% control cells threshold 20

clear all; close all; clc;

X=2;

width = 1.5\*4; % Width in inches

height = 1.5\*3; % Height in inches

alw = X\*1; % AxesLineWidth

fsz = X\*8; % Fontsize

tsz = X\*2; % text Fontsize sa

lw = X\*1; % LineWidth

msz = 3\*X;

% Load control Data Files

Tag1 =[];Tag2 =[];Tag3 =[];Date=[];

addpath('/cntrl parse/');

dirname='./cntrl parse/';

files=dir([dirname,'\*.mat']);

for ii=1:1:length(files) %loop over files

AD(ii) = load([dirname,files(ii).name]);

end

kk = 1;

for ii=1:1:length(files) %loop over files

Correct\_angles = AD(ii).D.DirectionEngelcorrect;

Amplitud\_angle = AD(ii).D.DirectionAMP;

for jj = 1:1:size(AD(ii).D.DirectionEngelcorrect,1)

Allcells\_Correct\_angles(jj,ii) =Correct\_angles(jj,1);

Allcells\_Amplitud\_angle(jj,ii) =Amplitud\_angle(jj,1);% amplitude at each angle

end

end

%all raw data

ResultsctlD.direction =Allcells\_Correct\_angles;% degree

ResultsctlD.directionAmp =Allcells\_Amplitud\_angle;% amplitude at each angle multiply by nor skeletal size(um/um^2)

% means all raw data

ResultsctlD.directionAmpMean = nanmean(ResultsctlD.directionAmp,2);

%SEM all data

ResultsctlD.directionAmpSEM = [std(ResultsctlD.directionAmp,0,2)./sqrt(size(ResultsctlD.directionAmp,2))];

% create variables +/- 2 degrees at both 0 and 90 peaks

Resultsctl0plus5 = ResultsctlD.directionAmp(44:48,:)

Resultctl90plus5 = ResultsctlD.directionAmp(133:137,:)

ResultsctlD.zeroplus5 = Resultsctl0plus5

ResultsctlD.ninetyplus5 = Resultctl90plus5

%create vectors for mean and SEM

cntrl0 = ResultsctlD.zeroplus5

cntrl0vec = cntrl0(:).'

cntrl90 = ResultsctlD.ninetyplus5

cntrl90vec = cntrl90(:).'

ResultsctlD.zeromean = nanmean(cntrl0vec,2);

ResultsctlD.ninetymean = nanmean(cntrl90vec,2);

ResultsctlD.zeroSEM = [std(cntrl0vec,0,2)./sqrt(size(cntrl0vec,2))];

ResultsctlD.ninetySEM = [std(cntrl90vec,0,2)./sqrt(size(cntrl90vec,2))];

save(['/Users/anniebrong/OneDrive - University of Maryland School of Medicine/AKK lab onedrive/DATA/t tubule imaging/new way/analysis apr 20/6 month male atria/results/','ResultsctlD'],'ResultsctlD');

%%

%KO cells

clear all; close all; clc;

X=2;

width = 1.5\*4; % Width in inches

height = 1.5\*3; % Height in inches

alw = X\*1; % AxesLineWidth

fsz = X\*8; % Fontsize

tsz = X\*2; % text Fontsize sa

lw = X\*1; % LineWidth

msz = 3\*X;

% Load control Data Files

Tag1 =[];Tag2 =[];Tag3 =[];Date=[];

addpath('/KO parse/');

dirname='./KO parse/';

files=dir([dirname,'\*.mat']);

for ii=1:1:length(files) %loop over files

AD(ii) = load([dirname,files(ii).name]);

end

kk = 1;

for ii=1:1:length(files) %loop over files

Correct\_angles = AD(ii).D.DirectionEngelcorrect;

Amplitud\_angle = AD(ii).D.DirectionAMP;

for jj = 1:1:size(AD(ii).D.DirectionEngelcorrect,1)

Allcells\_Correct\_angles(jj,ii) =Correct\_angles(jj,1);

Allcells\_Amplitud\_angle(jj,ii) =Amplitud\_angle(jj,1);% amplitude at each angle

end

end

%all raw data

ResultsKOD.direction =Allcells\_Correct\_angles;% degree

ResultsKOD.directionAmp =Allcells\_Amplitud\_angle;% amplitude at each angle multiply by nor skeletal size(um/um^2)

% means all raw data

ResultsKOD.directionAmpMean = nanmean(ResultsKOD.directionAmp,2);

%SEM all data

ResultsKOD.directionAmpSEM = [std(ResultsKOD.directionAmp,0,2)./sqrt(size(ResultsKOD.directionAmp,2))];

% create variables +/- 2 degrees at both 0 and 90 peaks

ResultsKO0plus5 = ResultsKOD.directionAmp(44:48,:)

ResultKO90plus5 = ResultsKOD.directionAmp(133:137,:)

ResultsKOD.zeroplus5 = ResultsKO0plus5

ResultsKOD.ninetyplus5 = ResultKO90plus5

KO90 = ResultsKOD.ninetyplus5

KO90vec = KO90(:).'

KO0 = ResultsKOD.zeroplus5

KO0vec = KO0(:).'

ResultsKOD.zeromean = nanmean(KO0vec,2);

ResultsKOD.ninetymean = nanmean(KO90vec,2);

ResultsKOD.zeroSEM = [std(KO0vec,0,2)./sqrt(size(KO0vec,2))];

ResultsKOD.ninetySEM = [std(KO90vec,0,2)./sqrt(size(KO90vec,2))];

save(['/Users/anniebrong/OneDrive - University of Maryland School of Medicine/AKK lab onedrive/DATA/t tubule imaging/new way/analysis apr 20/6 month male atria/results/','ResultsKOD'],'ResultsKOD');

%%

clear all; close all; clc;

addpath('results');

dirname='./results/';

files=dir([dirname,'\*.mat']);

for ii = 1:1:size(files,1)

disp([dirname,files(ii).name])

load([dirname,files(ii).name]);

end

X=2;

width = 1.5\*4; % Width in inches

height = 1.5\*3; % Height in inches

alw = X\*1; % AxesLineWidth

fsz = X\*8; % Fontsize

tsz = X\*2; % text Fontsize sa

lw = X\*1; % LineWidth

msz = 3\*X;

%create arrays to run t tests and for bar graph

KO0 = ResultsKOD.zeroplus5

cntrl0 = ResultsctlD.zeroplus5

KO0vec = KO0(:).'

cntrl0vec = cntrl0(:).'

KO90 = ResultsKOD.ninetyplus5

cntrl90 = ResultsctlD.ninetyplus5

KO90vec = KO90(:).'

cntrl90vec = cntrl90(:).'

[h,p] = ttest2(cntrl0vec,KO0vec,'Vartype','unequal')

Ttests = []

Ttests = [Ttests,"T Test transverse", p]

[h,p] = ttest2(cntrl90vec,KO90vec,'Vartype','unequal')

TTests = [Ttests,"T Test axial", p]

X=2;

width = 1.5\*4; % Width in inches

height = 1.5\*3; % Height in inches

alw = X\*1; % AxesLineWidth

fsz = X\*8; % Fontsize

tsz = X\*2; % text Fontsize sa

lw = X\*1; % LineWidth

msz = 3\*X;

for ii = 1:1:size(files,1)

load([dirname,files(ii).name]);

end

% Figure TT

figure(301)

plot(ResultsctlD.direction, ResultsctlD.directionAmp, 'o', 'MarkerSize',0.5, 'MarkerEdgeColor' ,[0.6 0.6 0.6],'MarkerFaceColor',[0.6 0.6 0.6])

hold on

plot(ResultsKOD.direction, ResultsKOD.directionAmp, 'o', 'MarkerSize',0.5, 'MarkerEdgeColor' ,[1 0.8 0.8],'MarkerFaceColor',[1 0.8 0.8])

hold on

errorbar(ResultsKOD.direction(:,1), ResultsKOD.directionAmpMean,ResultsKOD.directionAmpSEM,'ok','MarkerEdgeColor','r','markerfacecolor','r','markersize',1.5, 'CapSize',2, 'LineWidth', 0.1, 'Color','r')

hold on

errorbar(ResultsctlD.direction(:,1), ResultsctlD.directionAmpMean,ResultsctlD.directionAmpSEM,'ok','MarkerEdgeColor','k','markerfacecolor','k','markersize',1.5, 'CapSize',2, 'LineWidth', 0.1, 'Color','k')

hold on

ylabel('Amplitude')

xlabel('Direction (^{ o })')

ylim([0 0.03]);

xlim([-45 135]);

set(gca,'xtick',[-30:30:120])

set(gcf,'Units', 'inches','PaperSize', [width height]);

set(gca,'color','none','fontsize',fsz,'fontname','Helvetica','tickdir','out','yminortick','off','box','off','xminortick','off');

set(gcf,'PaperOrientation','Portrait','PaperUnits','normalized','PaperPosition', [0 0 1 1]);

FigName = ['TT\_amplitude\_at\_each\_direction'];

print(gcf, '-dpdf',['./Figures\_TT/',FigName]);

figure(302)

hold on;

bar([1], ResultsctlD.zeromean,'k','EdgeColor','k','LineWidth', 1.5);

hold on;

bar([2], ResultsKOD.zeromean,'r','EdgeColor','k','LineWidth', 1.5);

hold on;

errorbar([1],ResultsctlD.zeromean,ResultsctlD.zeroSEM,'ok','markerfacecolor','k','markersize',1.5\*msz, 'CapSize',10, 'LineWidth', 1);

hold on;

errorbar([2],ResultsKOD.zeromean,ResultsKOD.zeroSEM,'ok','markerfacecolor','r','markersize',1.5\*msz, 'CapSize',10, 'LineWidth', 1);

hold on;

scatter(ones(size(ResultsctlD.zeroplus5(1,:))).\*(1+(rand(size(ResultsctlD.zeroplus5(1,:)))-0.5)/2),ResultsctlD.zeroplus5(1,:),10, 'MarkerEdgeColor' ,[0.6 0.6 0.6],'MarkerFaceColor',[0.6 0.6 0.6]);

hold on;

scatter(ones(size(ResultsKOD.zeroplus5(1,:))).\*(2+(rand(size(ResultsKOD.zeroplus5(1,:)))-0.5)/2),ResultsKOD.zeroplus5(1,:),10, 'MarkerEdgeColor' ,[1 0.8 0.8],'MarkerFaceColor',[1 0.8 0.8]);

ylabel('Amplitude')

ylim([0 .03])

lh = legend('control','KO ', 'location', 'northoutside','orientation', 'horizontal');

set(gcf,'Units', 'inches','PaperSize', [width height]);

set(gca,'color','none','fontsize',fsz,'fontname','Helvetica','tickdir','out','yminortick','off','box','off','xminortick','off');

set(gcf,'PaperOrientation','Portrait','PaperUnits','normalized','PaperPosition', [0 0 1 1]);

set(lh,'fontsize',6);

FigName = ['Zero\_plus\_five'];

print(gcf, '-dpdf',['./Figures\_TT/',FigName]);

figure(303)

hold on;

bar([1], ResultsctlD.ninetymean,'k','EdgeColor','k','LineWidth', 1.5);

hold on;

bar([2], ResultsKOD.ninetymean,'r','EdgeColor','k','LineWidth', 1.5);

hold on;

errorbar([1],ResultsctlD.ninetymean,ResultsctlD.ninetySEM,'ok','markerfacecolor','k','markersize',1.5\*msz, 'CapSize',10, 'LineWidth', 1);

hold on;

errorbar([2],ResultsKOD.ninetymean,ResultsKOD.ninetySEM,'ok','markerfacecolor','r','markersize',1.5\*msz, 'CapSize',10, 'LineWidth', 1);

hold on;

scatter(ones(size(ResultsctlD.ninetyplus5(1,:))).\*(1+(rand(size(ResultsctlD.ninetyplus5(1,:)))-0.5)/2),ResultsctlD.ninetyplus5(1,:),10, 'MarkerEdgeColor' ,[0.6 0.6 0.6],'MarkerFaceColor',[0.6 0.6 0.6]);

hold on;

scatter(ones(size(ResultsKOD.ninetyplus5(1,:))).\*(2+(rand(size(ResultsKOD.ninetyplus5(1,:)))-0.5)/2),ResultsKOD.ninetyplus5(1,:),10, 'MarkerEdgeColor' ,[1 0.8 0.8],'MarkerFaceColor',[1 0.8 0.8]);

ylabel('Amplitude')

ylim([0 .03])

lh = legend('control','KO ', 'location', 'northoutside','orientation', 'horizontal');

set(gca,'color','none','fontsize',fsz,'fontname','Helvetica','tickdir','out','yminortick','off','box','off','xminortick','off');

set(gcf,'PaperOrientation','Portrait','PaperUnits','normalized','PaperPosition', [0 0 1 1]);

set(lh,'fontsize',6);

FigName = ['Ninety\_plus\_five'];

print(gcf, '-dpdf',['./Figures\_TT/',FigName]);