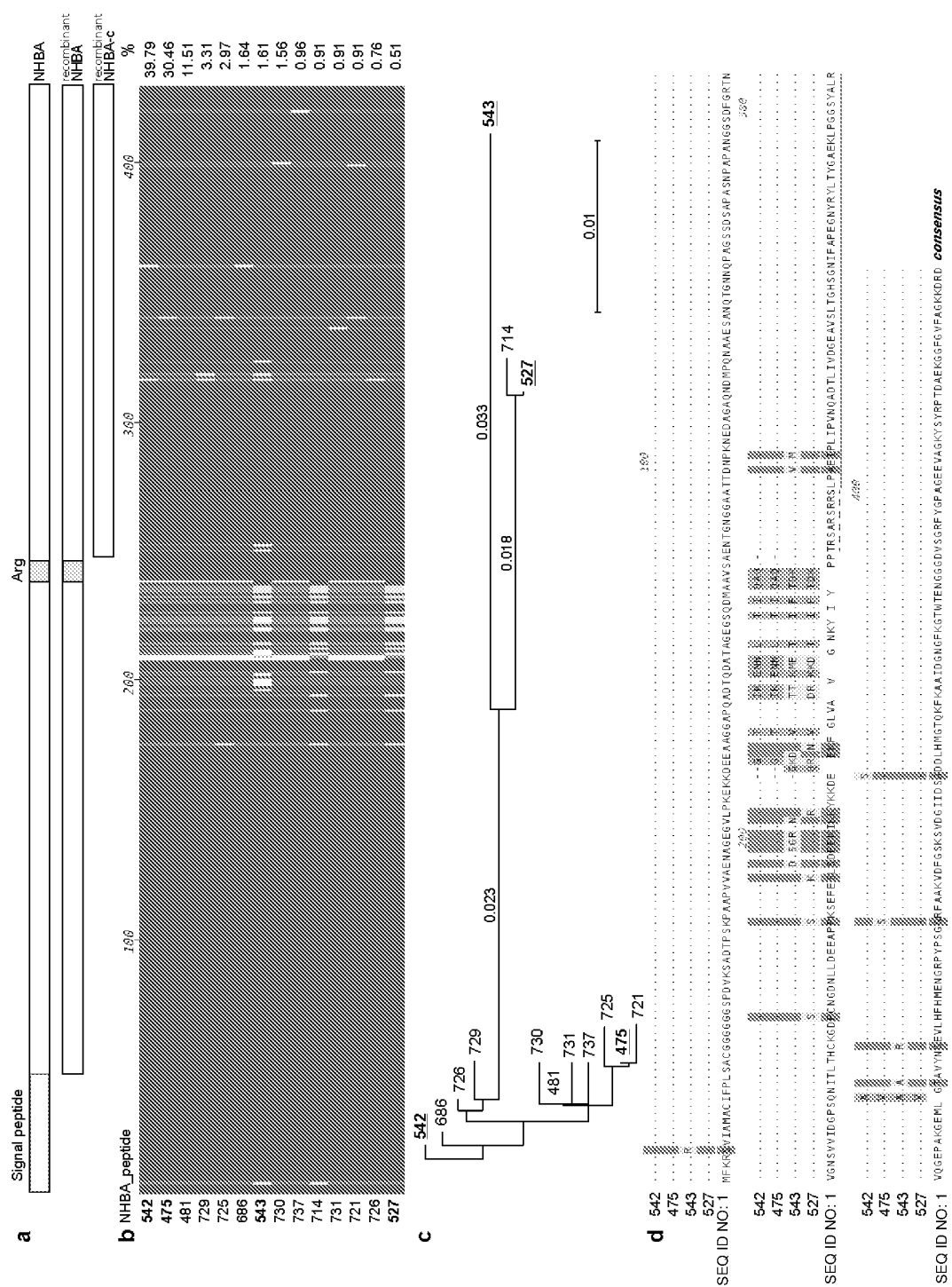




**FIG. 1**

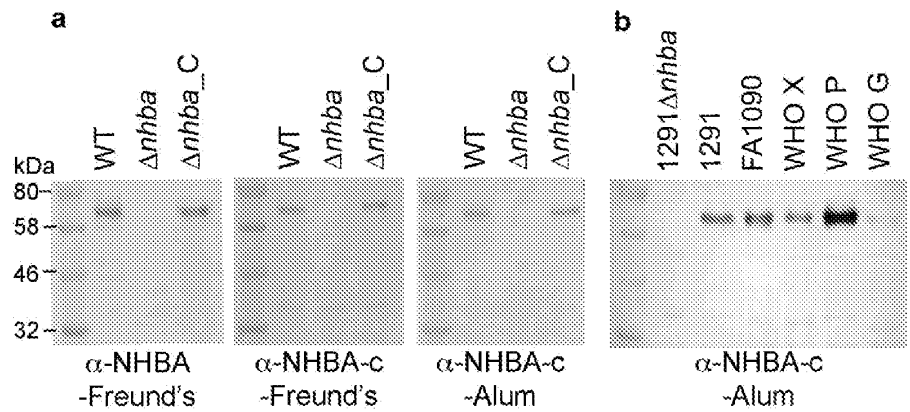


FIG. 2

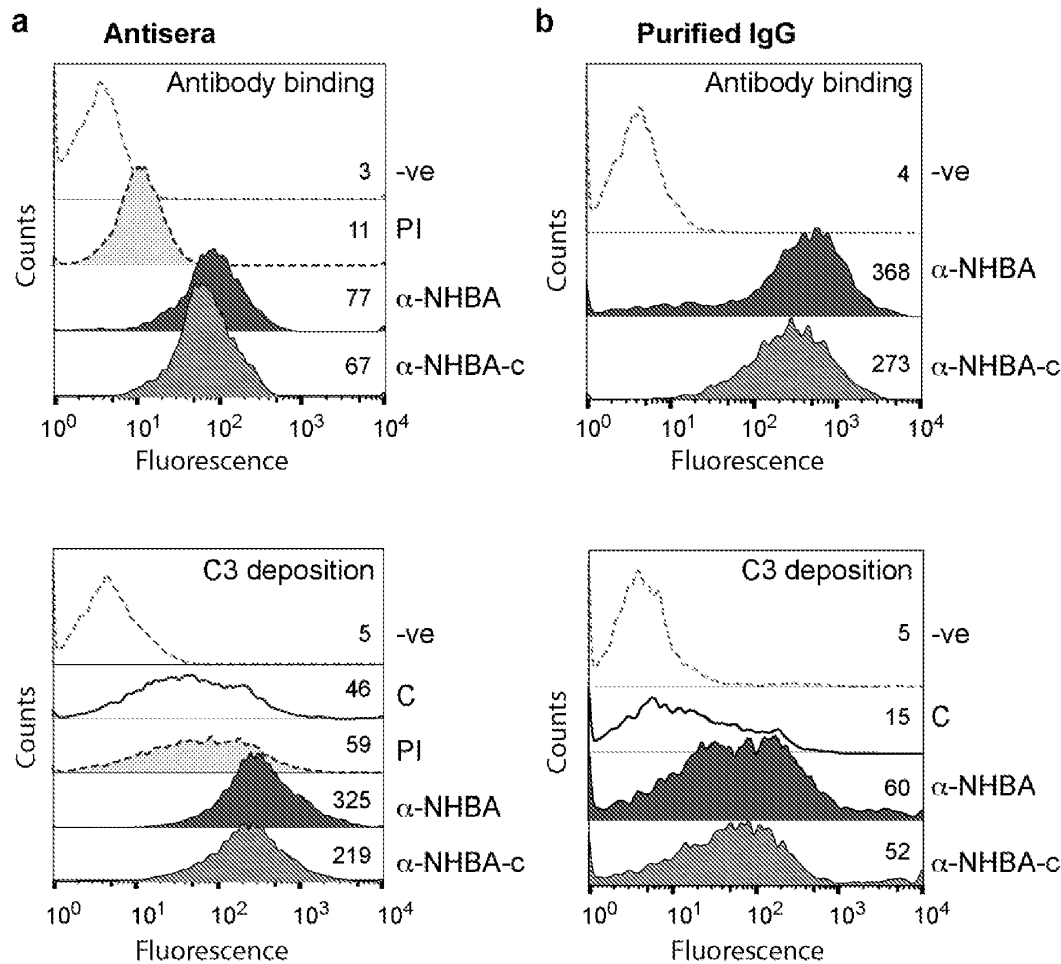


FIG. 3

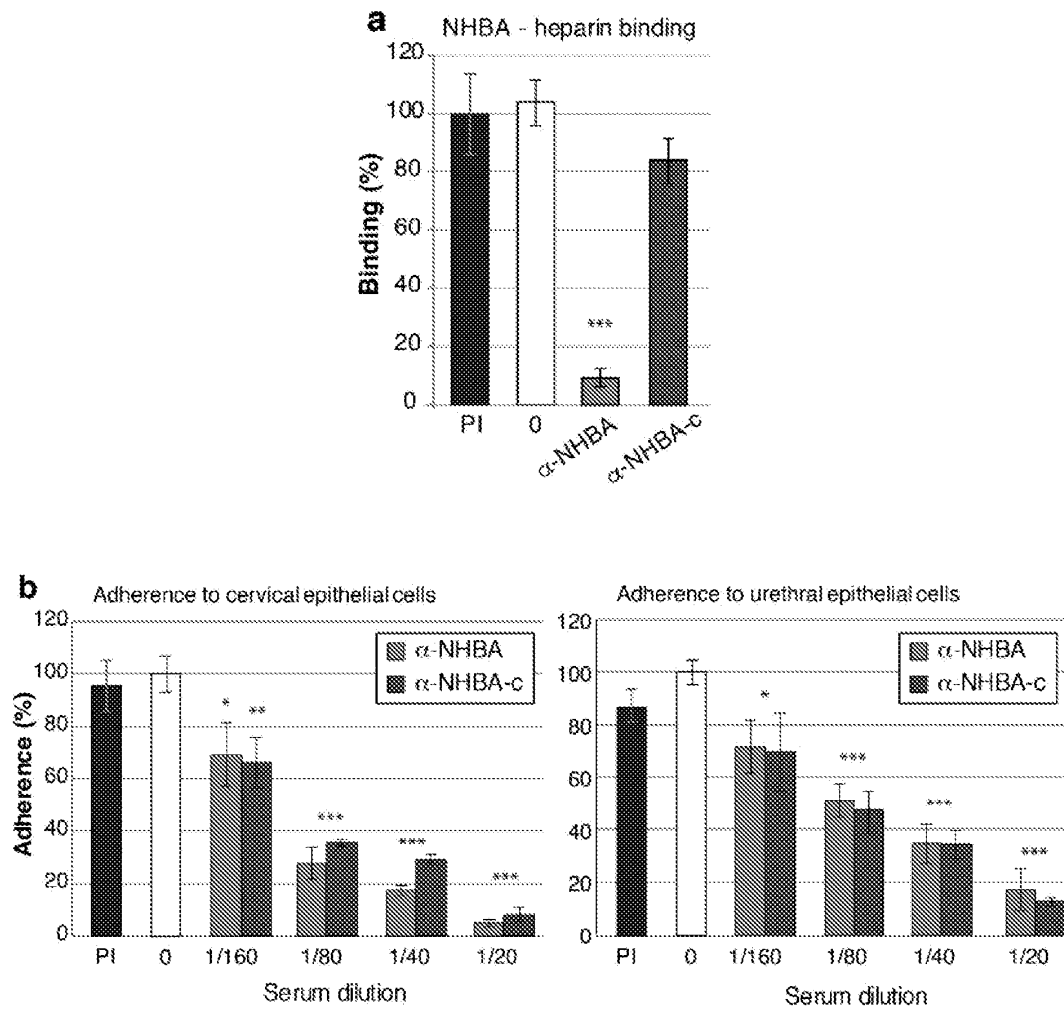


FIG. 4

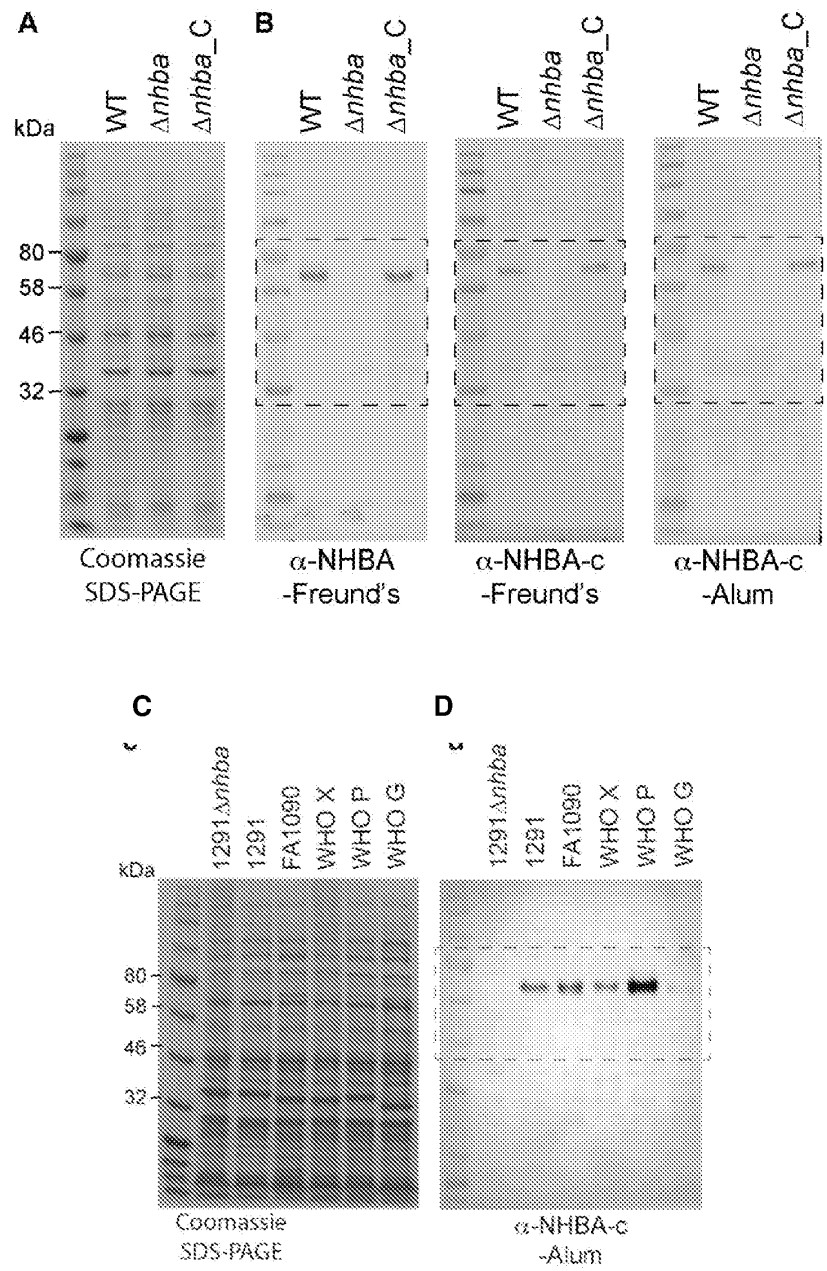
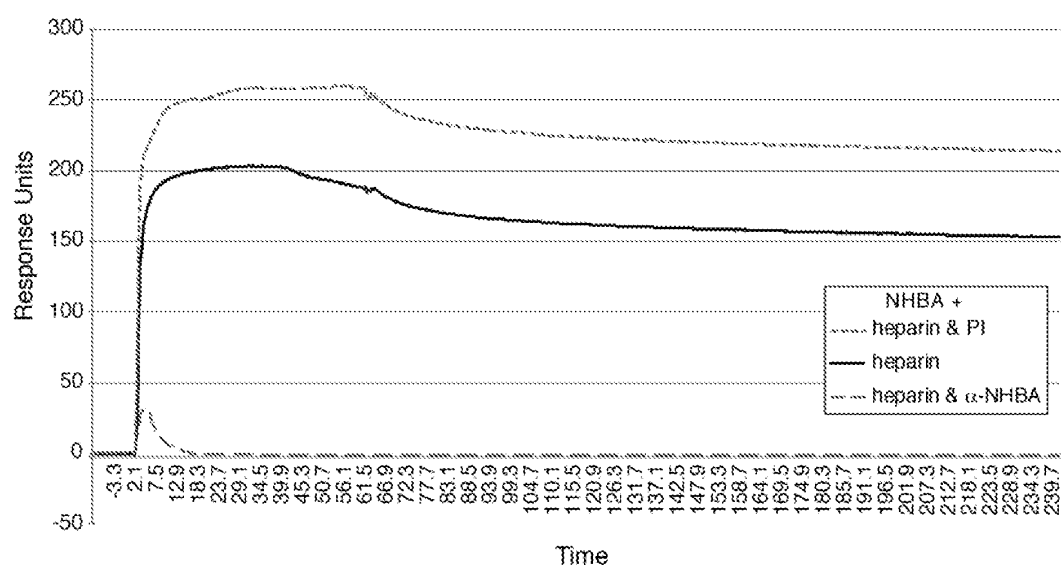
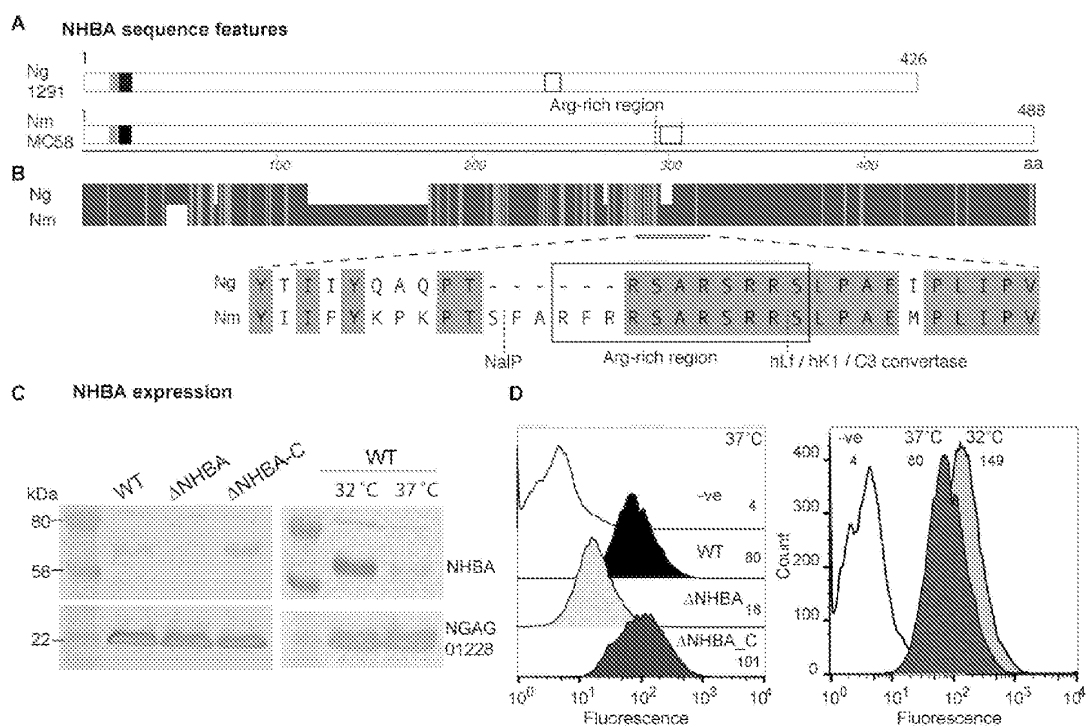


FIG. 5



**FIG. 6**



**FIG. 7**

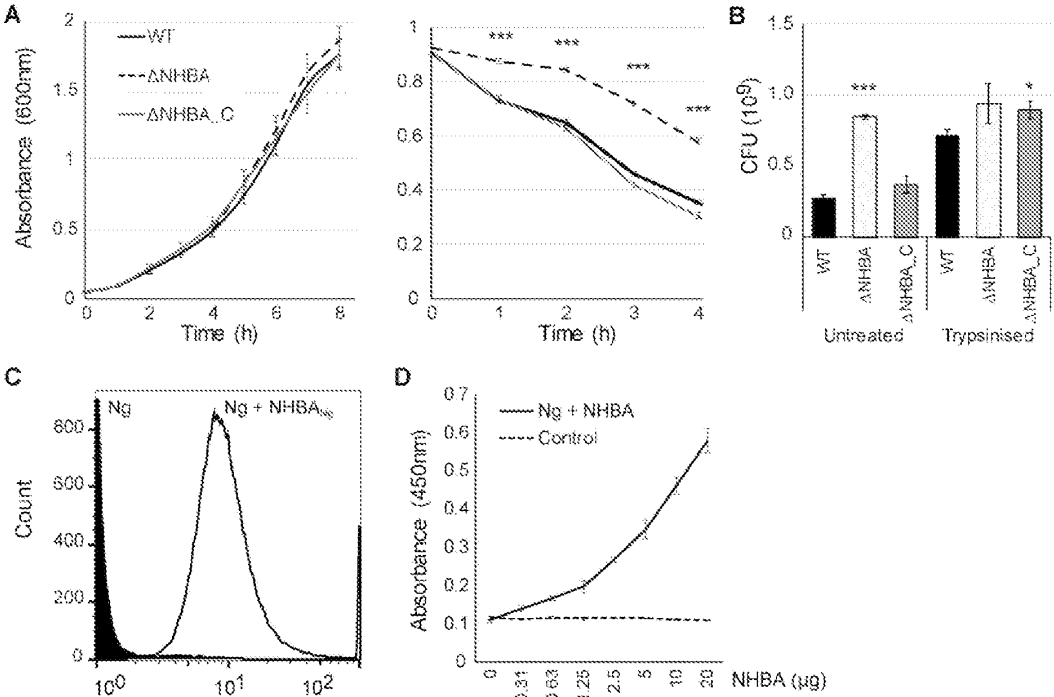


FIG. 8

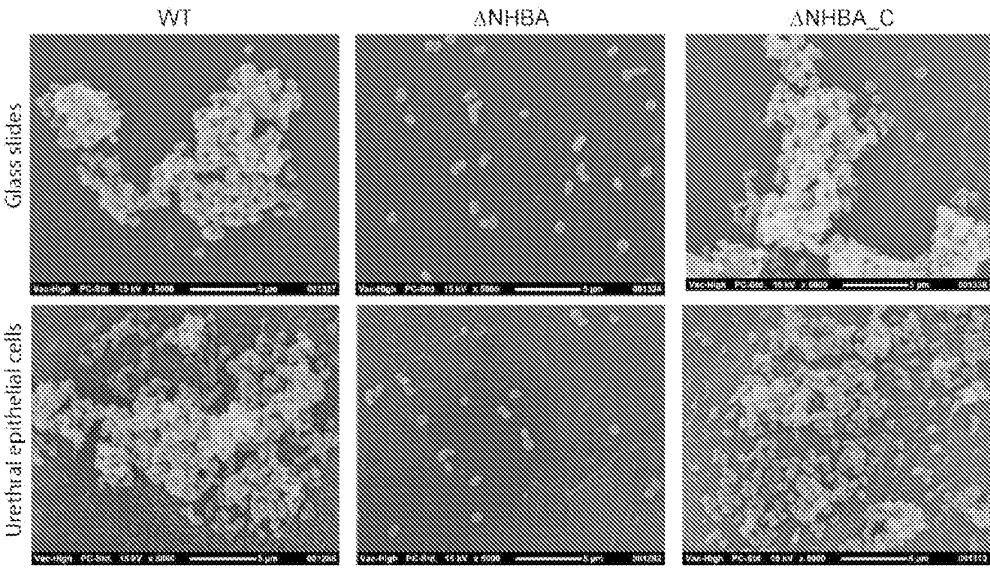


FIG. 9

A

| Name                                  | Structure | K <sub>D</sub> (μM) |                   |
|---------------------------------------|-----------|---------------------|-------------------|
|                                       |           | Ng<br>NHBA          | Nnp<br>NHEA*      |
| Heparan sulfate                       |           | 2.79<br>±1.83       | 1.36<br>±0.2      |
| Heparin                               |           | 0.0044<br>±0.0017   | 0.052<br>±0.026   |
| Hyaluronan                            |           | NB                  | 0.13<br>±0.03     |
| Chondroitin sulfate<br>A, C, D<br>mix |           | 0.073<br>±0.021     | 0.0052<br>±0.0024 |
| A                                     |           | NB                  | NB                |
| B                                     |           | NB                  | NB                |
| C                                     |           | 2.43<br>±1.04       | 71.8<br>±16.9     |
| Chondroitin disaccharide<br>ΔDi-disD  |           | 7.54<br>±2.87       | 0.0095<br>±0.0029 |
| ΔDi-disB                              |           | 5.11<br>±2.98       | 0.52<br>±0.045    |
| ΔDi-trisS                             |           | 4.58<br>±3.20       | NB                |
| ΔDi-UA2S                              |           | 4.38<br>±2.88       | NB                |

B

| Name                                | Structure | K <sub>D</sub> (μM) |              |
|-------------------------------------|-----------|---------------------|--------------|
|                                     |           | Ng<br>NHBA          | Nnp<br>NHEA* |
| H-disaccharide                      |           | NB                  |              |
| Lewis X<br>(CD15)                   |           | 0.68<br>±0.16       |              |
| Sialyl Lewis X<br>(CD15s)           |           | 3.65<br>±2.62       |              |
| LS-<br>Tetrasaccharide b<br>(LST b) |           | 2.26<br>±1.00       |              |
| LS-<br>Tetrasaccharide c<br>(LST c) |           | 0.24<br>±0.09       |              |
| Lacto-N-<br>neotetraose<br>(LNT)    |           | 4.69<br>±1.71       |              |
| β-Glc6P                             |           | 4.72<br>±2.67*      |              |
| Hexaacetyl<br>chitohexaose          |           | 8.93<br>±4.71       |              |
| α1-2 Mannobiose                     |           | 2.99<br>±1.21       |              |

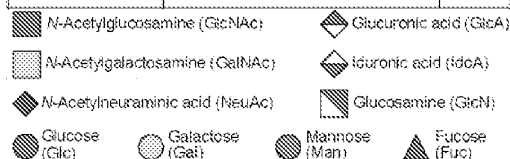


FIG. 10

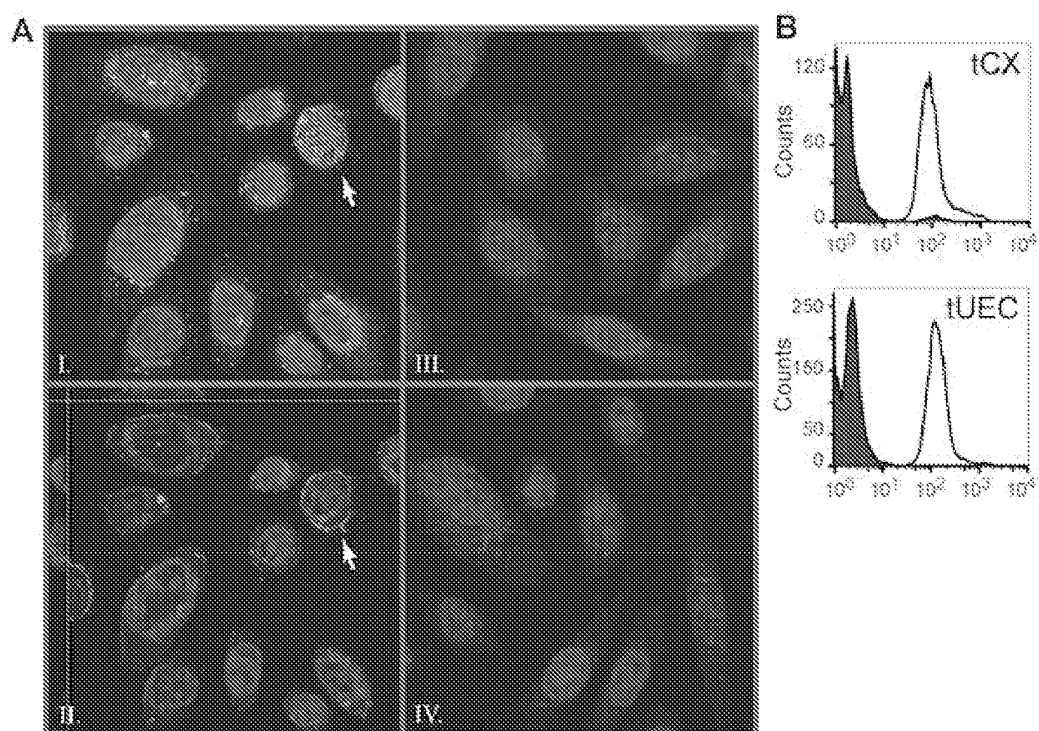


FIG. 11

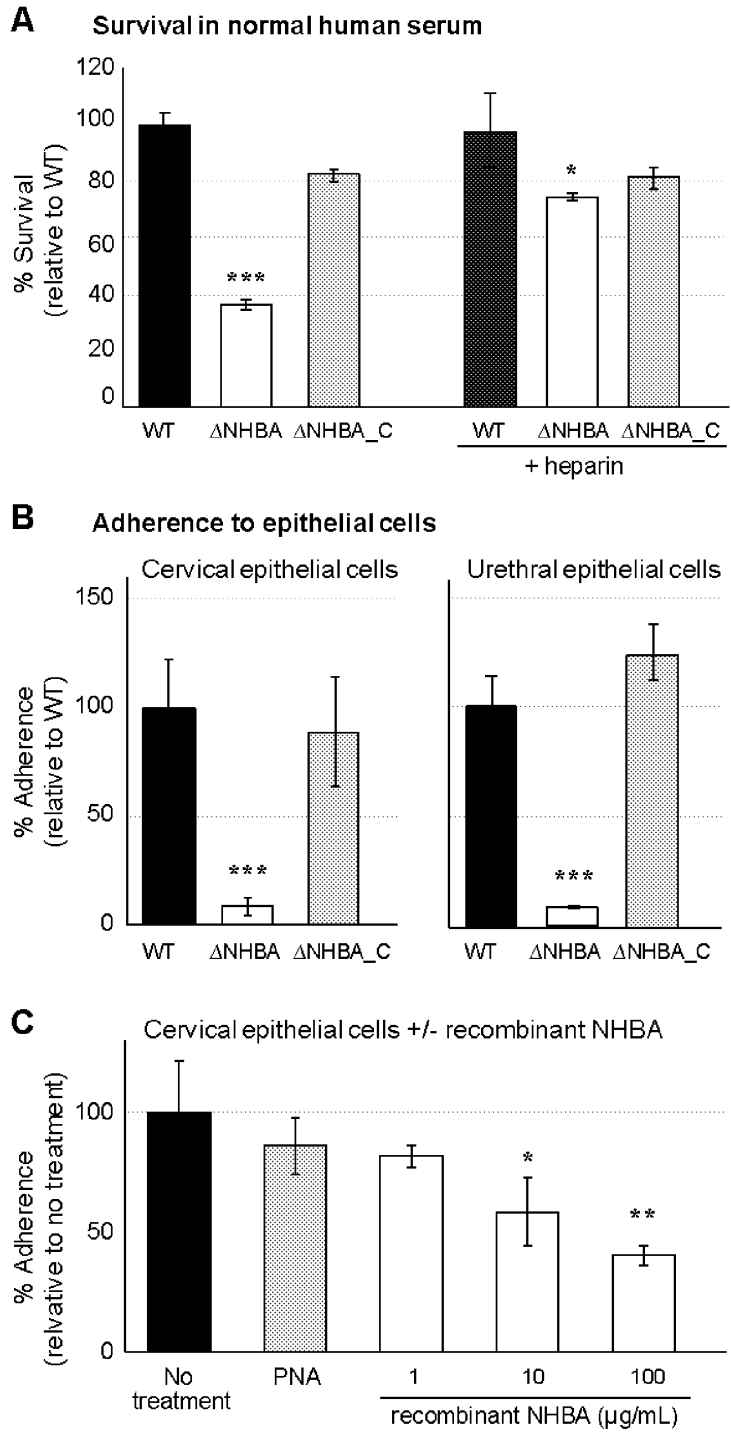


FIG. 12

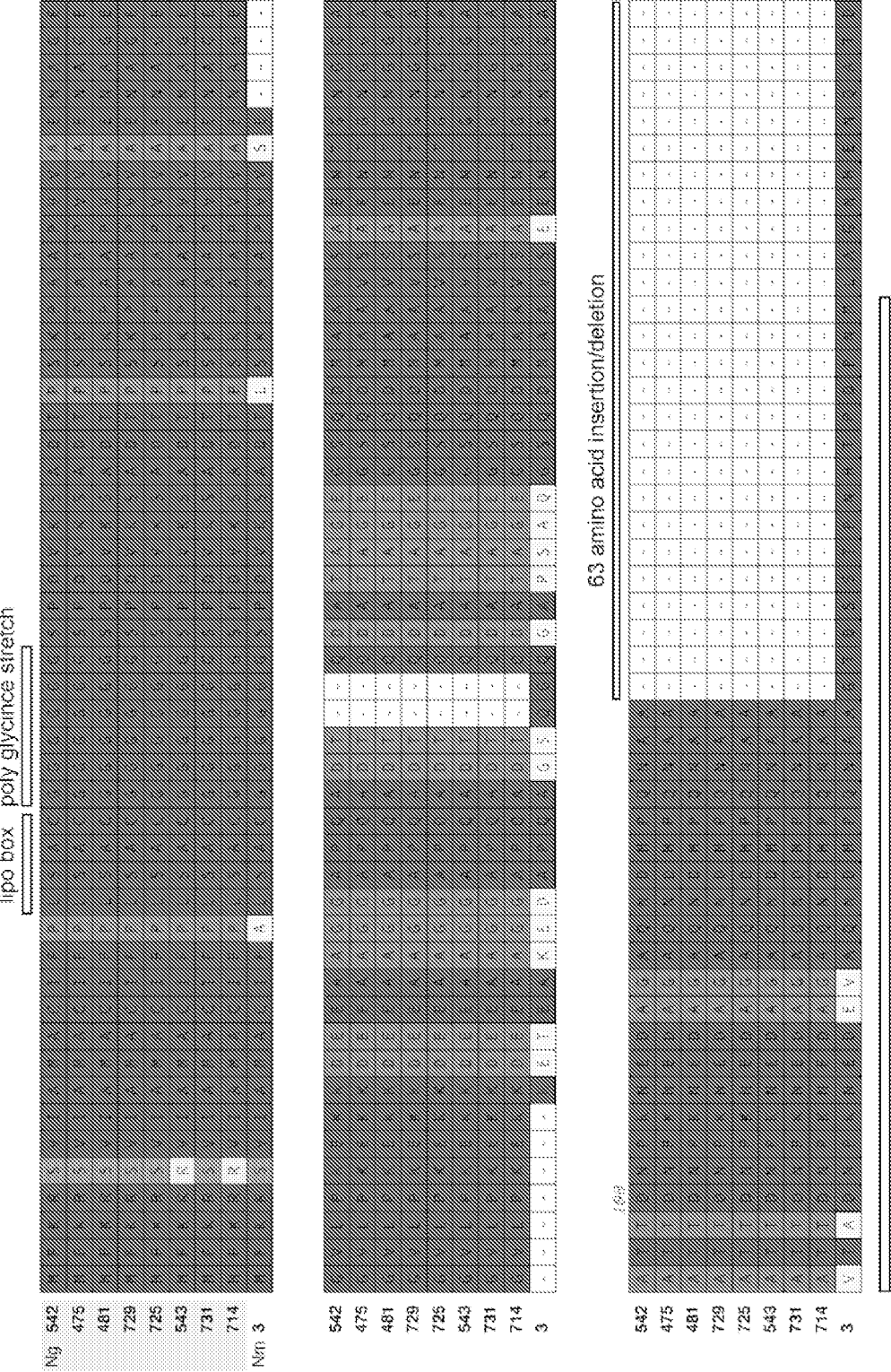


FIG. 13



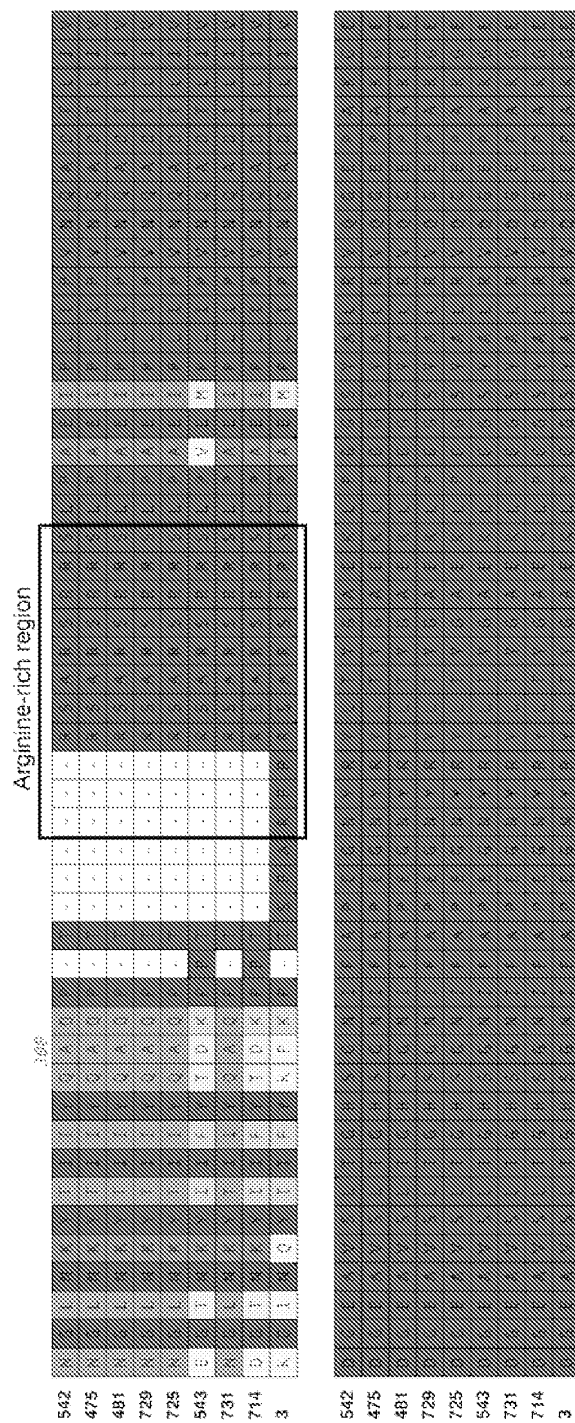


FIG. 13 cont'd

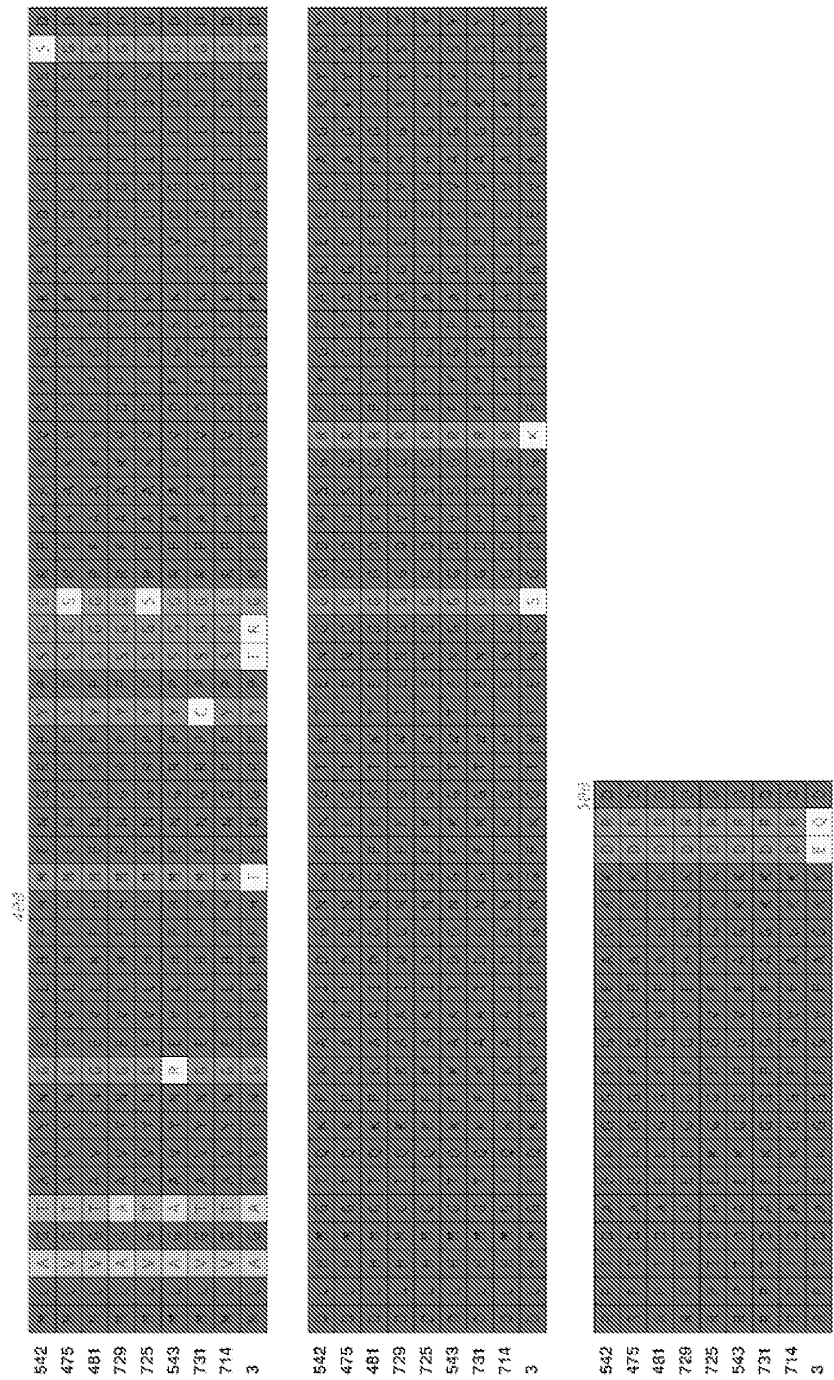


FIG. 13 cont'd

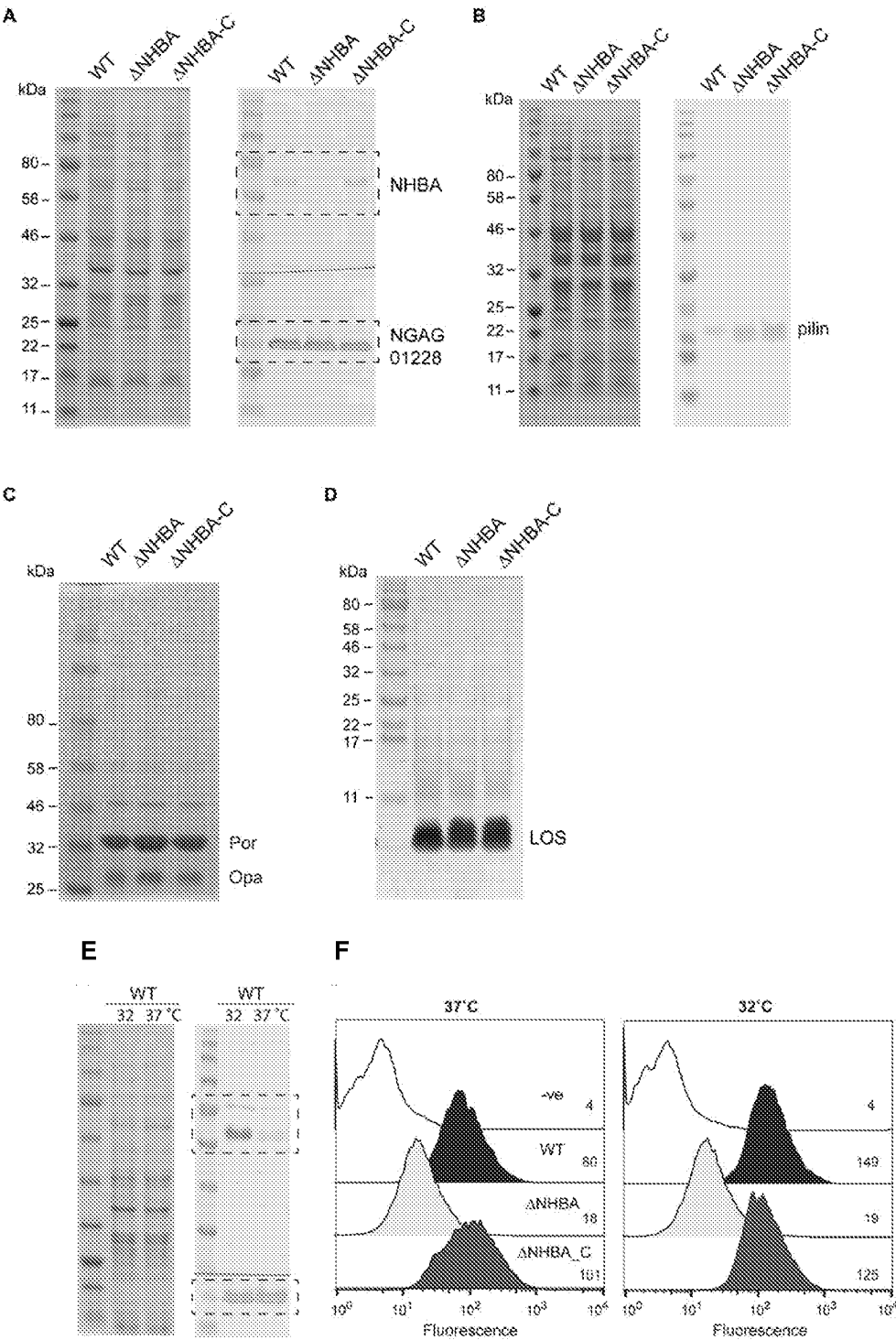


FIG. 14

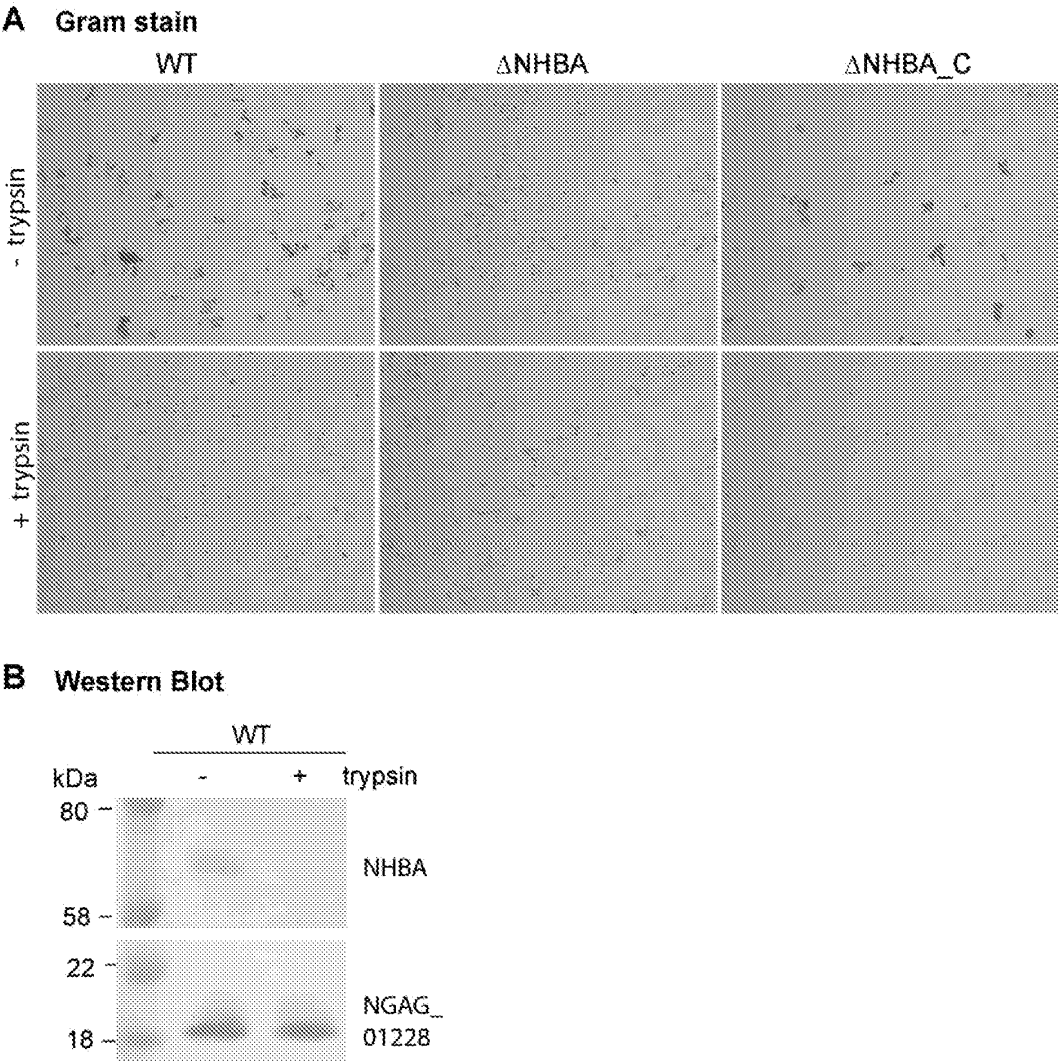


FIG. 15

|        | Class                     | NHBA <sub>Ng</sub> | No. glycans bound |
|--------|---------------------------|--------------------|-------------------|
| Glycan | Terminal Gal              |                    | 6/100 (6%)        |
|        | Terminal GlcNAc           |                    | 4/30 (13%)        |
|        | Mannosyl                  |                    | 1/20 (5%)         |
|        | Fucosyl                   |                    | 7/66 (11%)        |
|        | Sialylated                |                    | 8/66 (12%)        |
|        | Terminal GalNAc           |                    | 4/22 (18%)        |
|        | Terminal Glc              |                    | 3/12 (25%)        |
|        | Glycosaminoglycans (GAGs) |                    | 5/43 (12%)        |
|        | Other                     |                    | 1/9 (11%)         |
|        |                           |                    |                   |

FIG. 16

Sequence of NHBA from *N. gonorrhoeae* 1291      SEQ ID NO: 1

MFKRSVIAMACIFPLSACGGGGGGSPDVKSADTPSKPAAPVVAENAGEGVLPKEKKDEEA  
AGGAPQADTQDATAGEGSQDMAA VSAENTGNNGAAATTDNPKNEDAGAQNMPQNAAE  
SANQTGNNQPAGSSDSAPASNAPANGGSDFGRTNVGNSVIDGPSQNIILTHCKGDPGNG  
DNLLDEEAPPKSEFESLSDEEKIKKYKKDGEKFTGLVAIKVENNGLNKYTHYQAQPTRSAR  
SRRSLPAEIPLVNQADTLIVDGEAVSLTGHSGNIFAPEGNRYRLTYGAEKLPGGSYALRV  
QGEPAKGEMLAGTAVYNGEVLHFHMENGRPYPSGGRFAAKVDFGSKSVDDGIIDSSDDLH  
MGTQKFKA AIDNGFKGTWTENGGDVSGRFYGPAGEEVAGKYSYRPTDAEKGGFGVFA  
GKKDRD

Sequence of NHBA-C (c terminal fragment)      SEQ ID NO: 2

LPAEIPLVNQADTLIVDGEAVSLTGHSGNIFAPEGNRYRLTYGAEKLPGGSYALRVQGEP  
AKGEMLAGTAVYNGEVLHFHMENGRPYPSGGRFAAKVDFGSKSVDDGIIDSSDDLHMGTTQ  
KFKAAIDNGFKGTWTENGGDVSGRFYGPAGEEVAGKYSYRPTDAEKGGFGVFAKKD  
RD

FIG. 17



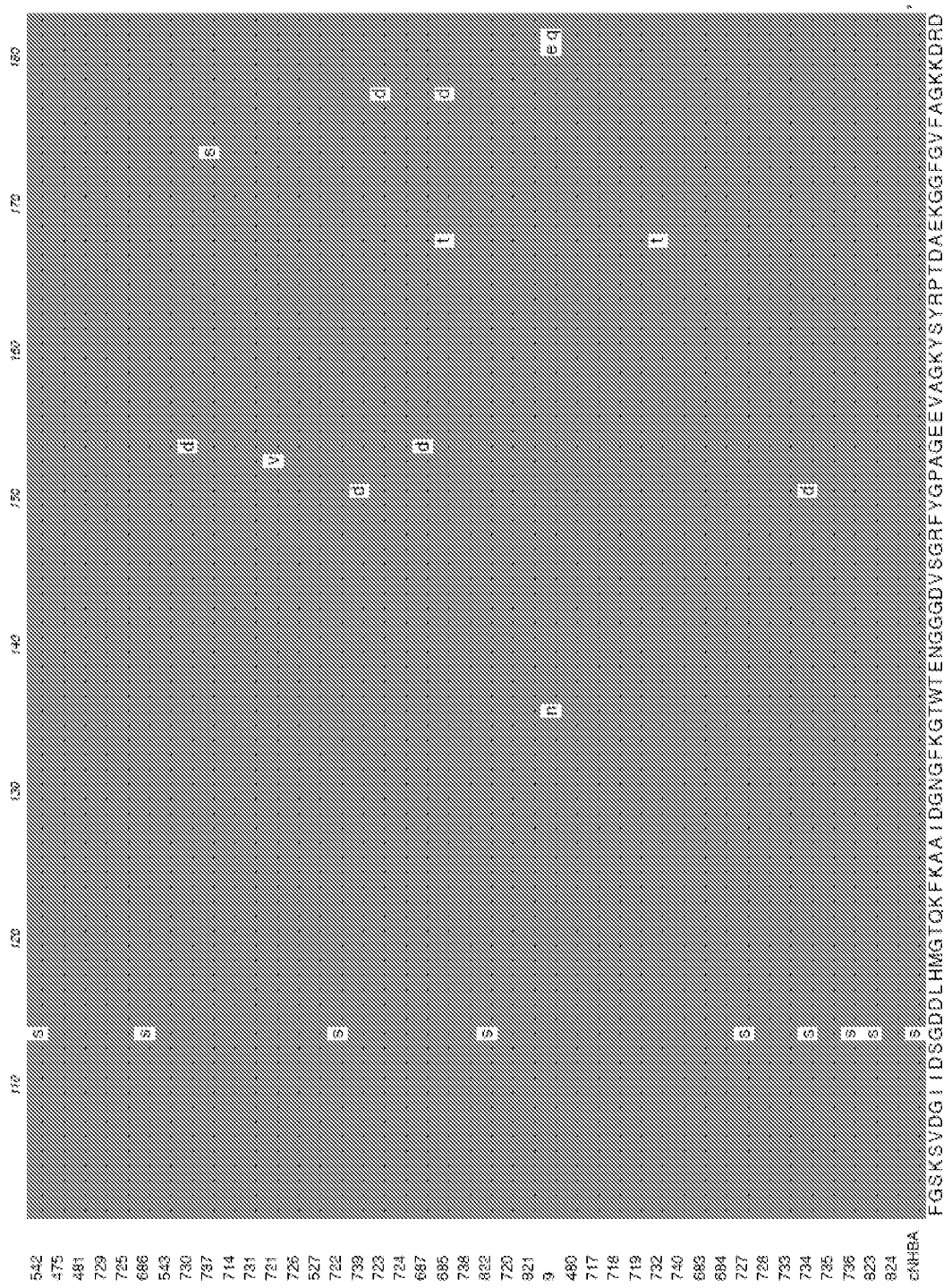


FIG. 18 cont'd

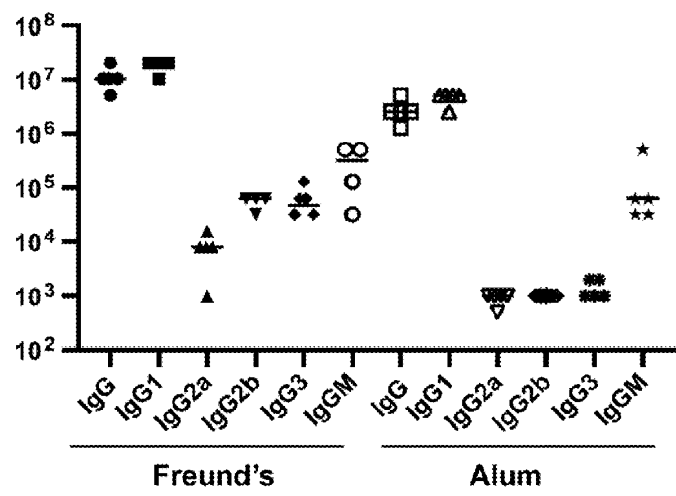


FIG. 19

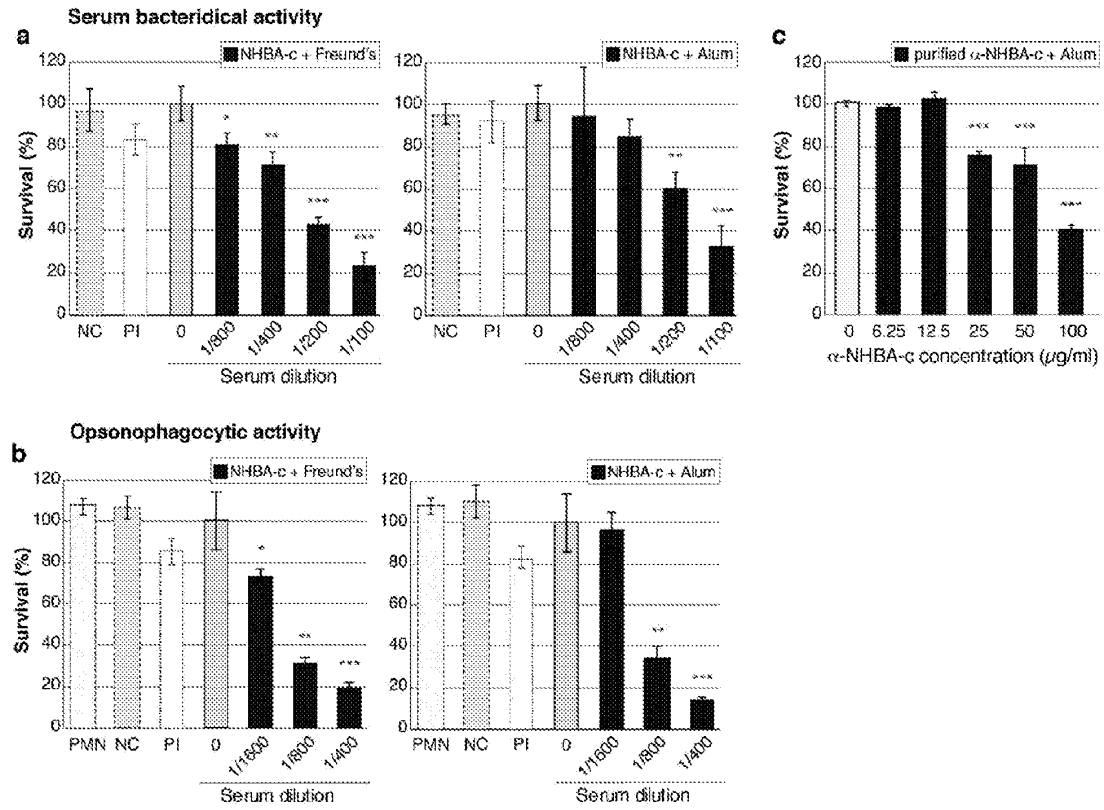


FIG. 20

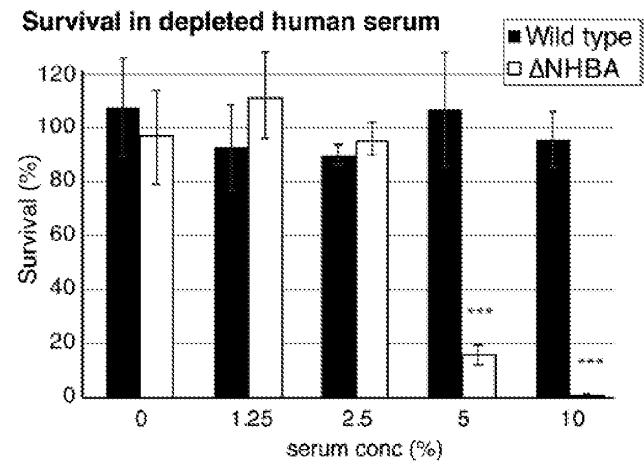


FIG. 21

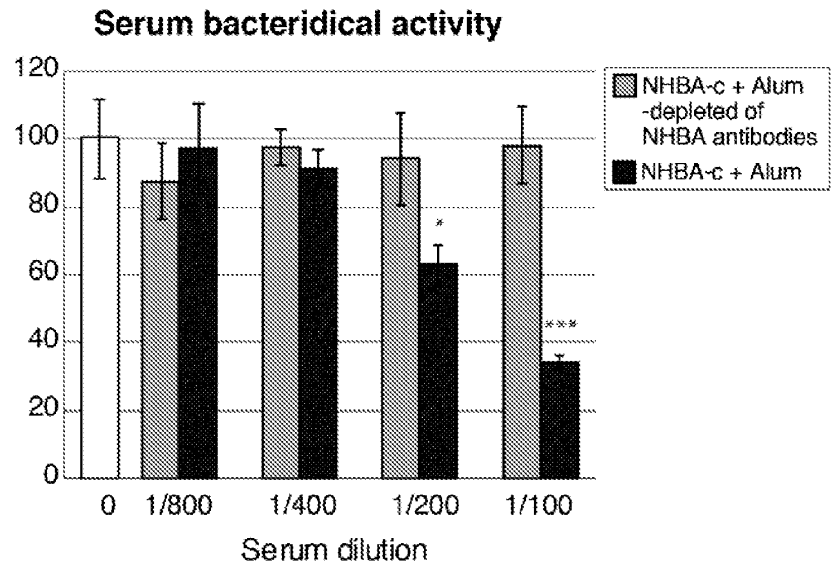


FIG. 22