This program uses the tissue expression and the IC50 values to simulate the T-cell repertoire post-transplant to determine the alloreactivity of the particular DRP using Eq 3.2. *(The term N0 in the numerator was not included in the program, since it is a constant =1)*

clear

tic

%% Reading all files

allfiles = dir;

cellallfiles = struct2cell(allfiles);

cellallfiles(2:5,:) = [];

%%

colallfiles = size(cellallfiles,2);

count = 1;

 for y = 1:colallfiles

 recog = strfind(cellallfiles(1,y),'xlsx');

 compare = cell2mat(recog);

 if compare>0

 finalfiles(count,1) = cellallfiles(1,y);

 count = count +1;

 end

 end

%% Extracting all the xlsx files from the folder

rowallfiles = size(finalfiles,1);

for y = 1:rowallfiles

 finalfiles(y,1) = strrep(finalfiles(y,1), '.xlsx', '');

end

%% Starting simulation algorithm

for compile = 1 : rowallfiles

 filename = finalfiles(compile,1);

 filenames = strjoin(filename);

 [~,~,raw] = xlsread(filenames);

 %%enter filename here

 %%enter limit of IC50 here

 %%number of iterations

 reps = 500;

 limit = 500;

 toc

%%

 colsm = size(raw,2);

 colcount = 1;

 i=1;

%% Reading the expression values

 while colcount==1 && i<=colsm

 c = strfind(raw(1,i),'Bladder');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==2 && i<=colsm

 c = strfind(raw(1,i),'Blood');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==3 && i<=colsm

 c = strfind(raw(1,i),'Blood Vessel');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==4 && i<=colsm

 c = strfind(raw(1,i),'Colon');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==5 && i<=colsm

 c = strfind(raw(1,i),'Esophagus');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==6 && i<=colsm

 c = strfind(raw(1,i),'Heart');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==7 && i<=colsm

 c = strfind(raw(1,i),'Kidney');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==8 && i<=colsm

 c = strfind(raw(1,i),'Liver');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==9 && i<=colsm

 c = strfind(raw(1,i),'Lung');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==10 && i<=colsm

 c = strfind(raw(1,i),'Muscle');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==11 && i<=colsm

 c = strfind(raw(1,i),'Salivary Gland');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==12 && i<=colsm

 c = strfind(raw(1,i),'Skin');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==13 && i<=colsm

 c = strfind(raw(1,i),'Small Intestine');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==14 && i<=colsm

 c = strfind(raw(1,i),'Spleen');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==15 && i<=colsm

 c = strfind(raw(1,i),'Stomach');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==16 && i<=colsm

 c = strfind(raw(1,i),'Thyroid');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 while colcount==17 && i<=colsm

 c = strfind(raw(1,i),'Vagina');

 d = cell2mat(c);

 if d>0

 expression(:,colcount) = raw(:,i);

 colcount = colcount + 1;

 end

 i = i+1;

 end

 %%

 colcount = 1;

 for i = 1:colsm

 c = strfind(raw(1,i),'HLA');

 d = cell2mat(c);

 if d>0

 data(:,colcount) = raw(:,i);

 colcount = colcount+1;

 end

 end

 %% Compiling expression and IC50 values

 colsm = size(data,2);

 z=0;

 for i = 1:colsm

 c = strfind(data(1,i),'\_');

 d = cell2mat(c);

 if d>0

 z=z+1;

 end

 end

 %% Organizing data to optimize the process

 i=1;

 while z>0

 c = strfind(data(1,i),'\_');

 d = cell2mat(c);

 if d>0

 data(:,i) = [];

 z=z-1;

 i=i-1;

 end

 i=i+1;

 end

 %% Clearing garbage values

 data(1,:)=[];

 expression(1,:)=[];

 data\_c = cell2mat(data);

 exp\_c = cell2mat(expression);

 clear expression data num raw txt;

 %% Limiting expression values below threshold

 it = size(data\_c,1);

 it\_c = size(exp\_c,2);

 it\_c2 = size(data\_c,2);

 z=1;

 it\_t = it\*it\_c2;

 final = zeros(it\_t,(it\_c+it\_c2));

 %%

 for y = 1:it\_c

 for i = 1:it

 if exp\_c(i,y) <= 1

 exp\_c(i,y) = 0;

 end

 end

 end

 %% Consolidating IC50 values

 for y=1:it\_c2

 for i = 1:it

 final(z,1) = data\_c(i,y);

 final(z,2:(1+it\_c)) = exp\_c(i,:);

 z=z+1;

 end

 end

 clear data\_c exp\_c

 %% Limiting IC50 values above threshold

 final = sortrows(final);

 it\_c = size(final,1);

 z=0;

 %%

 z=0;

 for i = 1:it\_c

 if final(i,1)<limit

 z=z+1;

 end

 end

 %%

 final2 = final(1:z,:);

 %% Generating Alpha Matrix

 it\_c = size(final2,1);

 r=1;

 a=1;

 e=1;

 wf=zeros(it\_c);

 for y = 1:(it\_c)

 for x = 1:(it\_c)

 wf(x,y)=final2(r,e)/final2(a,e);

 a=a+1;

 end

 a=1;

 r=r+1;

 end

 %%

 final2 (:,1) = 1./final2 (:,1);

 ic = final2(:,1);

 %% Generating steady state values

 k\_bladder=1000000.\*final2(:,2);

 k\_blood=1000000.\*final2(:,3);

 k\_bv=1000000.\*final2(:,4);

 k\_colon=1000000.\*final2(:,5);

 k\_e=1000000.\*final2(:,6);

 k\_h=1000000.\*final2(:,7);

 k\_liver=1000000.\*final2(:,8);

 k\_lung=1000000.\*final2(:,9);

 k\_m=1000000.\*final2(:,10);

 k\_sg=1000000.\*final2(:,11);

 k\_skin=1000000.\*final2(:,12);

 k\_si=1000000.\*final2(:,13);

 k\_spleen=1000000.\*final2(:,14);

 k\_stomach=1000000.\*final2(:,15);

 k\_t=1000000.\*final2(:,16);

 k\_v=1000000.\*final2(:,17);

 toc

 %%

 z=0;

 resultkbv = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkbv(:,1)=1;

 resultkbv(it\_c+1,y) = it\_c;

 %% Generating Alloreativity potential ignoring expression values below the threshold

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_bv(i,1) == 0

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultkbv(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_bv(x,1)== 0

 resultkbv(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_bv(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkbv(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkbv(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkbladder = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkbladder(:,1)=1;

 resultkbladder(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_bladder(i,1) == 0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultkbladder(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_bladder(x,1)==0

 resultkbladder(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_bladder(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkbladder(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkbladder(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkcolon = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkcolon(:,1)=1;

 resultkcolon(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_colon(i,1)==0

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultkcolon(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_colon(x,1) ==0

 resultkcolon(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_colon(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkcolon(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkcolon(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkblood = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkblood(:,1)=1;

 resultkblood(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_blood(i,1) == 0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultkblood(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_blood(x,1) ==0

 resultkblood(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_blood(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkblood(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkblood(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultke = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultke(:,1)=1;

 resultke(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_e(i,1)==0

 nt\_1sum(i,1) =0;

 else

 nt\_1 = resultke(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_e(x,1) ==0

 resultke(x,a) =0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_e(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultke(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultke(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkh = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkh(:,1)=1;

 resultkh(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_h(i,1)==0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultkh(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_h(x,1) == 0

 resultkh(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_h(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkh(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkh(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkskin = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkskin(:,1)=1;

 resultkskin(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_skin(i,1) ==0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultkskin(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_skin(x,1)==0

 resultkskin(x,a)=0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_skin(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkskin(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkskin(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultksg = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultksg(:,1)=1;

 resultksg(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_sg(i,1)==0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultksg(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_sg(x,1)==0

 resultksg(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_sg(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultksg(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultksg(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkliver = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkliver(:,1)=1;

 resultkliver(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_liver(i,1)==0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultkliver(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_liver(x,1) ==0

 resultkliver(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_liver(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkliver(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkliver(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkm = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkm(:,1)=1;

 resultkm(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_m(i,1)==0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultkm(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_m(x,1) ==0

 resultkm(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_m(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkm(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkm(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultklung = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultklung(:,1)=1;

 resultklung(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_lung(i,1)==0

 nt\_1sum(i,1) = 0;

 else

 nt\_1 = resultklung(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_lung(x,1)==0

 resultklung(x,a)=0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_lung(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultklung(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultklung(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultksi = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultksi(:,1)=1;

 resultksi(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_si(i,1)==0;

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultksi(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_si(x,1) == 0

 resultksi(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_si(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultksi(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultksi(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkspleen = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkspleen(:,1)=1;

 resultkspleen(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_spleen(i,1)==0

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultkspleen(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_spleen(x,1)==0;

 resultkspleen(x,a)=0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_spleen(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkspleen(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkspleen(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkstomach = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkstomach(:,1)=1;

 resultkstomach(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_stomach(i,1)==0

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultkstomach(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_stomach(x,1)==0

 resultkstomach(x,a)=0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_stomach(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkstomach(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkstomach(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkt = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkt(:,1)=1;

 resultkt(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_t(i,1)==0

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultkt(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_t(x,1)==0

 resultkt(x,a)=0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_t(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkt(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkt(it\_c+1,a)=sum1;

 end

 toc

 %%

 z=0;

 resultkv = zeros ((it\_c+1),reps);

 nt\_1sum=zeros((it\_c),1);

 c=1;

 y=1;

 resultkv(:,1)=1;

 resultkv(it\_c+1,y) = it\_c;

 %%

 a=1;

 for y = 1:(reps-1)

 for i = 1:it\_c

 if k\_v(i,1)==0

 nt\_1sum(i,1)=0;

 else

 nt\_1 = resultkv(1:it\_c,y);

 wfa = wf(1:it\_c,i);

 nt\_1sum(i,1) = dot(nt\_1,wfa);

 end

 end

 a=a+1;

 sum1 = 0;

 for x = 1:it\_c

 if k\_v(x,1)==0

 resultkv(x,a) = 0;

 else

 first = 1;

 c=nt\_1sum(x,first);

 b= ic(x,first);

 k = k\_v(x,first)^b;

 d = exp(-b\*1.5\*a);

 hla = (k)/((k-c)\*d+1);

 resultkv(x,a)=hla;

 sum1=sum1+hla;

 end

 end

 resultkv(it\_c+1,a)=sum1;

 end

 toc

 %% calculating averages for the last 100 iterations of sum of all clones

 average = cell(16,2);

 bv = resultkbv((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(1,1) = {'blood vessel'};

 average(1,2) = {avgbv};

 bv = resultkbladder((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(2,1) = {'bladder'};

 average(2,2) = {avgbv};

 bv = resultkblood((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(3,1) = {'blood'};

 average(3,2) = {avgbv};

 bv = resultkcolon((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(4,1) = {'colon'};

 average(4,2) = {avgbv};

 bv = resultke((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(5,1) = {'esophagus'};

 average(5,2) = {avgbv};

 bv = resultkh((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(6,1) = {'heart'};

 average(6,2) = {avgbv};

 bv = resultkliver((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(7,1) = {'liver'};

 average(7,2) = {avgbv};

 bv = resultklung((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(8,1) = {'lung'};

 average(8,2) = {avgbv};

 bv = resultkm((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(9,1) = {'m'};

 average(9,2) = {avgbv};

 bv = resultksg((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(10,1) = {'salivary gland'};

 average(10,2) = {avgbv};

 bv = resultksi((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(11,1) = {'small intestine'};

 average(11,2) = {avgbv};

 bv = resultkskin((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(12,1) = {'skin'};

 average(12,2) = {avgbv};

 bv = resultkspleen((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(13,1) = {'spleen'};

 average(13,2) = {avgbv};

 bv = resultkstomach((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(14,1) = {'stomach'};

 average(14,2) = {avgbv};

 bv = resultkt((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(15,1) = {'t'};

 average(15,2) = {avgbv};

 bv = resultkv((it\_c+1),401:500);

 avgbv = sum(bv)/100;

 average(16,1) = {'v'};

 average(16,2) = {avgbv};

 %% Consolidating alloreactivity potential for all organs

 result\_f = resultkbv+resultkcolon+resultkbladder+resultkblood+resultke+resultkh+resultkskin+resultksg+resultkliver+resultkm+resultklung+resultksi+resultkspleen+resultkstomach+resultkt+resultkv;

 %% Generating files for individual organs and sum of all organs

 file = 'mf.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,result\_f)

 file = 'bv.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkbv)

 file = 'colon.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkcolon)

 file = 'bladder.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkbladder)

 file = 'blood.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkblood)

 file = 'e.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultke)

 file = 'h.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkh)

 file = 'skin.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkskin)

 file = 'sg.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultksg)

 file = 'liver.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkliver)

 file = 'm.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkm)

 file = 'lung.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultklung)

 file = 'si.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultksi)

 file = 'mf6.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,result\_f6)

 file = 'spleen.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkspleen)

 file = 'stomach.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkstomach)

 file = 't.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkt)

 file = 'v.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,resultkv)

 file = 'avg.xlsx';

 files = strjoin(filename,file);

 files = strcat(files,file);

 xlswrite(files,average)

 toc

end