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In[ ]:= (**Input identifying information**)

numWeeks = ToString[Evaluate[Input["Input the number of weeks post injection"]]];

mouse = ToString[Evaluate[Input["Input the mouse identity (e.g. Mouse123)"]]];

In[ ]:= path = StringJoin["S:/Imaging/Garrett/BCMM_EpiFluorConfocScope/CaspaseInjections/",
    ToString[numWeeks], "weeksPostInj/", mouse, "/"];

(**Path for control-injected hemisphere**)

In[ ]:= pathRightHem =
    StringJoin["S:/Imaging/Garrett/BCMM_EpiFluorConfocScope/CaspaseInjections/",
        ToString[numWeeks], "weeksPostInj/", mouse, "/RightHem/"];

In[ ]:= (*****V1*****)

In[ ]:= v1Right = ToExpression[Import[StringJoin[pathRightHem, mouse, "_RH_V1CellCounts.txt"]]];

In[ ]:= v1Area = ToExpression[Import[StringJoin[path, mouse, "_V1Areas.txt"]]] * 10^-6;
(**values in mm^2**)

In[ ]:= v1AllSectCounts = v1Right[[All, 2]];

In[ ]:= v1TotalCountsRight = Total[v1AllSectCounts];

In[ ]:= v1CellDensityRight = Reverse@
    Table[{Abs@v1Right[[n, 1]], v1Right[[n, 2]] / v1Area[[n]]}, {n, 1, Length[v1Right]}];

In[ ]:= v1TotalVolume = NIntegrate[Interpolation[v1Area][x], {x, 1, Length[v1Area]}];
(**in mm^3**)

In[ ]:= v1TotalCellDensityRight = v1TotalCountsRight / v1TotalVolume;

In[ ]:= (*****LP*****)

In[ ]:= lpRight = ToExpression[Import[StringJoin[pathRightHem, mouse, "_RH_LPCellCounts.txt"]]];

In[ ]:= lpArea = ToExpression[Import[StringJoin[path, mouse, "_LPAreas.txt"]]] * 10^-6;

In[ ]:= lpAllSectCounts = lpRight[[All, 2]];

In[ ]:= lpTotalCountsRight = Total[lpAllSectCounts];

In[ ]:= lpCellDensityRight =
    Table[{Abs@lpRight[[n, 1]], lpRight[[n, 2]] / lpArea[[n]]}, {n, 1, Length[lpRight]}];

In[ ]:= lpTotalVolume = NIntegrate[Interpolation[lpArea][x], {x, 1, Length[lpArea]}];
(**in mm^3**)

In[ ]:= lpTotalCellDensityRight = lpTotalCountsRight / lpTotalVolume;

In[ ]:= (*****RL*****)

In[ ]:= rlRight = ToExpression[Import[StringJoin[pathRightHem, mouse, "_RH_RLCellCounts.txt"]]];

In[ ]:= rlArea = ToExpression[Import[StringJoin[path, mouse, "_RLAreas.txt"]]] * 10^-6;

In[ ]:= rlAllSectCounts = rlRight[[All, 2]];

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In[ ]:= r1TotalCountsRight = Total[r1AllSectCounts];

In[ ]:= r1CellDensityRight =
  Table[{Abs@r1Right[[n, 1]], r1Right[[n, 2]] / r1Area[[n]]}, {n, 1, Length[r1Right]}}];

In[ ]:= r1TotalVolume = NIntegrate[Interpolation[r1Area][x], {x, 1, Length[r1Area]}}];
  (***in mm^3***)

In[ ]:= r1TotalCellDensityRight = r1TotalCountsRight / r1TotalVolume;

In[ ]:= (*****AL*****)

In[ ]:= alRight = ToExpression[Import[StringJoin[pathRightHem, mouse, "_RH_ALCellCounts.txt"]]];

In[ ]:= alArea = ToExpression[Import[StringJoin[path, mouse, "_ALAreas.txt"]]] * 10^-6;

In[ ]:= alAllSectCounts = alRight[[All, 2]];

In[ ]:= alTotalCountsRight = Total[alAllSectCounts];

In[ ]:= alCellDensityRight =
  Table[{Abs@alRight[[n, 1]], alRight[[n, 2]] / alArea[[n]]}, {n, 1, Length[alRight]}}];

In[ ]:= alTotalVolume = NIntegrate[Interpolation[alArea][x], {x, 1, Length[alArea]}}];
  (***in mm^3***)

In[ ]:= alTotalCellDensityRight = alTotalCountsRight / alTotalVolume;

In[ ]:= (*****LM*****)

In[ ]:= lmRight = ToExpression[Import[StringJoin[pathRightHem, mouse, "_RH_LMCellCounts.txt"]]];

In[ ]:= lmArea = ToExpression[Import[StringJoin[path, mouse, "_LMAreas.txt"]]] * 10^-6;

In[ ]:= lmAllSectCounts = lmRight[[All, 2]];

In[ ]:= lmTotalCountsRight = Total[lmAllSectCounts];

In[ ]:= lmCellDensityRight =
  Table[{Abs@lmRight[[n, 1]], lmRight[[n, 2]] / lmArea[[n]]}, {n, 1, Length[lmRight]}}];

In[ ]:= lmTotalVolume = NIntegrate[Interpolation[lmArea][x], {x, 1, Length[lmArea]}}];
  (***in mm^3***)

In[ ]:= lmTotalCellDensityRight = lmTotalCountsRight / lmTotalVolume;

In[ ]:= (****In addition to cell density plots,
  create normalized cell count plots (normalized to the number of
  cells in the section of the region with the maximum # of cells)****)

  maxCount = Max[Join[v1AllSectCounts,
    lpAllSectCounts, r1AllSectCounts, alAllSectCounts, lmAllSectCounts]];

In[ ]:= v1RightNorm = Table[{Abs[(Reverse@v1Right)[[n, 1]]],
  N@ (Reverse@v1Right)[[n, 2]] / maxCount}, {n, 1, Length[(Reverse@v1Right)]}];

In[ ]:= lpRightNorm =
  Table[{Abs[lpRight[[n, 1]]], N@lpRight[[n, 2]] / maxCount}, {n, 1, Length[lpRight]}}];

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In[ ]:= r1RightNorm =
  Table[{Abs[r1Right[[n, 1]]], N@r1Right[[n, 2]]/maxCount}, {n, 1, Length[r1Right] }];

In[ ]:= alRightNorm =
  Table[{Abs[alRight[[n, 1]]], N@alRight[[n, 2]]/maxCount}, {n, 1, Length[alRight] }];

In[ ]:= lmRightNorm =
  Table[{Abs[lmRight[[n, 1]]], N@lmRight[[n, 2]]/maxCount}, {n, 1, Length[lmRight] }];

In[ ]:= (*****Export data*****)

In[ ]:= (***Cell counts***)

In[ ]:= Export[StringJoin[path, mouse, "_RH_V1_CellCounts.txt"], Reverse[Abs@v1Right]];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LP_CellCounts.txt"], Abs@lpRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_RL_CellCounts.txt"], Abs@r1Right];

In[ ]:= Export[StringJoin[path, mouse, "_RH_AL_CellCounts.txt"], Abs@alRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LM_CellCounts.txt"], Abs@lmRight];

In[ ]:= (***Normalized cell counts***)

In[ ]:= Export[StringJoin[path, mouse, "_RH_V1_NormCellCounts.txt"], v1RightNorm];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LP_NormCellCounts.txt"], lpRightNorm];

In[ ]:= Export[StringJoin[path, mouse, "_RH_RL_NormCellCounts.txt"], r1RightNorm];

In[ ]:= Export[StringJoin[path, mouse, "_RH_AL_NormCellCounts.txt"], alRightNorm];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LM_NormCellCounts.txt"], lmRightNorm];

In[ ]:= (***Cell densities***)

In[ ]:= Export[StringJoin[path, mouse, "_RH_V1_CellDensities.txt"], v1CellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LP_CellDensities.txt"], lpCellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_RL_CellDensities.txt"], r1CellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_AL_CellDensities.txt"], alCellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LM_CellDensities.txt"], lmCellDensityRight];

In[ ]:= (***Total cell densities***)

In[ ]:= Export[StringJoin[path, mouse, "_RH_V1_TotalCellDensity.txt"], v1TotalCellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LP_TotalCellDensity.txt"], lpTotalCellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_RL_TotalCellDensity.txt"], r1TotalCellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_AL_TotalCellDensity.txt"], alTotalCellDensityRight];

In[ ]:= Export[StringJoin[path, mouse, "_RH_LM_TotalCellDensity.txt"], lmTotalCellDensityRight];

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