))

```

268

```

# load slide #2 & look at some of the annotated patches
import openslide
import matplotlib.pyplot as plt
import numpy as np

slide = openslide.open_slide(path_can + 'WSI/a8773be388e12df89edd.svs')

# show & store coordinates of slide #2 spot annotations, agreed label class, &
# annot. no.

# initialize:
ct = 0
spot_coord = 4          # spotAnnotations have pair of coord.

```

```

cols = list(range(spot_coord + 2))      # 1 col. for annot. no. (uid) &
                                         # 1 col. for agreedClass
coord = np.zeros((len(DB.annotations), len(cols)), dtype=int)

d_items = DB.annotations.items()
for item in d_items:
    annot_no = item[0]
    xy_pair = item[1].coordinates
    x1 = xy_pair[0][0]
    x2 = xy_pair[1][0]
    y1 = xy_pair[0][1]
    y2 = xy_pair[1][1]
    cl = item[1].agreedClass
    print(f'annot no.: {annot_no:5d} \t'
          f'annot coords: {xy_pair[0]} {xy_pair[1]}\t'
          f'\Deltax: {x1 - x2}\t'
          f'\Deltay: {y1 - y2}\t'
          f'class: {cl}')

# store annot. values:
coord[ct, :] = [annot_no, x1, x2, y1, y2, cl]
ct += 1

```

annot no..	annot coords.	Δx	Δy	class
1419	[9321 41507] [9371 41557]	-50	-50	1
1420	[34250 41922] [34300 41972]	-50	-50	1
1421	[34180 41964] [34230 42014]	-50	-50	1
1422	[36961 42161] [37011 42211]	-50	-50	1
1423	[9424 42308] [9474 42358]	-50	-50	1
1424	[10048 42240] [10098 42290]	-50	-50	1
1425	[36105 42683] [36155 42733]	-50	-50	1
1426	[36667 42341] [36717 42391]	-50	-50	1
1427	[33335 44010] [33385 44060]	-50	-50	1
1428	[34028 44548] [34078 44598]	-50	-50	1
1429	[34630 52049] [34680 52099]	-50	-50	2
1430	[24266 52465] [24316 52515]	-50	-50	1
1431	[29506 53381] [29556 53431]	-50	-50	1
1432	[29703 53364] [29753 53414]	-50	-50	1
1433	[29532 53491] [29582 53541]	-50	-50	1
1434	[29623 53333] [29673 53383]	-50	-50	1
1435	[30444 53421] [30494 53471]	-50	-50	1
1436	[29659 54665] [29709 54715]	-50	-50	1
30096	[10458 36877] [10508 36927]	-50	-50	1
30097	[10616 36818] [10666 36868]	-50	-50	1
30098	[11090 36396] [11140 36446]	-50	-50	1
30099	[7632 38198] [7682 38248]	-50	-50	1
30100	[9854 38102] [9904 38152]	-50	-50	1
30101	[23197 37818] [23247 37868]	-50	-50	1
30102	[41439 38402] [41489 38452]	-50	-50	1
30103	[9113 38788] [9163 38838]	-50	-50	1
30104	[13148 38842] [13198 38892]	-50	-50	1
30105	[37694 38850] [37744 38900]	-50	-50	1
30106	[37372 38669] [37422 38719]	-50	-50	1
30107	[37363 39928] [37413 39978]	-50	-50	1
30108	[23753 40426] [23803 40476]	-50	-50	1
30109	[25280 40097] [25330 40147]	-50	-50	2
30110	[39110 40692] [39160 40742]	-50	-50	1
30111	[9296 41632] [9346 41682]	-50	-50	1
30112	[10680 42218] [10730 42268]	-50	-50	1
30113	[34724 41678] [34774 41728]	-50	-50	1
30114	[34861 41757] [34911 41807]	-50	-50	1
30115	[9373 42409] [9423 42459]	-50	-50	1
30116	[35599 43000] [35649 43050]	-50	-50	1
30117	[34692 43403] [34742 43453]	-50	-50	1
30118	[34834 43737] [34884 43787]	-50	-50	1
30119	[36816 43727] [36866 43777]	-50	-50	2
30120	[35794 43978] [35844 44028]	-50	-50	1
30121	[36056 44008] [36106 44058]	-50	-50	1
30122	[35558 43796] [35608 43846]	-50	-50	1
30123	[36727 43865] [36777 43915]	-50	-50	1
30124	[33845 46229] [33895 46279]	-50	-50	1
30125	[33646 46447] [33696 46497]	-50	-50	1
30126	[36263 46312] [36313 46362]	-50	-50	1
30127	[36187 47489] [36237 47539]	-50	-50	1
30128	[32443 48784] [32493 48834]	-50	-50	2
30129	[32771 48806] [32821 48856]	-50	-50	2
30130	[30356 49682] [30406 49732]	-50	-50	1
30131	[37540 49737] [37590 49787]	-50	-50	1
30132	[27266 51935] [27316 51985]	-50	-50	1

```
annot no.: 30133      annot coords: [28391 52753] [28441 52803]      Δx: -50 Δy: -50 class: 1
annot no.: 30134      annot coords: [29243 54443] [29293 54493]      Δx: -50 Δy: -50 class: 1
```

```
# append center annotation coordinates (xc, yc) to coord:
```

```
# initialize
cols_zeros = np.zeros((len(DB.annotations), 2), dtype=int)
coord = np.append(coord, cols_zeros, axis=1)

# add mean coord. (xc,yc) to coord:
for i in range(len(DB.annotations)):
    coord[i,6] = int((coord[i,1] + coord[i,2])/2)    # stores xc in col 6
    coord[i,7] = int((coord[i,3] + coord[i,4])/2)    # stores yc in col 7

print(coord)
```

```
[[ 1 21004 21054 ... 1 21029 7246]
 [ 2 21005 21055 ... 1 21030 7305]
 [ 3 20353 20403 ... 1 20378 6976]
 ...
 [30132 27266 27316 ... 1 27291 51960]
 [30133 28391 28441 ... 1 28416 52778]
 [30134 29243 29293 ... 1 29268 54468]]
```

```
# sort coord row indices by agreedLabel:
```

```
cl_sort_idx = coord[:,5].argsort()
print(cl_sort_idx)
```

```
[ 0 172 174 175 176 178 180 181 182 183 184 185 171 186 189 190 191 192
 193 194 195 196 197 200 202 187 170 169 168 121 122 126 128 130 131 266
 136 139 144 145 146 148 151 152 153 154 155 161 162 163 164 165 166 167
 203 204 205 206 237 238 239 240 241 243 244 245 246 247 248 249 250 251
 253 254 255 256 257 258 259 260 263 264 265 236 120 235 233 207 208 209
 210 211 212 213 214 215 216 217 218 219 220 222 223 224 225 226 227 228
 229 230 231 232 234 119 267 67 75 42 41 78 40 79 80 81 39 38
 83 84 37 36 87 35 34 33 32 74 73 43 44 54 55 56 58 59
 50 60 49 48 53 61 63 47 65 46 114 68 69 45 70 62 93 31
 29 11 10 105 9 106 8 7 108 30 6 5 4 111 112 113 3 2
 1 109 13 12 14 28 27 26 25 95 96 24 23 103 21 22 20 19
 18 102 17 16 15 52 261 262 221 51 252 242 115 201 149 99 147 100
 101 143 142 141 140 138 137 104 135 134 132 107 129 127 125 124 123 110
 118 117 116 150 57 98 94 199 198 64 66 188 71 72 76 77 179 177
 173 82 85 86 88 89 90 91 92 160 159 158 157 156 97 133]
```

```
# reorder coord rows by cl_sort_idx:
```

```
coord_sort = coord[cl_sort_idx]
print(coord_sort)
```

```
[[ 1 21004 21054 ... 1 21029 7246]
 [ 1378 12395 12445 ... 1 12420 28597]
 [ 1380 28382 28432 ... 1 28407 29819]
 ...
 [ 168 33082 33132 ... 2 33107 50474]
 [ 102 10885 10935 ... 2 10910 35820]
 [ 143 37747 37797 ... 2 37772 39661]]
```

```
# count no. MLFs (agreedClass = 1) & MFs (agreedClass = 2) on slide #2:
```

```
mlf = 0
mf = 0
```

```
for i in range(len(DB.annotations)):
    if coord_sort[i,5] == 1:
        mlf += 1
    else:
        mf += 1
```

```
print(f'No. MLFs on slide: {mlf}\n'
      f'No. MFs on slide: {mf}'
```

```
No. MLFs on slide: 204
No. MFs on slide: 64
```

```
# look at some MLFs:
```

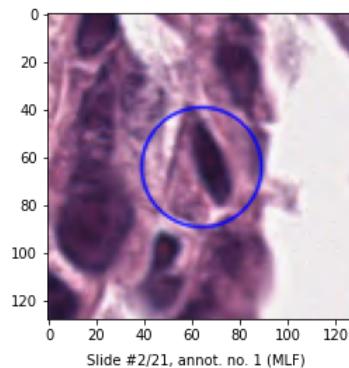
```
from SlideRunner.dataAccess.annotations import ViewingProfile

num_slides = 100
pix_dim = 128    # fig dim (pixels)

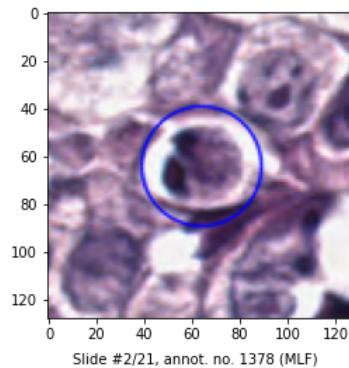
for i in range(num_slides):
    lu = ((coord_sort[i,6] - int(pix_dim/2)),
          (coord_sort[i,7] - int(pix_dim/2)))
    img = np.array(slide.read_region(lu, 0, [pix_dim, pix_dim]))[:, :, 0:4]
    DB.annotations[coord_sort[i,0]].draw(image=img, leftUpper=lu, zoomLevel=1., thickness=1, vp=ViewingProfile())
    caption = f'Slide #2/21, annot. no. {coord_sort[i,0]} (MLF)'

    plt.figure(figsize=(4,4))
    plt.imshow(img)
    plt.figtext(0.5, 0.01, caption, wrap=False, horizontalalignment='center', fontsize=10)
    plt.show()
```

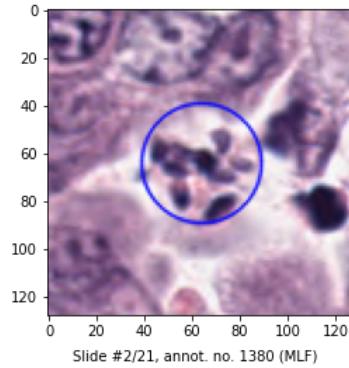
⟳



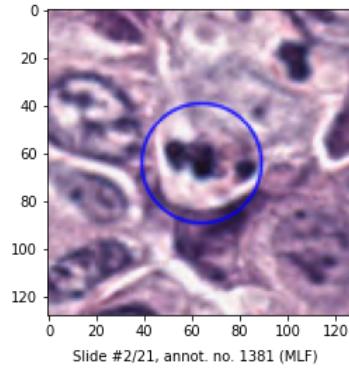
Slide #2/21, annot. no. 1 (MLF)



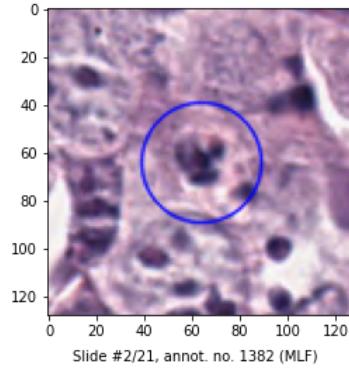
Slide #2/21, annot. no. 1378 (MLF)



Slide #2/21, annot. no. 1380 (MLF)

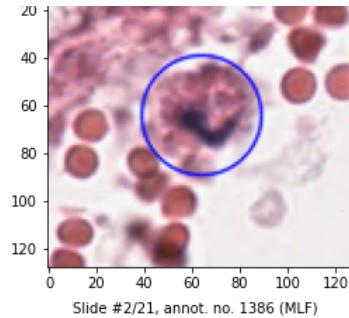


Slide #2/21, annot. no. 1381 (MLF)

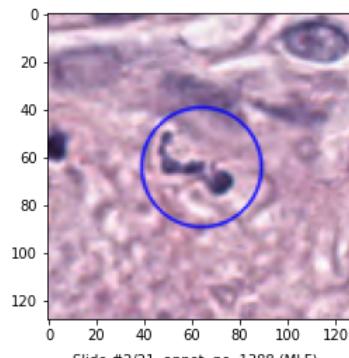


Slide #2/21, annot. no. 1382 (MLF)

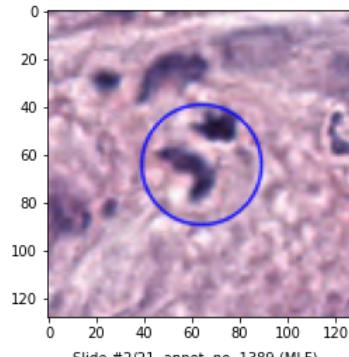




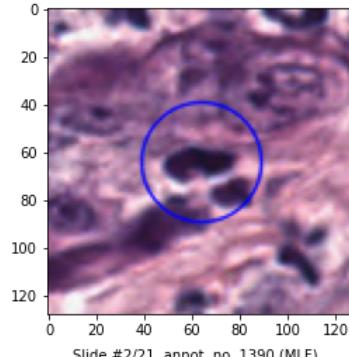
Slide #2/21, annot. no. 1386 (MLF)



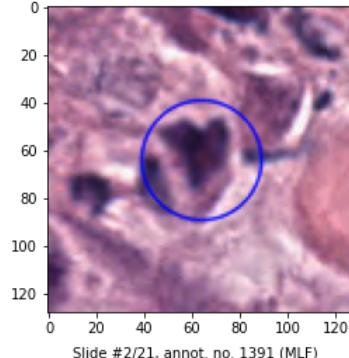
Slide #2/21, annot. no. 1388 (MLF)



Slide #2/21, annot. no. 1389 (MLF)

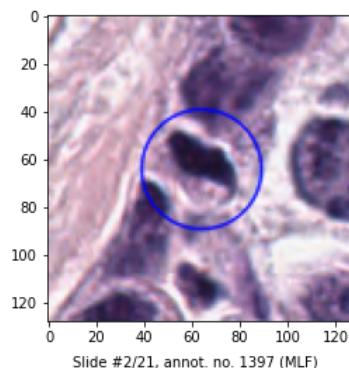
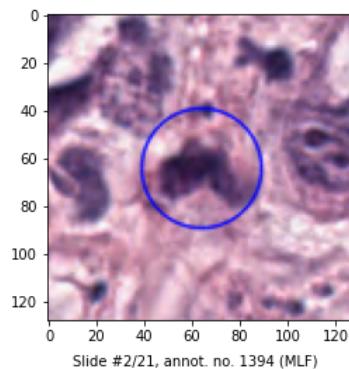
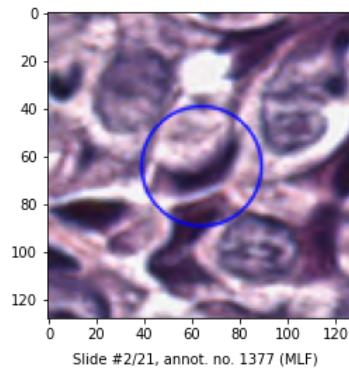
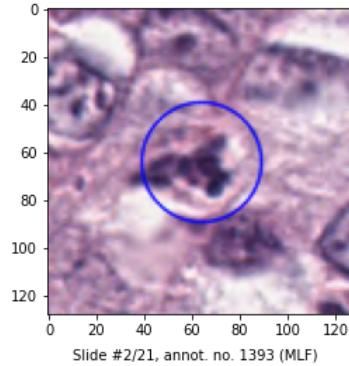
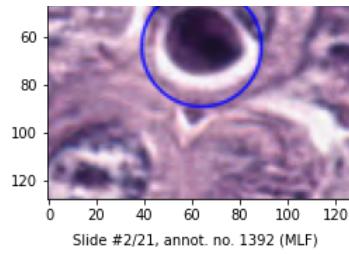


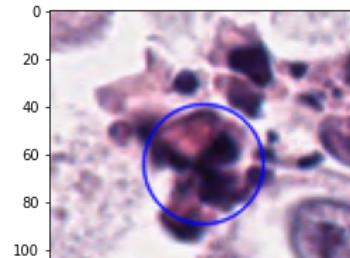
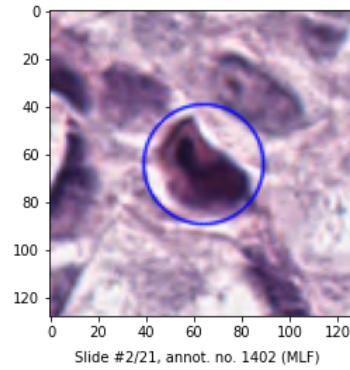
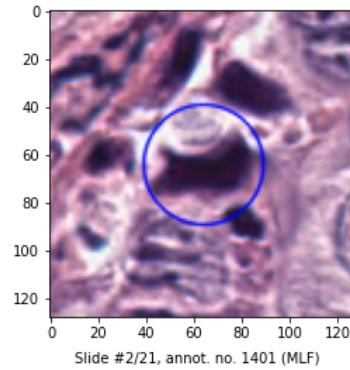
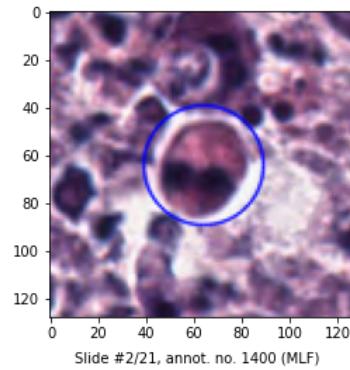
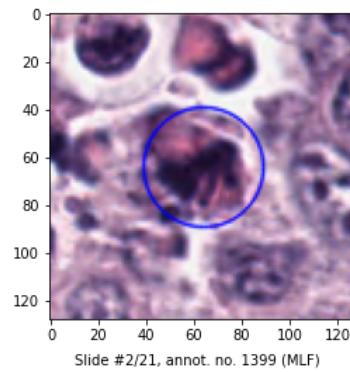
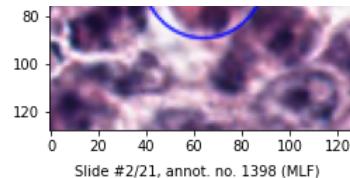
Slide #2/21, annot. no. 1390 (MLF)

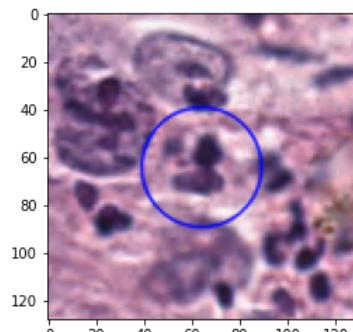
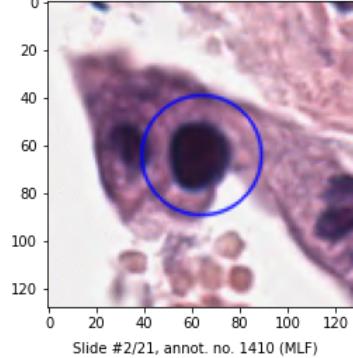
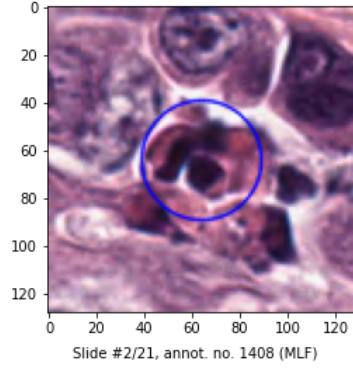
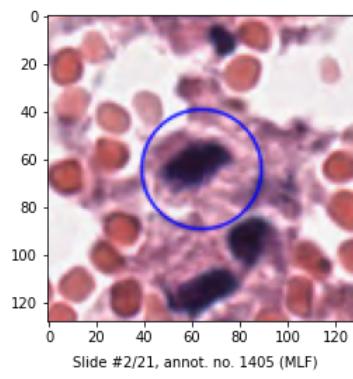
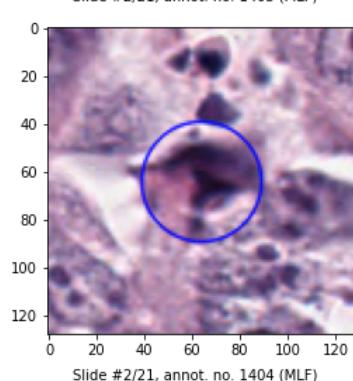
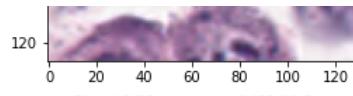


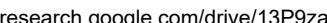
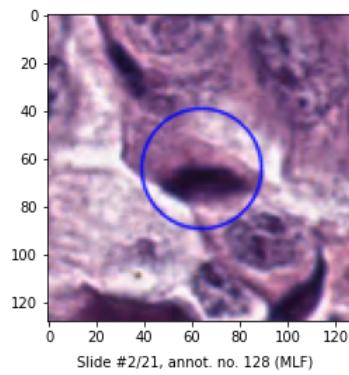
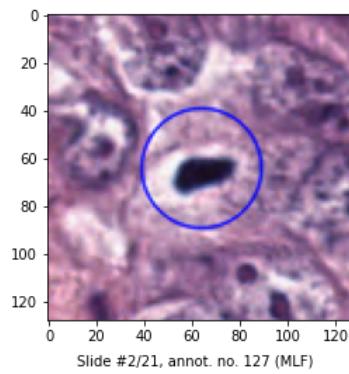
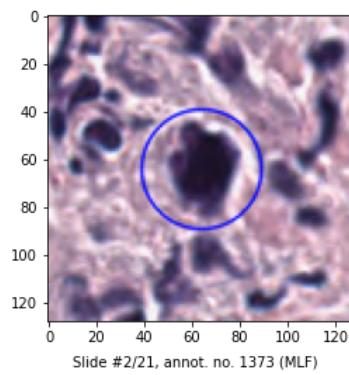
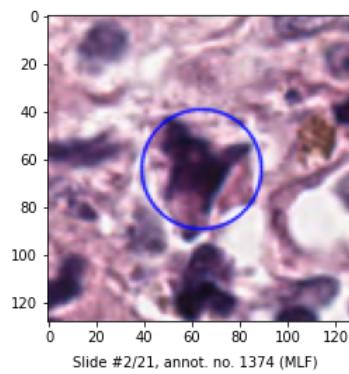
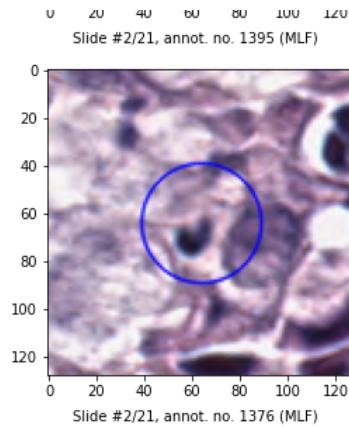
Slide #2/21, annot. no. 1391 (MLF)

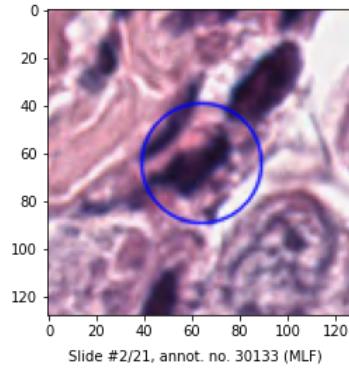
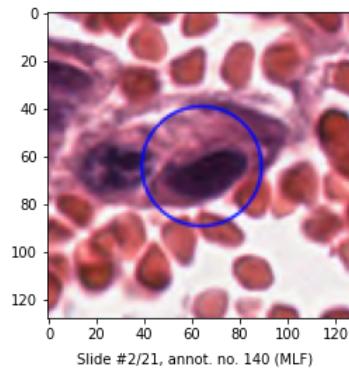
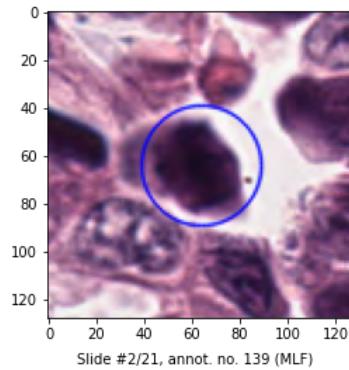
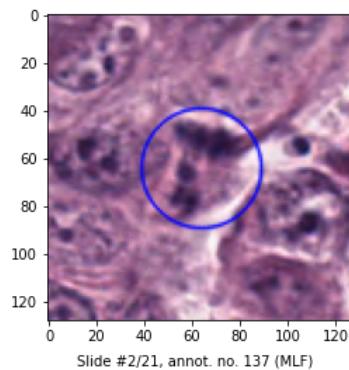
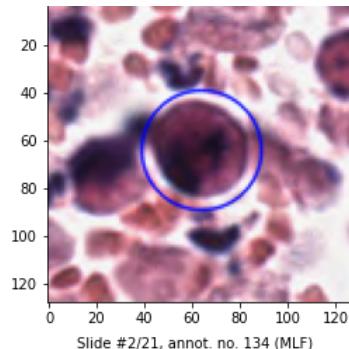


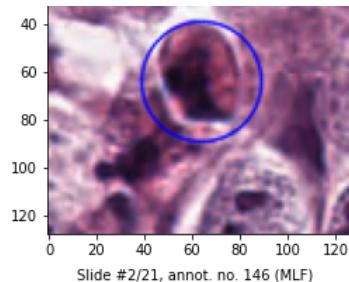




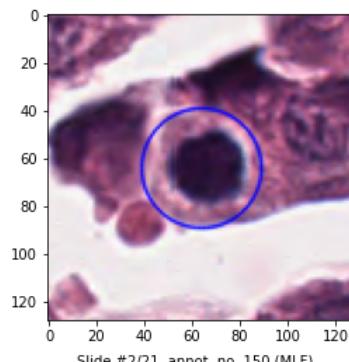




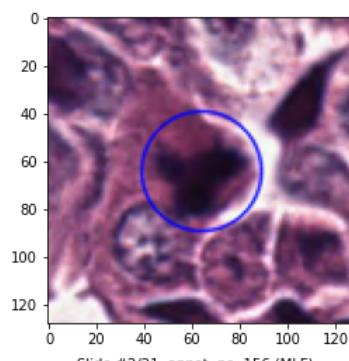




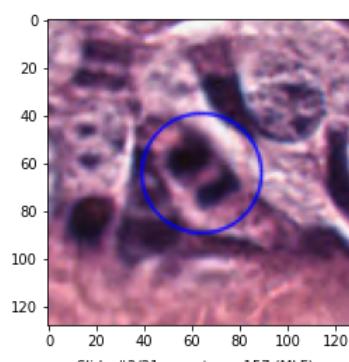
Slide #2/21, annot. no. 146 (MLF)



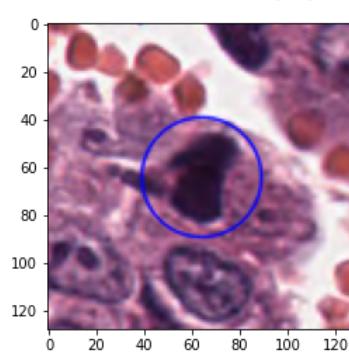
Slide #2/21, annot. no. 150 (MLF)



Slide #2/21, annot. no. 156 (MLF)

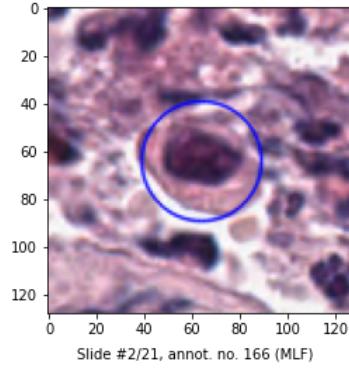
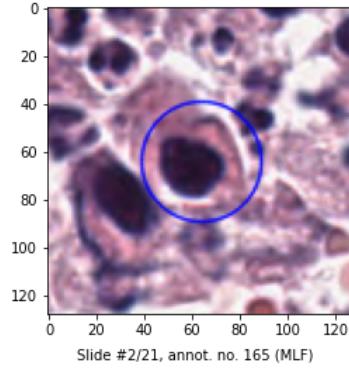
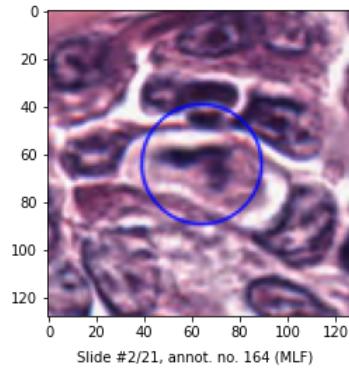
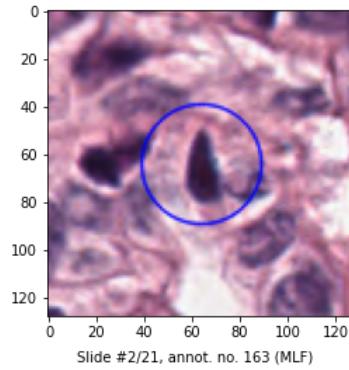
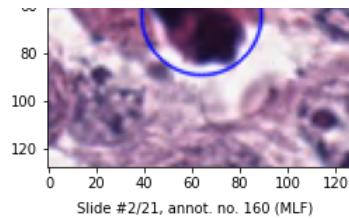


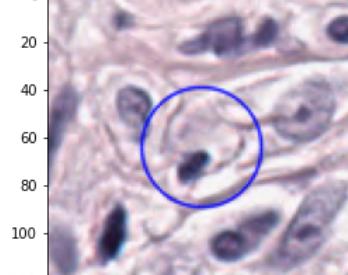
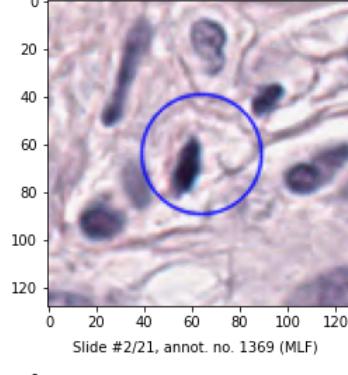
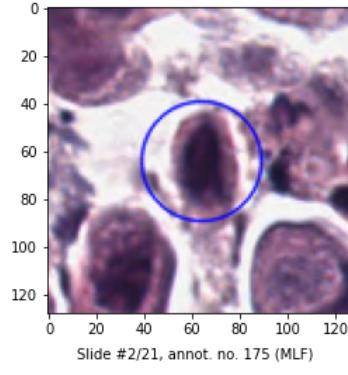
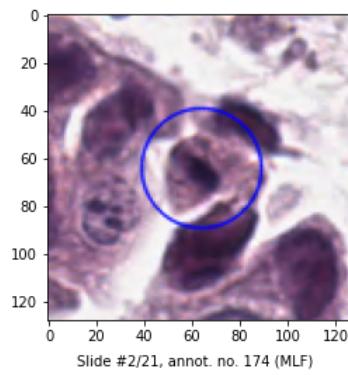
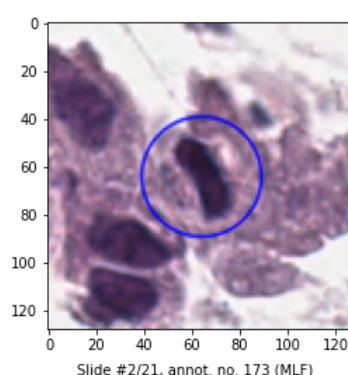
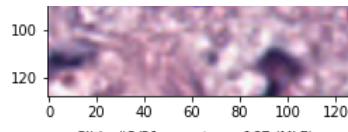
Slide #2/21, annot. no. 157 (MLF)

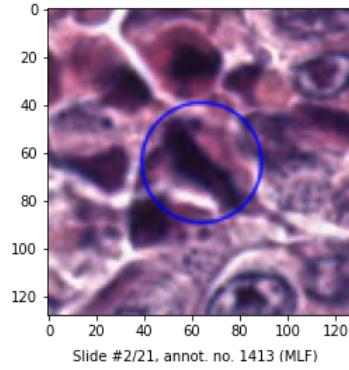
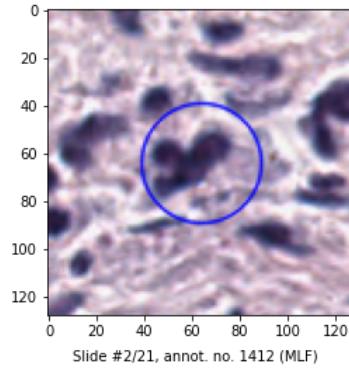
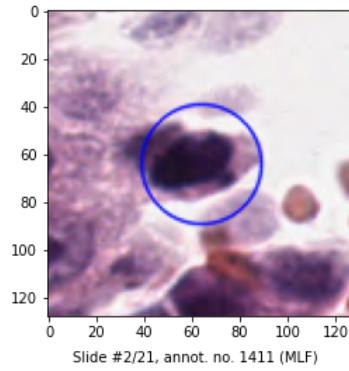
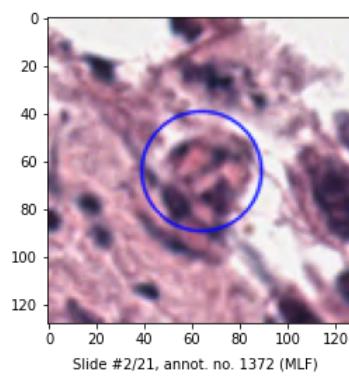
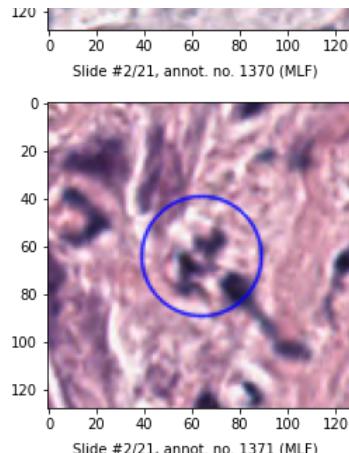


Slide #2/21, annot. no. 158 (MLF)

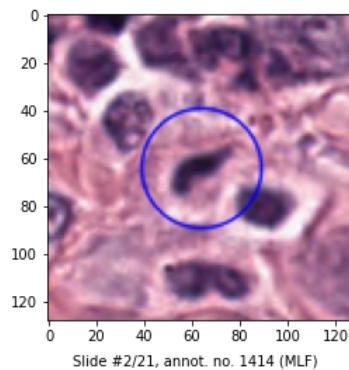




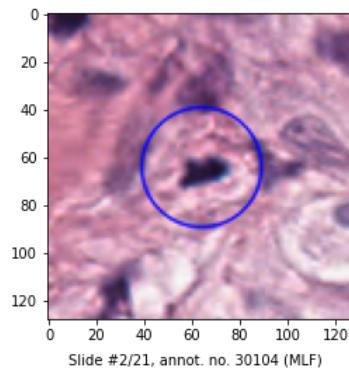




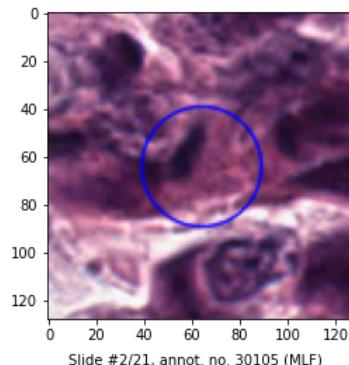
Slide #2/21, annot. no. 1413 (MLF)



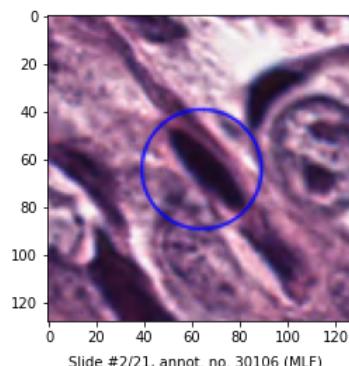
Slide #2/21, annot. no. 1414 (MLF)



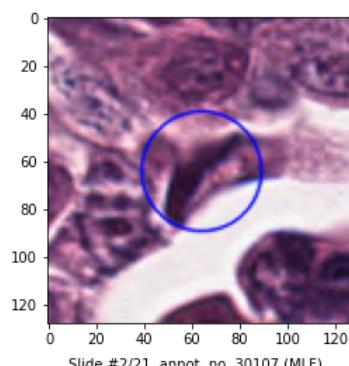
Slide #2/21, annot. no. 30104 (MLF)



Slide #2/21, annot. no. 30105 (MLF)

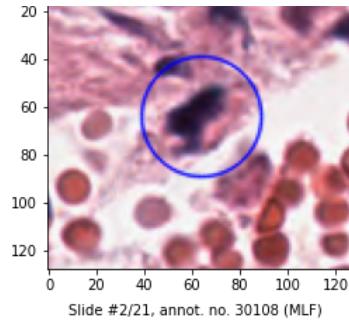


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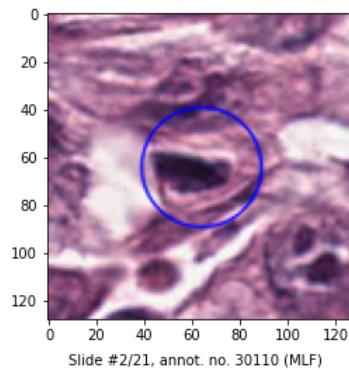


Slide #2/21, annot. no. 30107 (MLF)

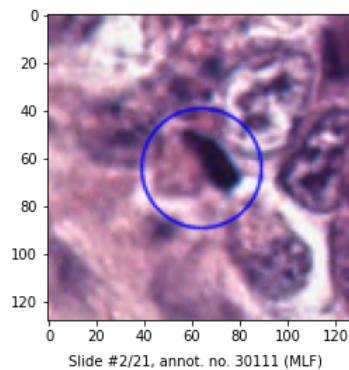




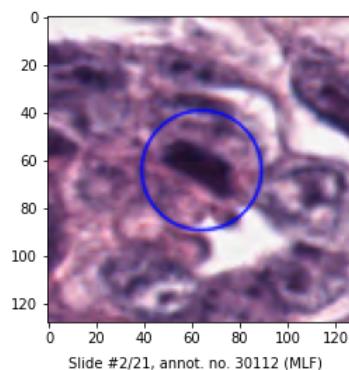
Slide #2/21, annot. no. 30108 (MLF)



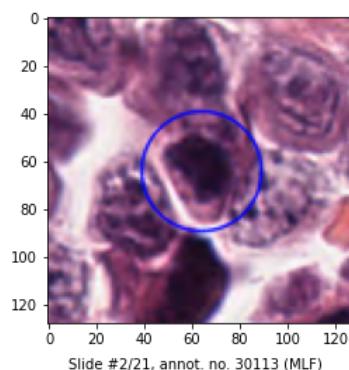
Slide #2/21, annot. no. 30110 (MLF)



Slide #2/21, annot. no. 30111 (MLF)

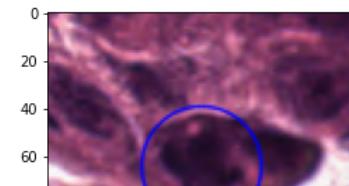
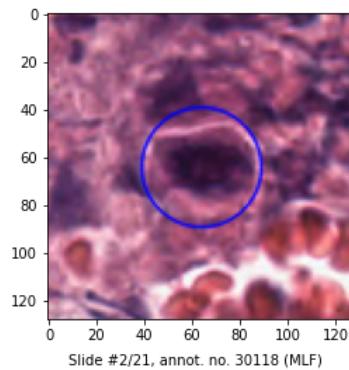
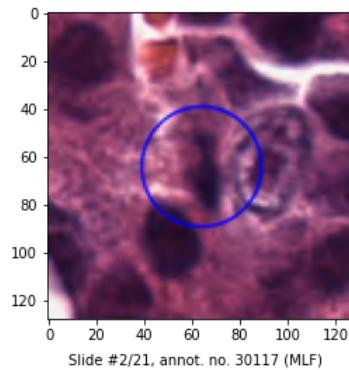
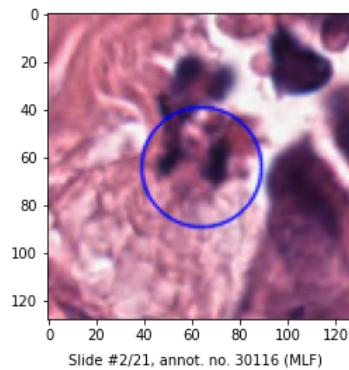
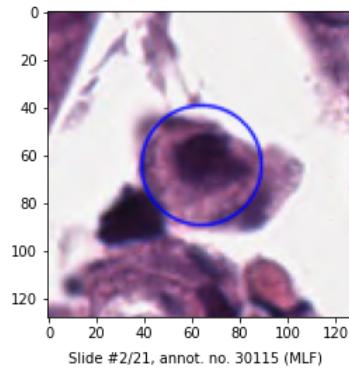
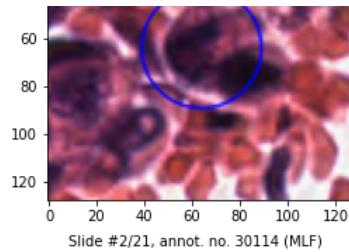


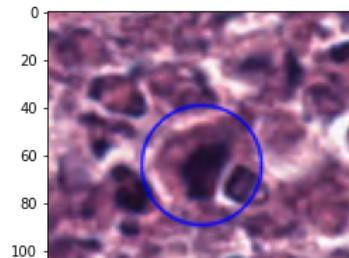
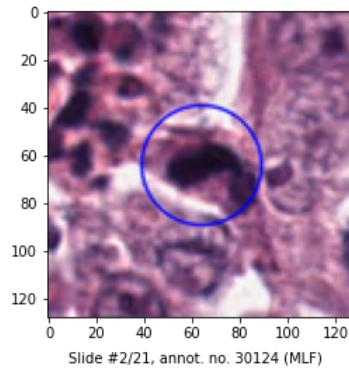
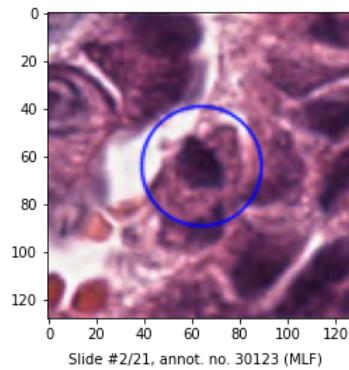
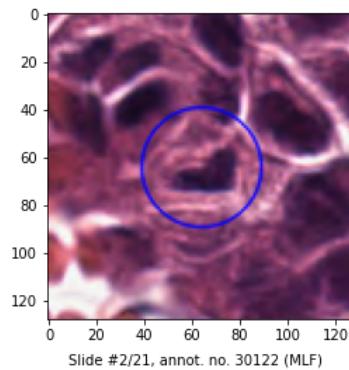
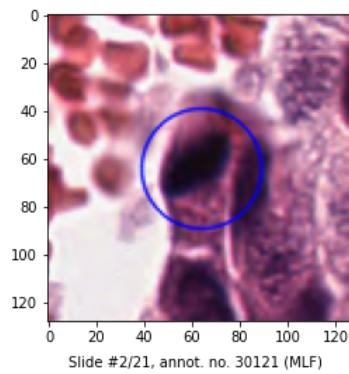
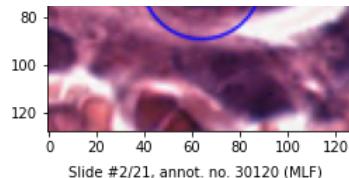
Slide #2/21, annot. no. 30112 (MLF)

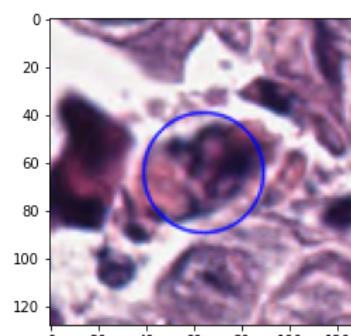
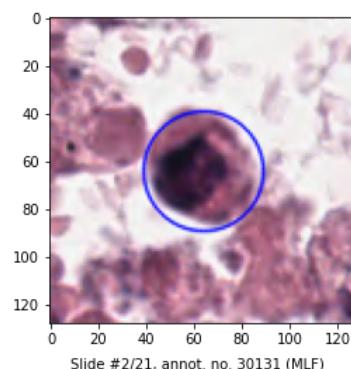
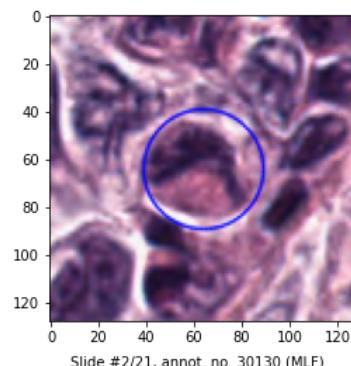
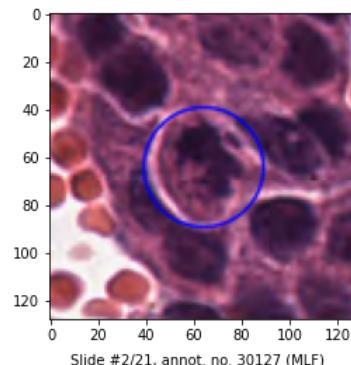
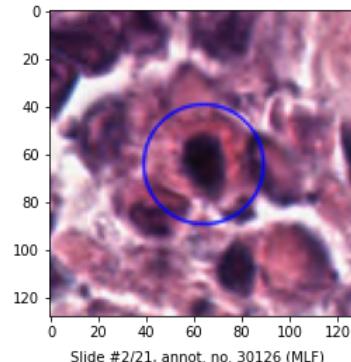
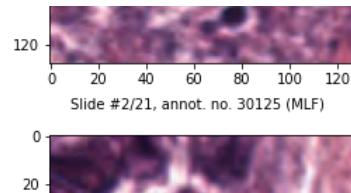


Slide #2/21, annot. no. 30113 (MLF)



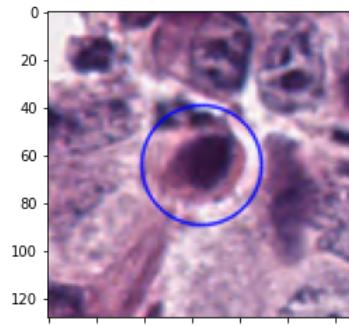




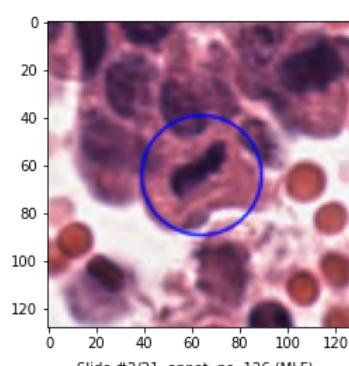


0 20 40 60 80 100 120

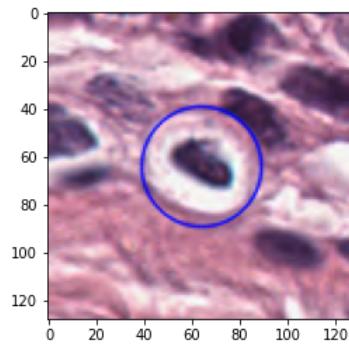
Slide #2/21, annot. no. 30132 (MLF)



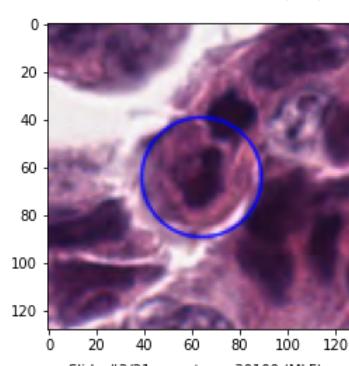
Slide #2/21, annot. no. 30103 (MLF)



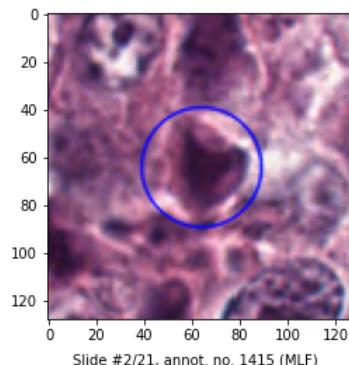
Slide #2/21, annot. no. 126 (MLF)



Slide #2/21, annot. no. 30102 (MLF)

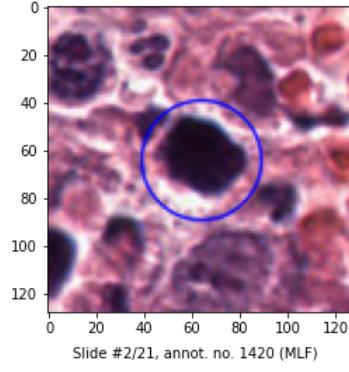
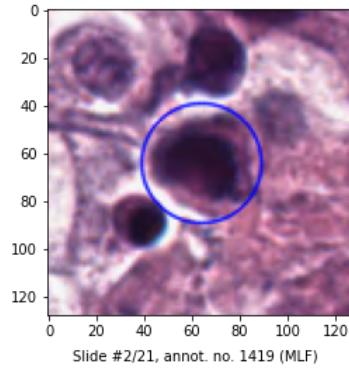
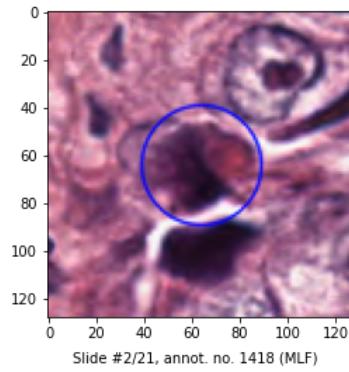
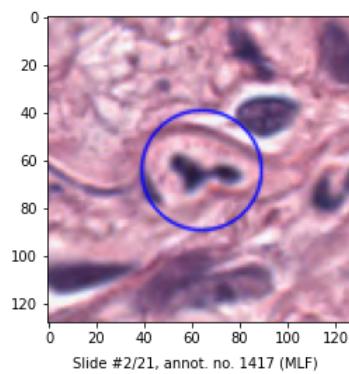
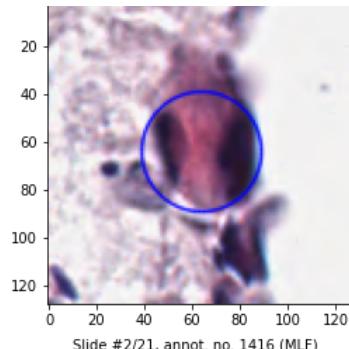


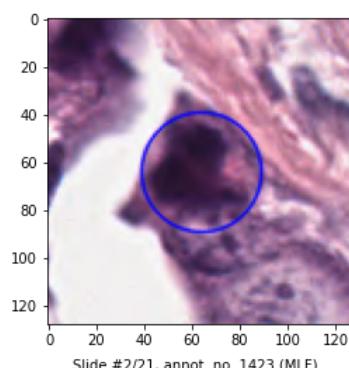
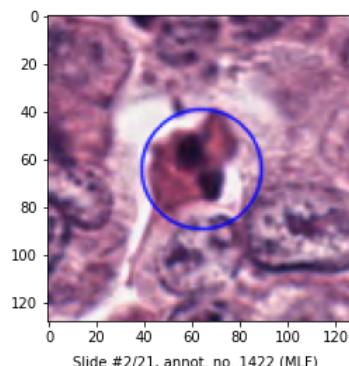
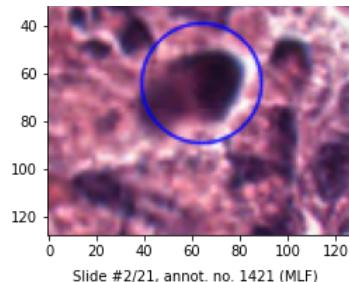
Slide #2/21, annot. no. 30100 (MLF)



Slide #2/21, annot. no. 1415 (MLF)

0 1





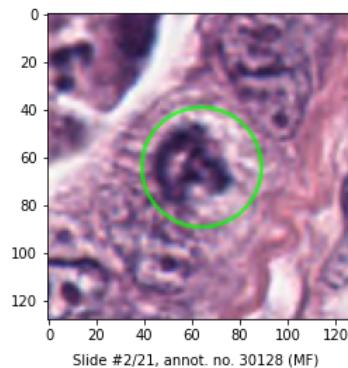
```
# show all 64 MFs for slide #2:

num_slides = mf
assert mf == len(DB.annotations) - mlf

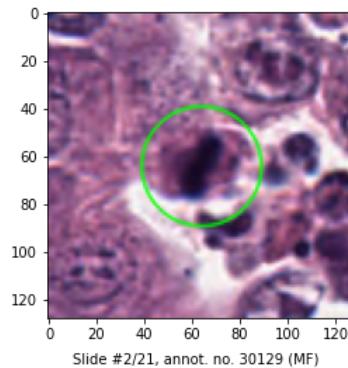
pix_dim = 128

for i in range(mlf, mlf+num_slides):
    lu = ((coord_sort[i,6] - int(pix_dim/2)),
          (coord_sort[i,7] - int(pix_dim/2)))
    img = np.array(slide.read_region(lu, 0, [pix_dim, pix_dim]))[:, :, 0:4]
    DB.annotations[coord_sort[i,0]].draw(image=img, leftUpper=lu, zoomLevel=1., thickness=1, vp=ViewingProfile())
    caption = f'Slide #2/21, annot. no. {coord_sort[i,0]} (MF)'

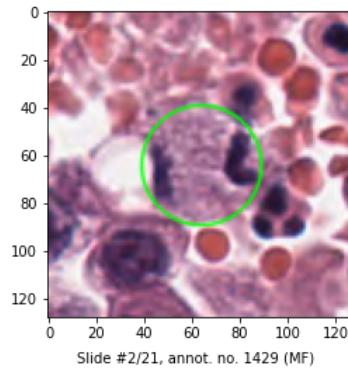
    plt.figure(figsize=(4,4))
    plt.imshow(img)
    plt.figtext(0.5, 0.01, caption, wrap=False, horizontalalignment='center', fontsize=10)
    plt.show()
```



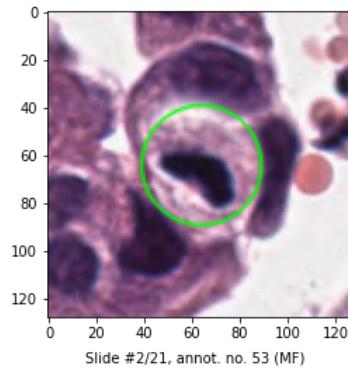
Slide #2/21, annot. no. 30128 (MF)



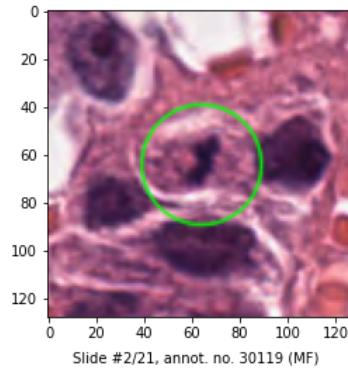
Slide #2/21, annot. no. 30129 (MF)



Slide #2/21, annot. no. 1429 (MF)

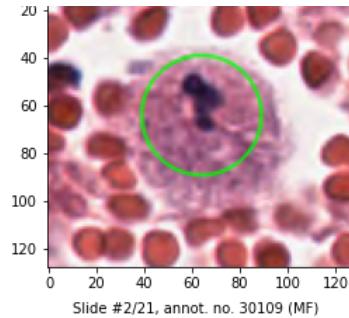


Slide #2/21, annot. no. 53 (MF)

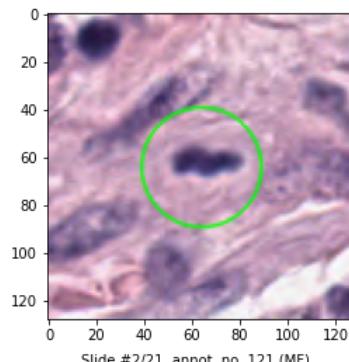


Slide #2/21, annot. no. 30119 (MF)

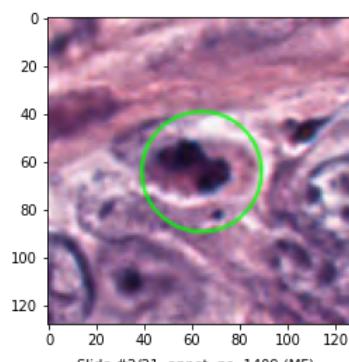




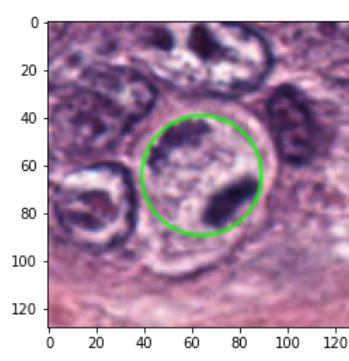
Slide #2/21, annot. no. 30109 (MF)



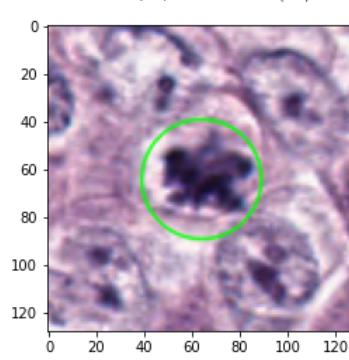
Slide #2/21, annot. no. 121 (MF)



Slide #2/21, annot. no. 1409 (MF)

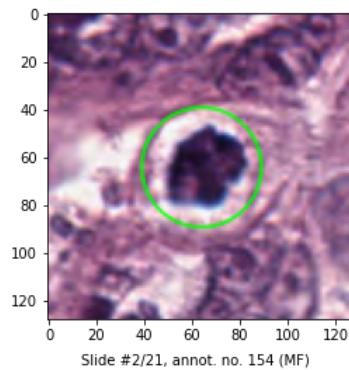
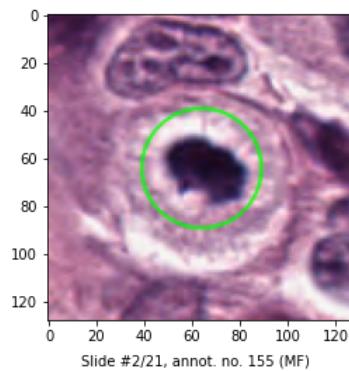
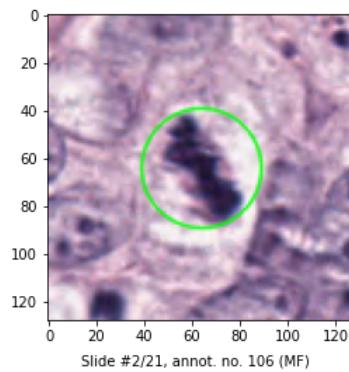
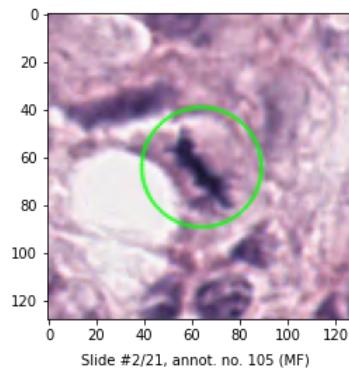
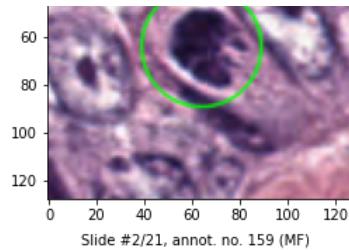


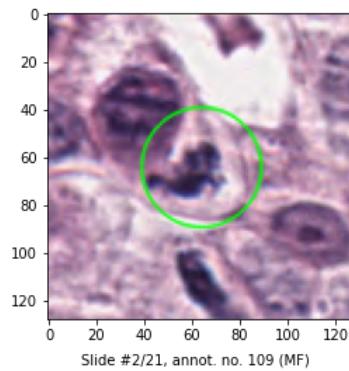
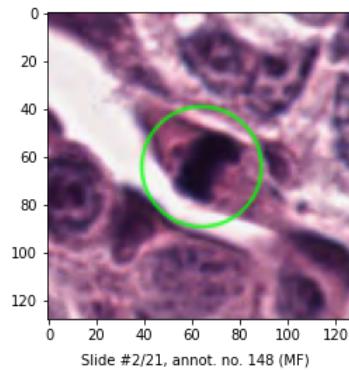
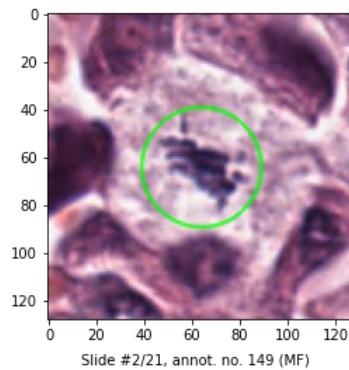
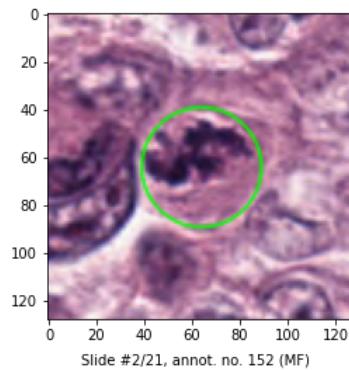
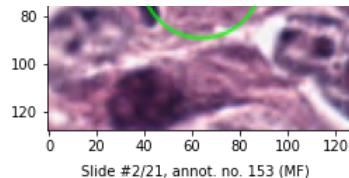
Slide #2/21, annot. no. 161 (MF)

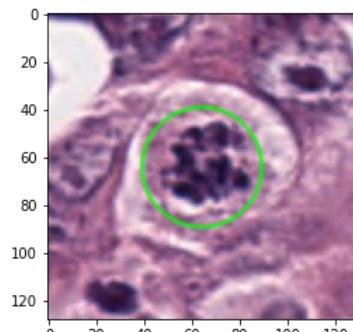
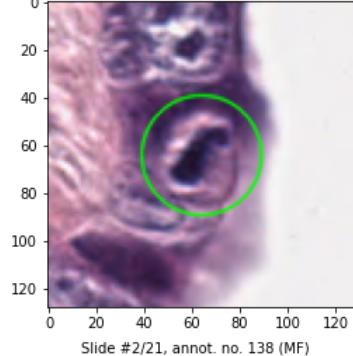
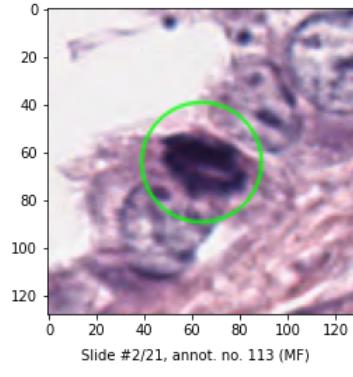
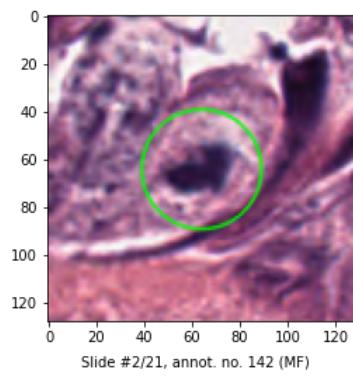
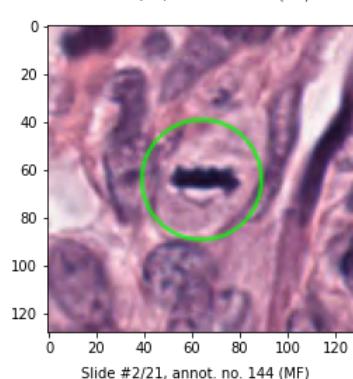
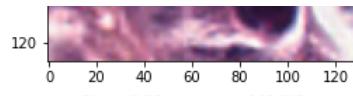


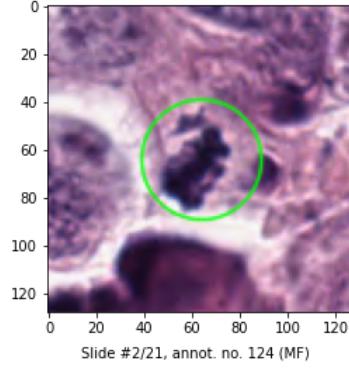
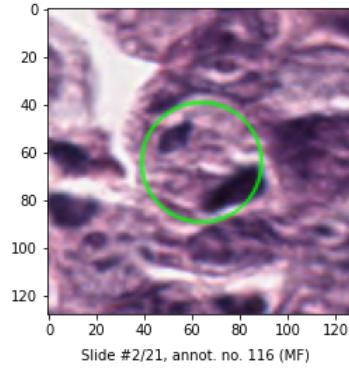
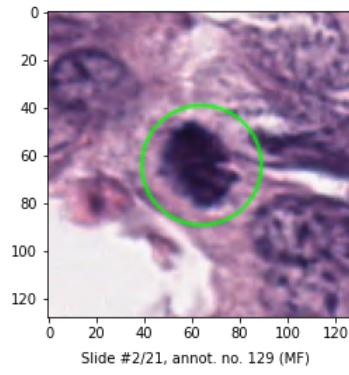
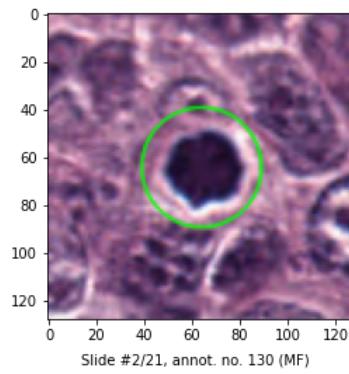
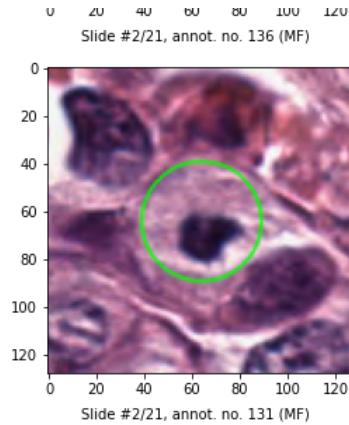
Slide #2/21, annot. no. 104 (MF)



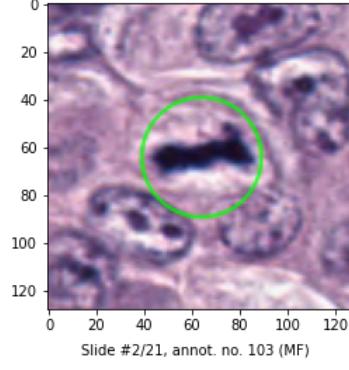
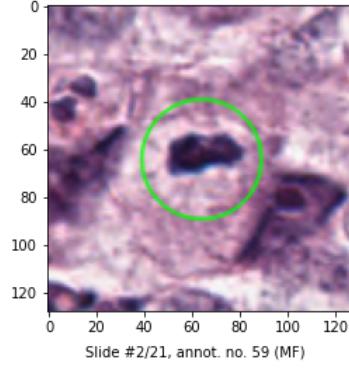
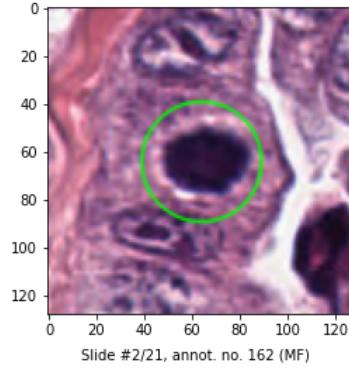
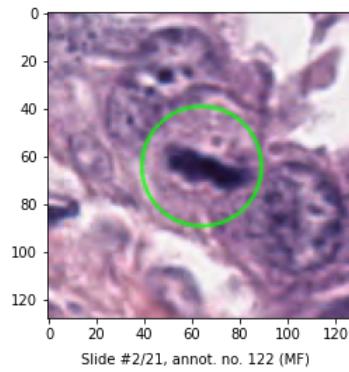
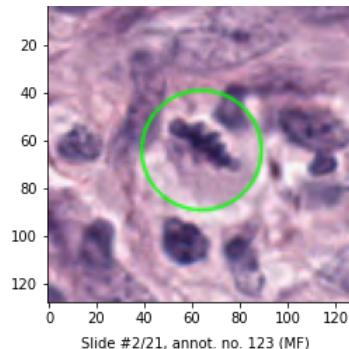


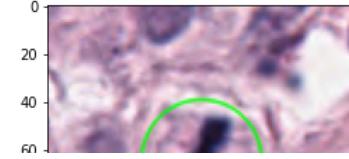
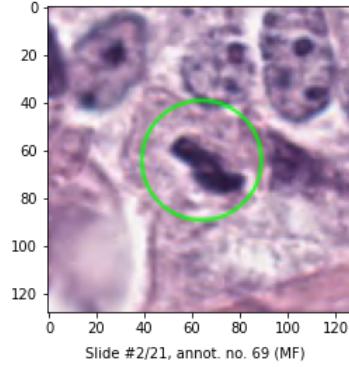
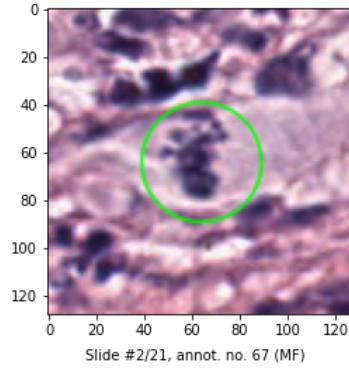
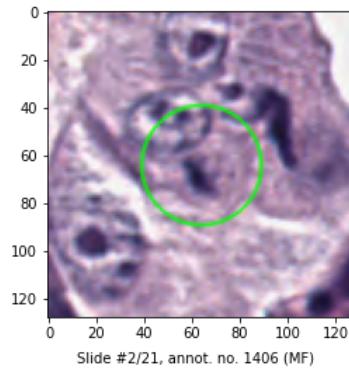
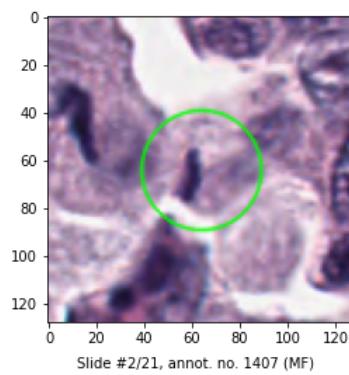
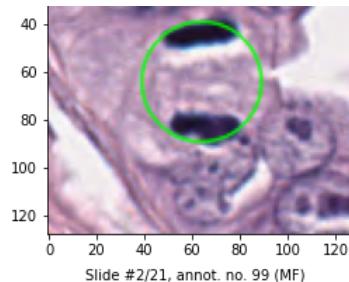


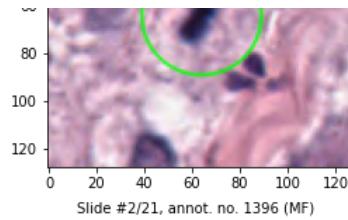




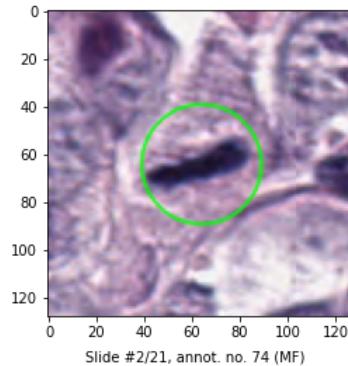
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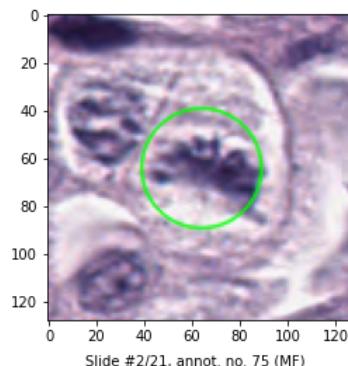




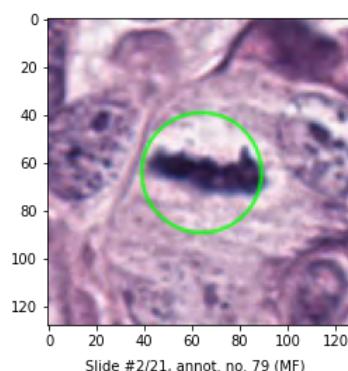
Slide #2/21, annot. no. 1396 (MF)



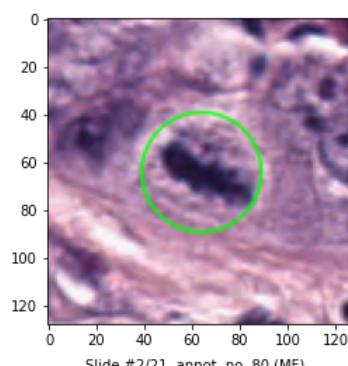
Slide #2/21, annot. no. 74 (MF)



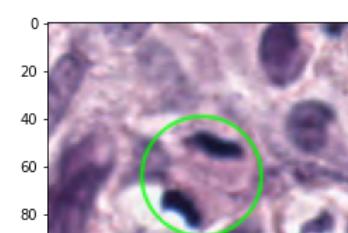
Slide #2/21, annot. no. 75 (MF)

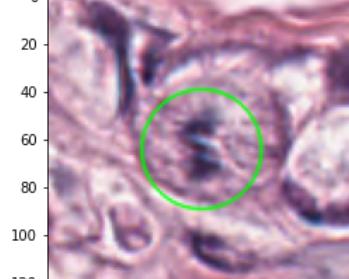
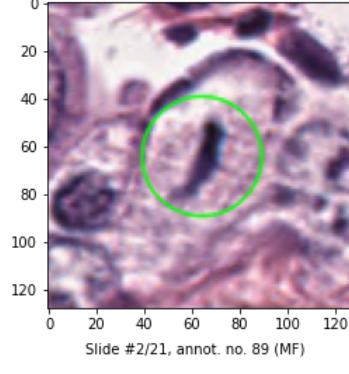
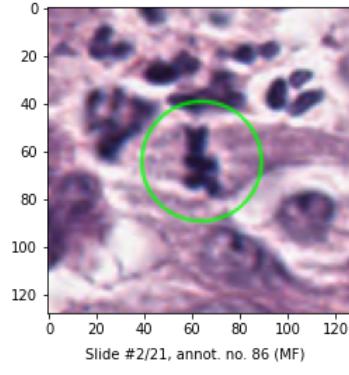
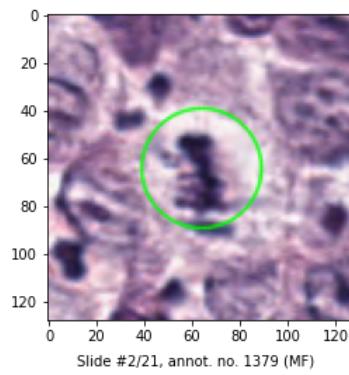
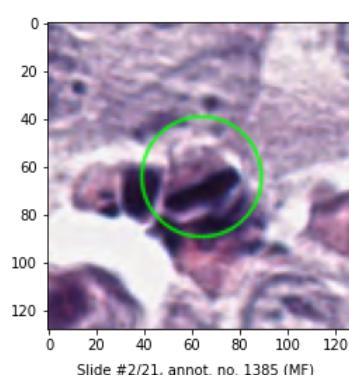
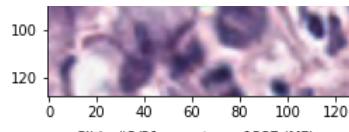


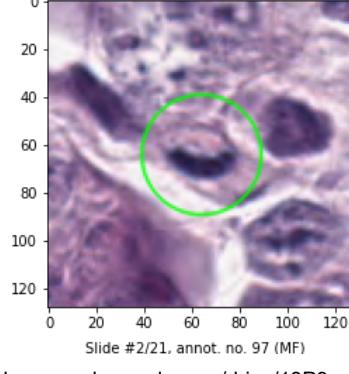
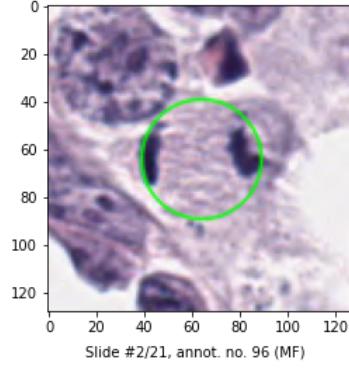
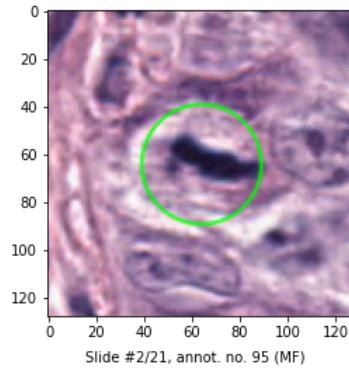
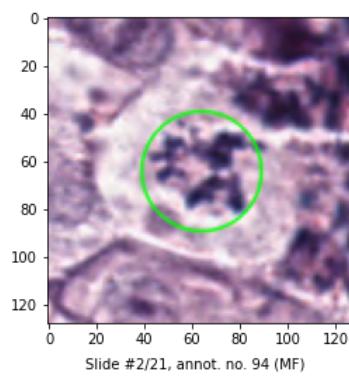
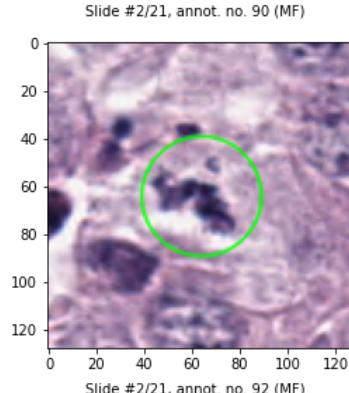
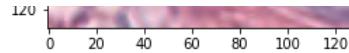
Slide #2/21, annot. no. 79 (MF)



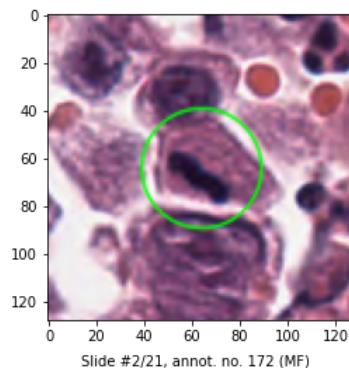
Slide #2/21, annot. no. 80 (MF)



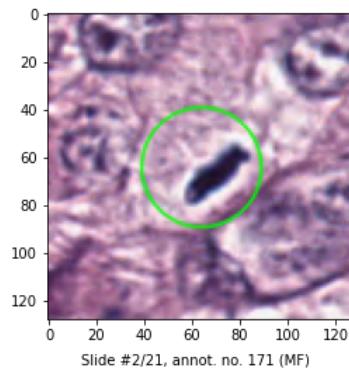




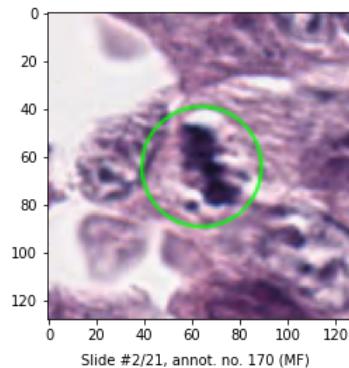
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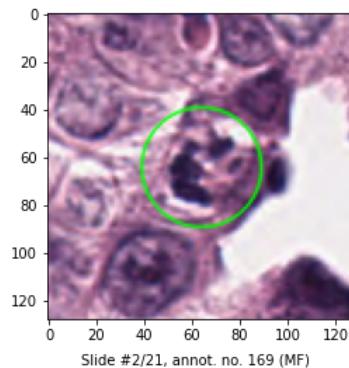
Slide #2/21, annot. no. 172 (MF)



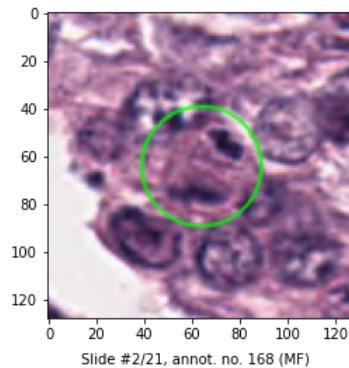
Slide #2/21, annot. no. 171 (MF)



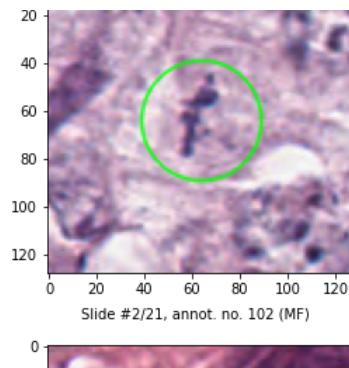
Slide #2/21, annot. no. 170 (MF)



Slide #2/21, annot. no. 169 (MF)



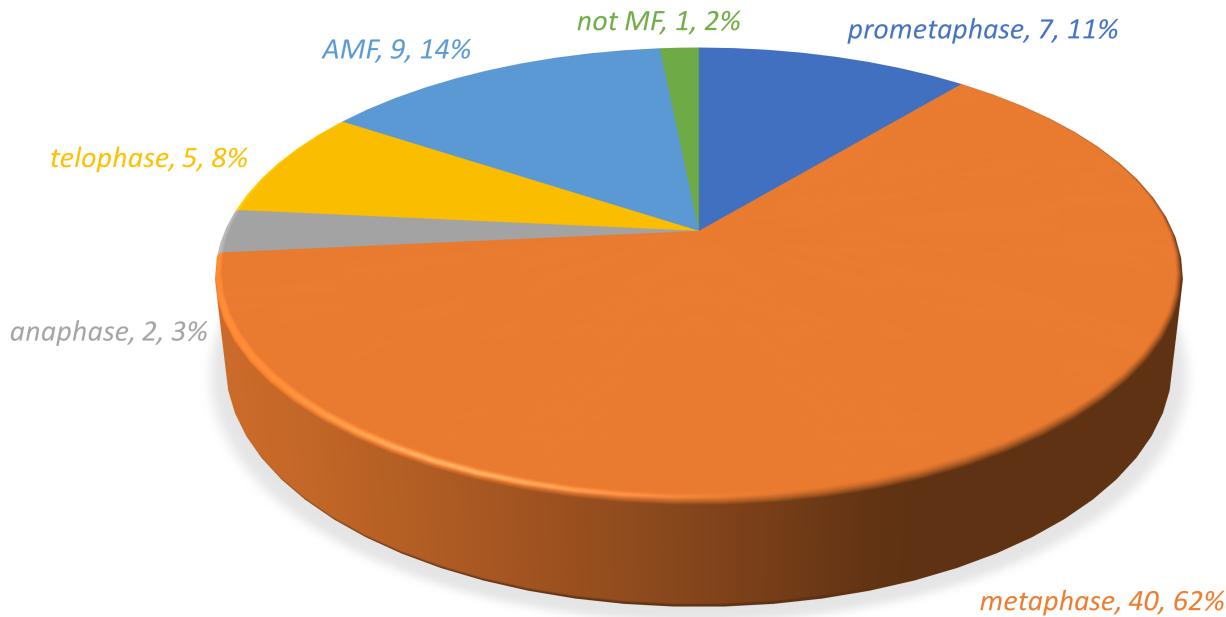
Slide #2/21, annot. no. 168 (MF)



▼ Analysis of mitotic-like figures (MLF, n=100), mitotic figures (MF, n=64):

- This notebook shows 100 of 204 images of MLFs w/ annot. at dim 128 x 128 px from Slide #2 in the published canine training set, as well as the images w/ annot. of all 64 MFs from that slide (total Slide #2 annot. = 268).
- While these images were not reviewed blinded, fsl was in agreement with almost all the MLF (100) and MF (64) labels assigned in the paper.
- To get an idea of how subclassable these mitotic figures are, as well as the distribution of subclasses (at least on this slide), all 64 Slide #2 MFs were reviewed and subclassified (unblinded). Overall, there was disagreement with only a single label (annot. no. 30109), which was felt to be more likely an MLF than MF. Results are summarized below:

Canine Slide #2 subclassing (fsl)								
Canine Slide	#2							
Slide Type	Training							
Date	10/2/2022							
Blinded	No							
Image size	128 x 128 px	figuresize=(4,4)	600 dpi M452dw					
agreedClass	MEL sqlite db							
#MFs (agreedClass=2)	64							
#Subclass groups chosen	5							
Class labels	prometaphase	metaphase	anaphase	telophase	AMF	not MF	total MFs	
(& observations/ subclassif. notes)		(incl. rosette forms)	(incl. early ana.)	(requires visible cleavage furrow)	(atypical mitotic figure: mostly non-sub-subtype-able (bizarre forms) > tri/multi-polar > asymmetric; no chromosome bridging/lagging examples seen)	disagreed with MF label (i.e., should have been MLF)		
count	7	40	2	5	9	1	64	
% of total	10.9%	62.5%	3.1%	7.8%	14.1%	1.6%	100.0%	

Subclassing of all mitotic figure annotations (#64) on canine slide #2

NB: chart slice labels show (subclass label, absolute count, % total)
Frederick Lee, MD (10/2/2022)

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✓ 54s completed at 9:21 AM

