Human Paper

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Assess the individual antigens

# model\_name <- 'Human\_BurkPx'  
# model\_name <- 'NHP\_BurkPx'  
# antigen <- Antigens[2]  
output <- NULL  
  
for( model\_name in c('Human\_BurkPx', 'NHP\_BurkPx')){  
 test <- get(str\_c(model\_name, '\_test')) %>% ungroup()  
 train <- get(str\_c(model\_name, '\_train')) %>% ungroup()  
 Antigens <- unique(test$Antigen)  
 for( type in c('IgG', 'IgM', 'IgGM') ){  
 for( antigen in Antigens ){  
 test1 <- test %>% filter(Antigen == antigen, Type == type)  
 train1 <- train %>% filter(Antigen == antigen, Type == Type)  
   
 if( nrow(test1) > 0 & nrow(train1)>0 ){  
 model <- glm( Status ~ Value, data=train1, family='binomial' )  
 test1 <- test1 %>% mutate( phat = predict( model, newdata=test1) )  
 AUC <- pROC::roc(Status ~ phat, data=test1) %>% magrittr::extract2('auc')  
   
 output <- data.frame( model = model\_name, Type = type, Antigen=antigen, AUC = AUC ) %>% rbind(output, .)   
 }  
 }  
 }  
}

## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred  
  
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output %>% arrange(desc(AUC))

## model Type Antigen AUC  
## 1 NHP\_BurkPx IgM LPSA 0.9430077  
## 2 Human\_BurkPx IgG LPSA 0.9424090  
## 3 NHP\_BurkPx IgG LPSA 0.9367816  
## 4 NHP\_BurkPx IgM CPS 0.9267241  
## 5 NHP\_BurkPx IgG CPS 0.8946360  
## 6 Human\_BurkPx IgG BPSS1498\_HCP1.B 0.8938908  
## 7 NHP\_BurkPx IgM MSHR5855.WCL 0.8893678  
## 8 NHP\_BurkPx IgM BPSS1498\_HCP1.B 0.8608716  
## 9 Human\_BurkPx IgG CPS 0.8528769  
## 10 NHP\_BurkPx IgG BPSS1498\_HCP1.B 0.8445881  
## 11 NHP\_BurkPx IgM BPSL2522\_OmpA 0.8397989  
## 12 NHP\_BurkPx IgM LPSB 0.8093870  
## 13 NHP\_BurkPx IgG MSHR5855.WCL 0.8055556  
## 14 Human\_BurkPx IgG BPSL2697\_GroEL 0.8038655  
## 15 Human\_BurkPx IgG MSHR5855.WCL 0.7967743  
## 16 Human\_BurkPx IgM LPSA 0.7859514  
## 17 NHP\_BurkPx IgG BPSL2697\_GroEL 0.7823276  
## 18 Human\_BurkPx IgG BPSS0477\_GroEL2 0.7795752  
## 19 NHP\_BurkPx IgM BPSL2697\_GroEL 0.7686782  
## 20 NHP\_BurkPx IgG BPSL2522\_OmpA 0.7670019  
## 21 NHP\_BurkPx IgM BPSL1404\_ClpX 0.7535920  
## 22 Human\_BurkPx IgM BPSS1498\_HCP1.B 0.7406477  
## 23 NHP\_BurkPx IgG BPSS0476\_GroS 0.7387452  
## 24 NHP\_BurkPx IgM BPSL1201\_IMPS 0.7373084  
## 25 Human\_BurkPx IgG LPSB 0.7308437  
## 26 Human\_BurkPx IgG BPSS0476\_GroS 0.7299285  
## 27 NHP\_BurkPx IgM BPSS0476\_GroS 0.7286877  
## 28 NHP\_BurkPx IgM BPSS1652 0.7238985  
## 29 Human\_BurkPx IgG BPSL2096\_AhpC 0.7183321  
## 30 NHP\_BurkPx IgM BPSS1769\_NADH 0.7121648  
## 31 NHP\_BurkPx IgM BPSL3222\_rpIL 0.7119253  
## 32 Human\_BurkPx IgG BPSS1652 0.7102590  
## 33 NHP\_BurkPx IgM BPSS0477\_GroEL2 0.7095307  
## 34 NHP\_BurkPx IgM BPSL2096\_AhpC 0.7085728  
## 35 Human\_BurkPx IgG BPSS0135 0.7060248  
## 36 Human\_BurkPx IgM CPS 0.7011752  
## 37 NHP\_BurkPx IgM BPSL3396\_AtpD 0.6977969  
## 38 NHP\_BurkPx IgM BPSL1743\_Arg 0.6963602  
## 39 NHP\_BurkPx IgG BPSL1743\_Arg 0.6939655  
## 40 NHP\_BurkPx IgG BPSL2096\_AhpC 0.6870211  
## 41 NHP\_BurkPx IgG BPSS0135 0.6812739  
## 42 Human\_BurkPx IgG BPSS0530 0.6801617  
## 43 NHP\_BurkPx IgG BPSL1404\_ClpX 0.6793582  
## 44 NHP\_BurkPx IgM BPSS1850 0.6793582  
## 45 Human\_BurkPx IgG BPSL2522\_OmpA 0.6745946  
## 46 NHP\_BurkPx IgG BPSS0477\_GroEL2 0.6743295  
## 47 NHP\_BurkPx IgM BPSS0135 0.6714559  
## 48 NHP\_BurkPx IgG BPSS1769\_NADH 0.6649904  
## 49 NHP\_BurkPx IgM BPSL2827\_DNAK 0.6594828  
## 50 NHP\_BurkPx IgG BPSS1652 0.6542146  
## 51 Human\_BurkPx IgG BPSL1743\_Arg 0.6373351  
## 52 Human\_BurkPx IgM MSHR5855.WCL 0.6372746  
## 53 NHP\_BurkPx IgG BPSL3222\_rpIL 0.6340996  
## 54 NHP\_BurkPx IgG BPSS0530 0.6238027  
## 55 NHP\_BurkPx IgG BPSL1201\_IMPS 0.6144636  
## 56 NHP\_BurkPx IgG LPSB 0.6144636  
## 57 NHP\_BurkPx IgG BPSL2827\_DNAK 0.5979406  
## 58 Human\_BurkPx IgM BPSL1404\_ClpX 0.5946667  
## 59 NHP\_BurkPx IgG BPSS1850 0.5941092  
## 60 Human\_BurkPx IgG BPSL1201\_IMPS 0.5755943  
## 61 Human\_BurkPx IgM BPSS1769\_NADH 0.5748632  
## 62 NHP\_BurkPx IgG BPSL3396\_AtpD 0.5737548  
## 63 Human\_BurkPx IgM BPSL3396\_AtpD 0.5688033  
## 64 Human\_BurkPx IgM BPSL2522\_OmpA 0.5636674  
## 65 Human\_BurkPx IgG BPSL2827\_DNAK 0.5608922  
## 66 Human\_BurkPx IgM BPSS0477\_GroEL2 0.5604647  
## 67 Human\_BurkPx IgG BPSL3396\_AtpD 0.5603590  
## 68 Human\_BurkPx IgM BPSS1652 0.5601193  
## 69 Human\_BurkPx IgM BPSL2096\_AhpC 0.5591370  
## 70 Human\_BurkPx IgG BPSS1769\_NADH 0.5567601  
## 71 NHP\_BurkPx IgM BPSS0530 0.5548372  
## 72 Human\_BurkPx IgG BPSL3222\_rpIL 0.5477985  
## 73 Human\_BurkPx IgM BPSS0135 0.5404952  
## 74 Human\_BurkPx IgM BPSS1850 0.5344128  
## 75 Human\_BurkPx IgM LPSB 0.5327532  
## 76 Human\_BurkPx IgM BPSL1201\_IMPS 0.5209159  
## 77 Human\_BurkPx IgG BPSL1404\_ClpX 0.5146043  
## 78 Human\_BurkPx IgM BPSS0530 0.5144164  
## 79 Human\_BurkPx IgM BPSL3222\_rpIL 0.5116668  
## 80 Human\_BurkPx IgG BPSS1850 0.5079042  
## 81 Human\_BurkPx IgM BPSL1743\_Arg 0.5000718  
## 82 Human\_BurkPx IgM BPSS0476\_GroS 0.4981295  
## 83 Human\_BurkPx IgM BPSL2827\_DNAK 0.4898538  
## 84 Human\_BurkPx IgM BPSL2697\_GroEL 0.4488517

output %>%   
 group\_by(model, Type) %>% arrange(desc(AUC)) %>%   
 slice(1:5) %>% pander::pander()

|  |  |  |  |
| --- | --- | --- | --- |
| model | Type | Antigen | AUC |
| Human\_BurkPx | IgG | LPSA | 0.9424 |
| Human\_BurkPx | IgG | BPSS1498\_HCP1.B | 0.8939 |
| Human\_BurkPx | IgG | CPS | 0.8529 |
| Human\_BurkPx | IgG | BPSL2697\_GroEL | 0.8039 |
| Human\_BurkPx | IgG | MSHR5855.WCL | 0.7968 |
| Human\_BurkPx | IgM | LPSA | 0.786 |
| Human\_BurkPx | IgM | BPSS1498\_HCP1.B | 0.7406 |
| Human\_BurkPx | IgM | CPS | 0.7012 |
| Human\_BurkPx | IgM | MSHR5855.WCL | 0.6373 |
| Human\_BurkPx | IgM | BPSL1404\_ClpX | 0.5947 |
| NHP\_BurkPx | IgG | LPSA | 0.9368 |
| NHP\_BurkPx | IgG | CPS | 0.8946 |
| NHP\_BurkPx | IgG | BPSS1498\_HCP1.B | 0.8446 |
| NHP\_BurkPx | IgG | MSHR5855.WCL | 0.8056 |
| NHP\_BurkPx | IgG | BPSL2697\_GroEL | 0.7823 |
| NHP\_BurkPx | IgM | LPSA | 0.943 |
| NHP\_BurkPx | IgM | CPS | 0.9267 |
| NHP\_BurkPx | IgM | MSHR5855.WCL | 0.8894 |
| NHP\_BurkPx | IgM | BPSS1498\_HCP1.B | 0.8609 |
| NHP\_BurkPx | IgM | BPSL2522\_OmpA | 0.8398 |

library(expss)

##   
## Attaching package: 'expss'

## The following objects are masked from 'package:purrr':  
##   
## keep, modify, modify\_if, transpose

## The following object is masked from 'package:ggplot2':  
##   
## vars

## The following objects are masked from 'package:stringr':  
##   
## fixed, regex

## The following objects are masked from 'package:dplyr':  
##   
## between, compute, first, last, na\_if, recode, vars

## The following object is masked from 'package:tidyr':  
##   
## nest

data(mtcars)  
mtcars = apply\_labels(mtcars,  
 mpg = "Miles/(US) gallon",  
 cyl = "Number of cylinders",  
 disp = "Displacement (cu.in.)",  
 hp = "Gross horsepower",  
 drat = "Rear axle ratio",  
 wt = "Weight (1000 lbs)",  
 qsec = "1/4 mile time",  
 vs = "Engine",  
 vs = c("V-engine" = 0,  
 "Straight engine" = 1),  
 am = "Transmission",  
 am = c("Automatic" = 0,  
 "Manual"=1),  
 gear = "Number of forward gears",  
 carb = "Number of carburetors"  
)  
cro(mtcars$am, mtcars$vs)

 Engine

 V-engine

 Straight engine

 Transmission

   Automatic

12

7

   Manual

6

7

   #Total cases

18

14