

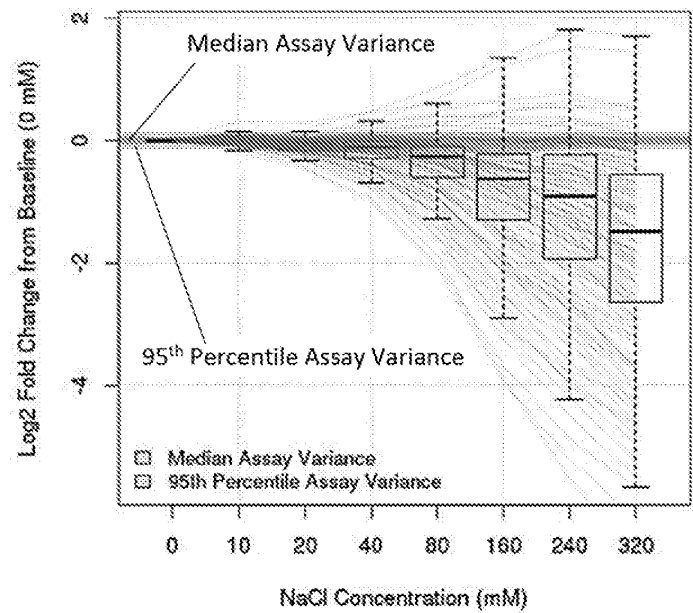


FIG. 1A

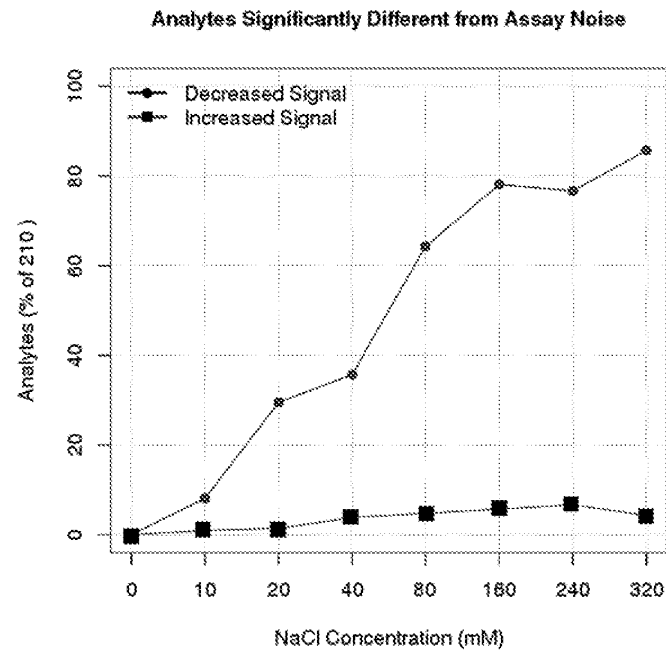


FIG. 1B

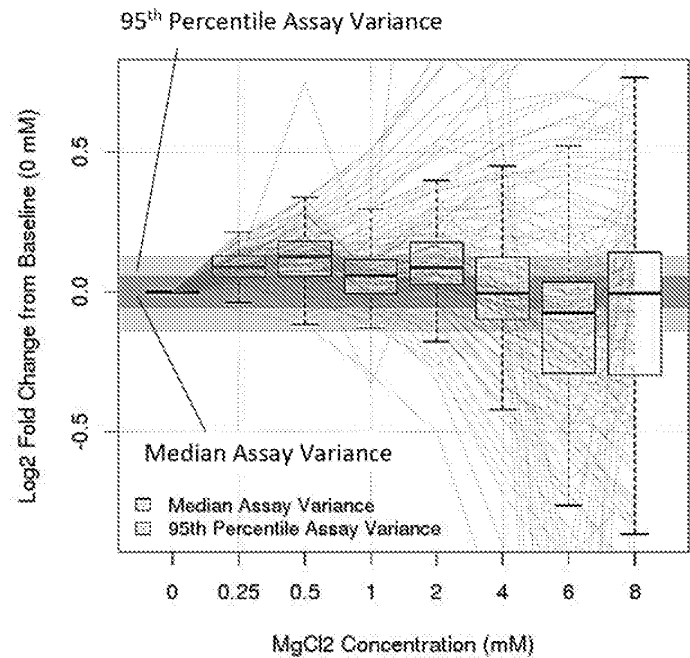


FIG. 2A

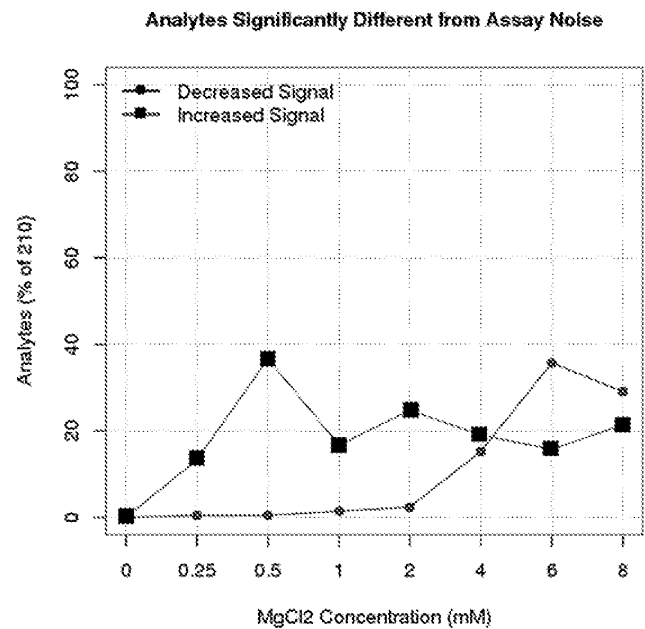
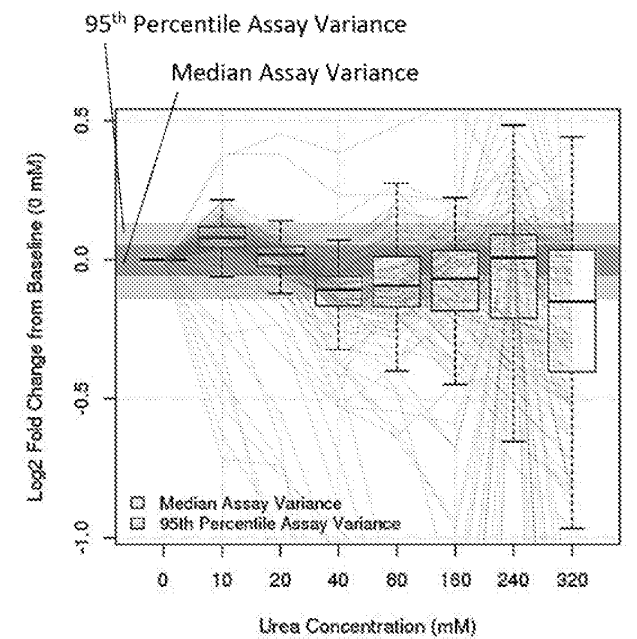


FIG. 2B

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FIG. 3A

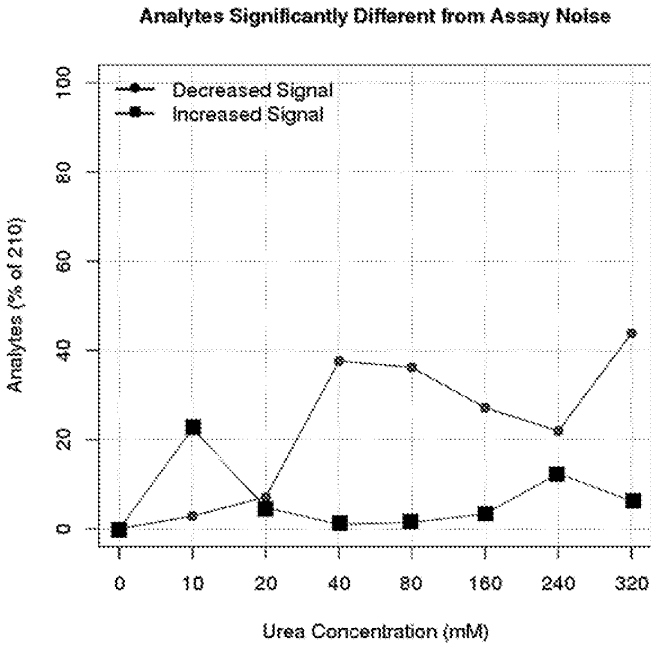


FIG. 3B

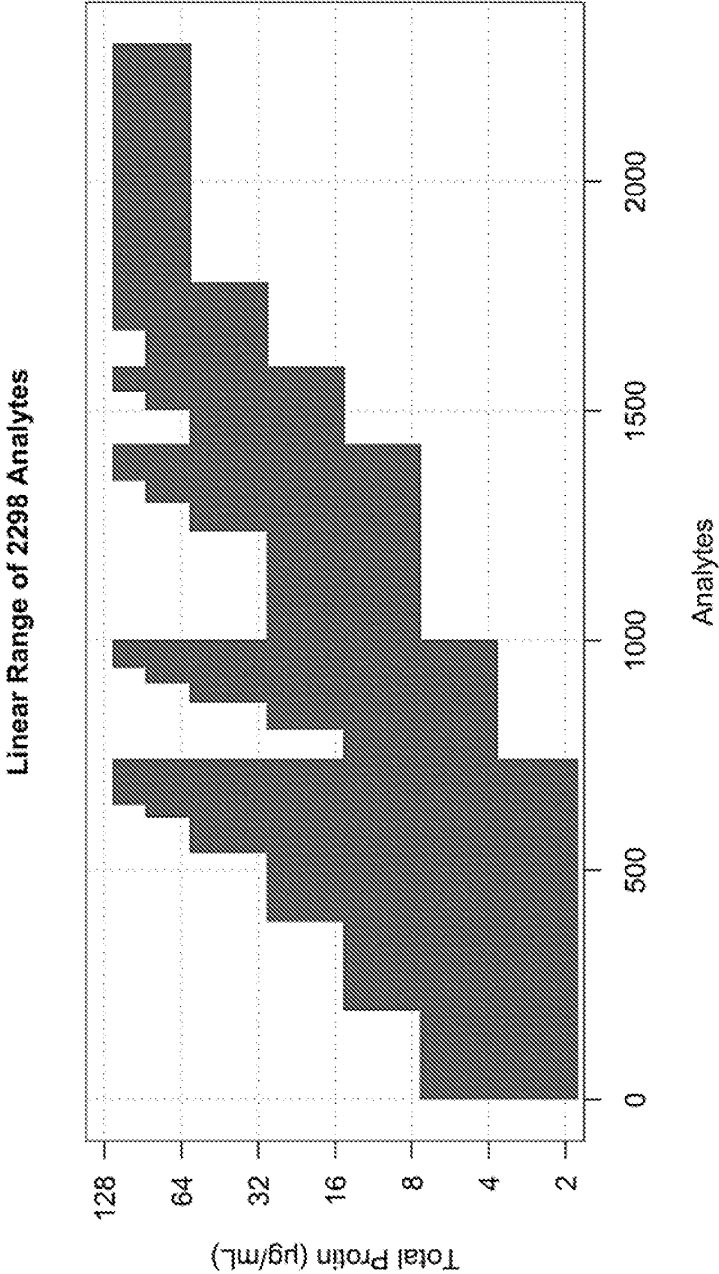


FIG. 4

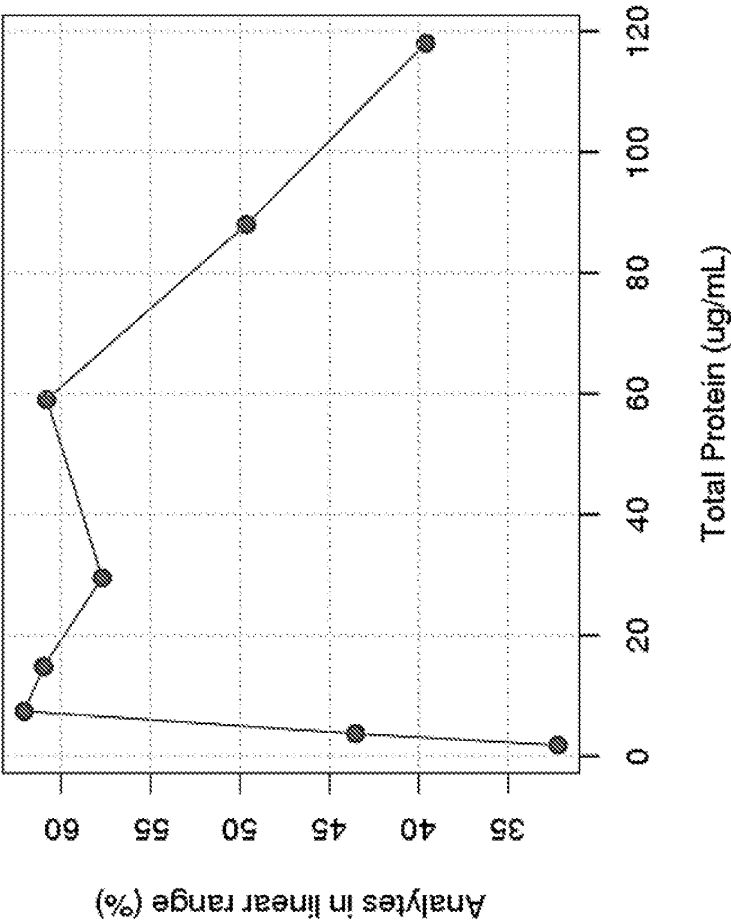


FIG. 5

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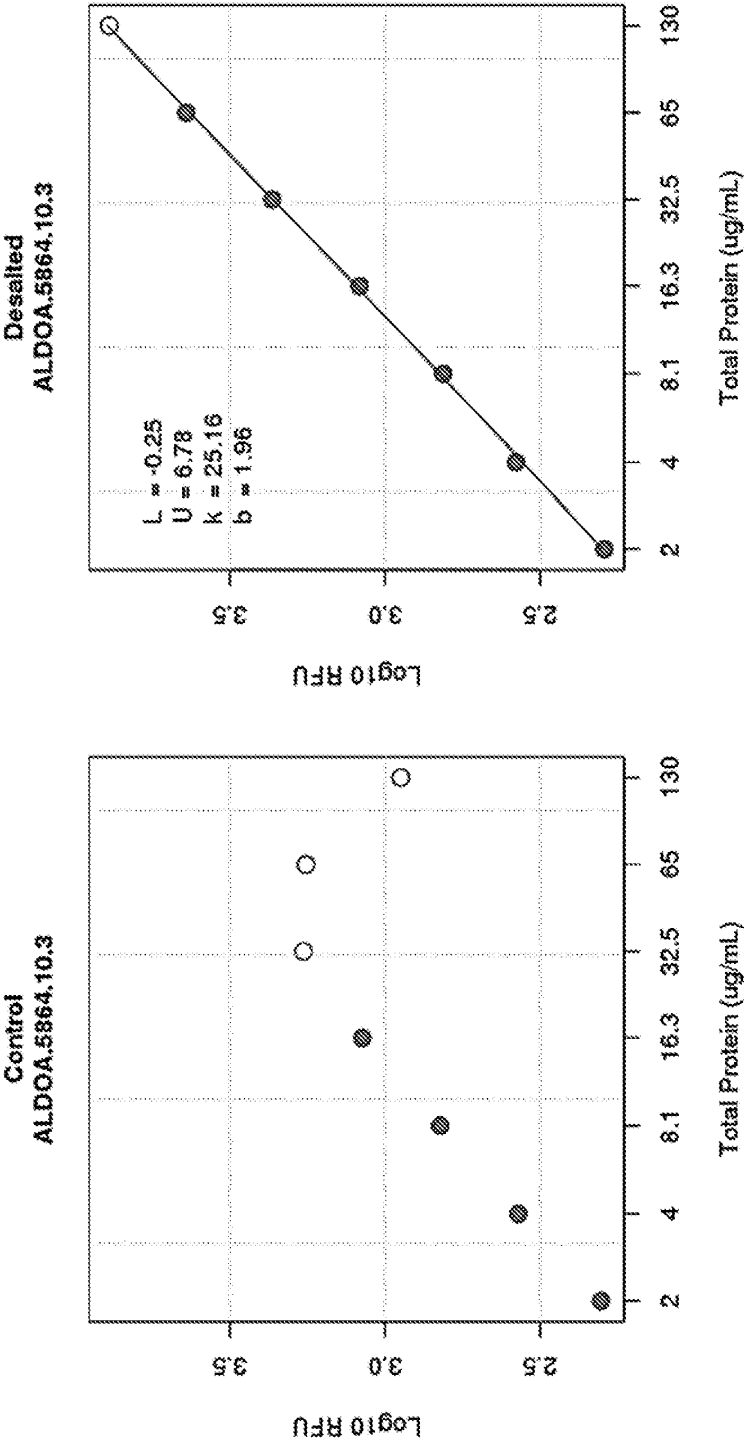


FIG. 6

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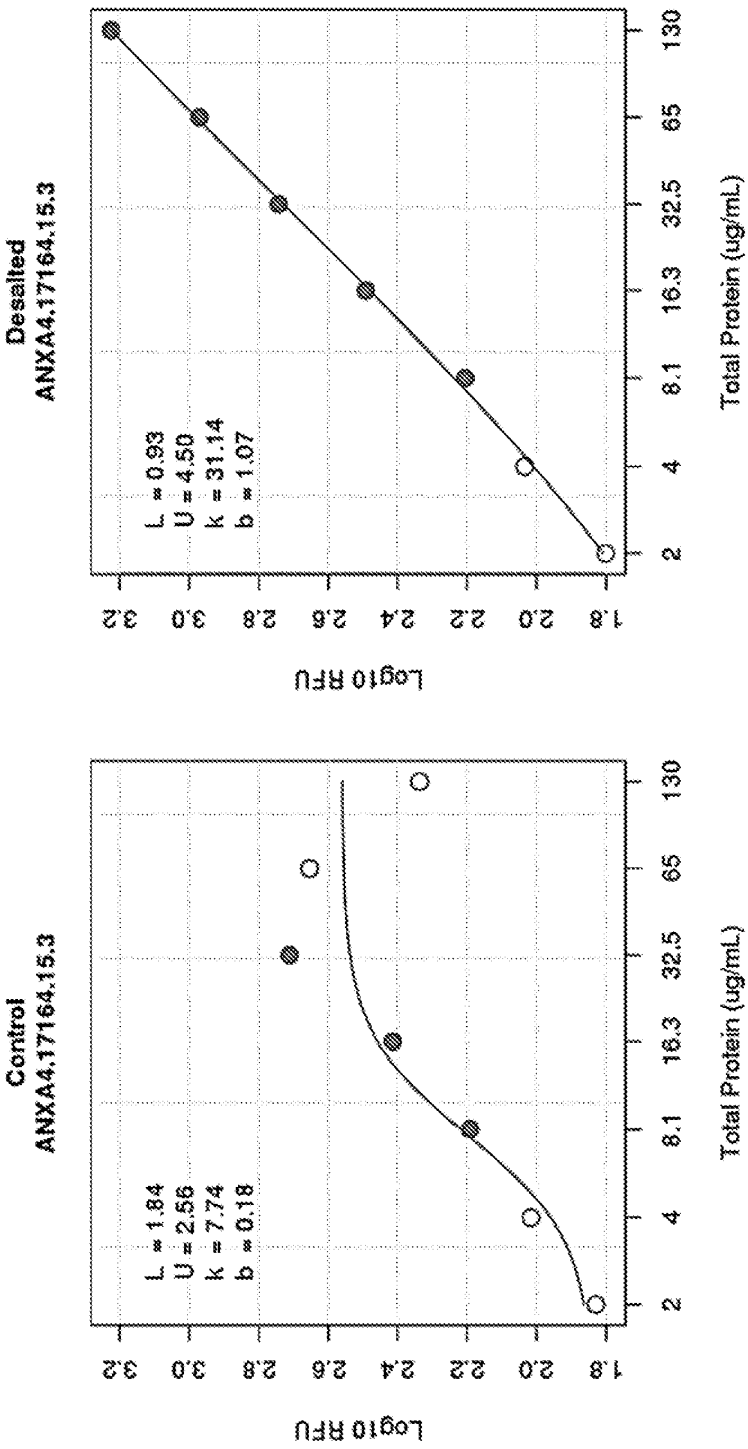


FIG. 6 (cont.)

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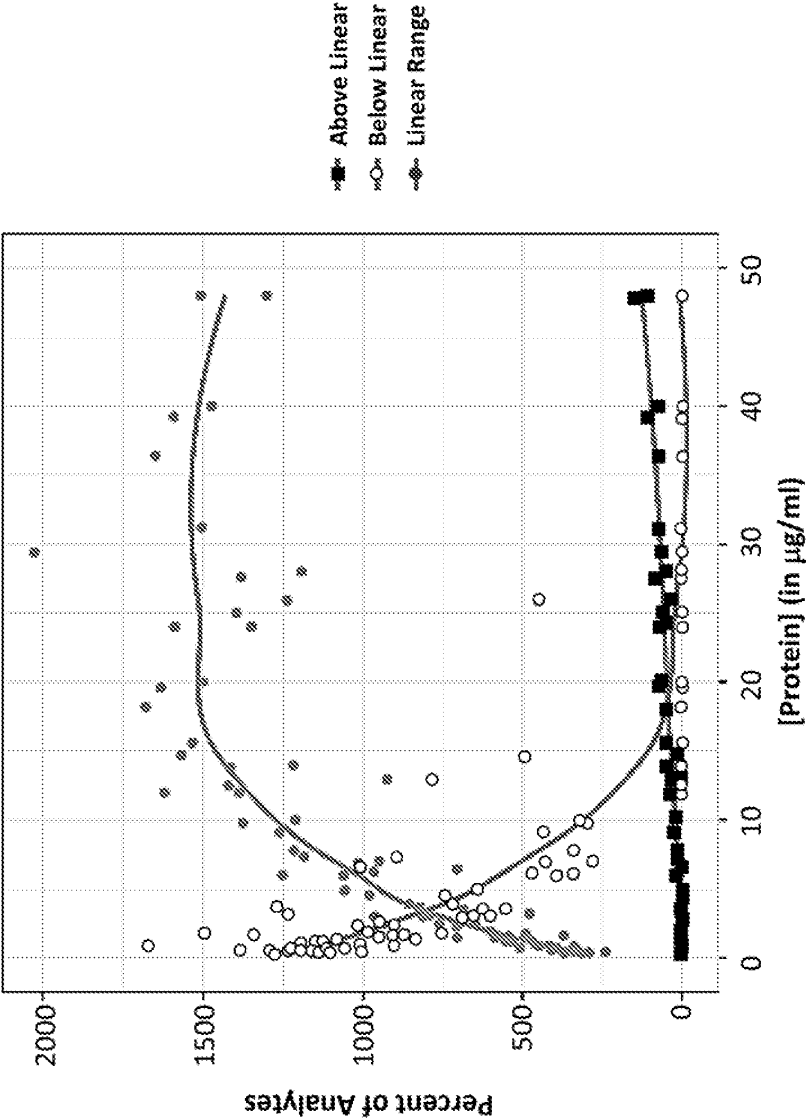


FIG. 7A

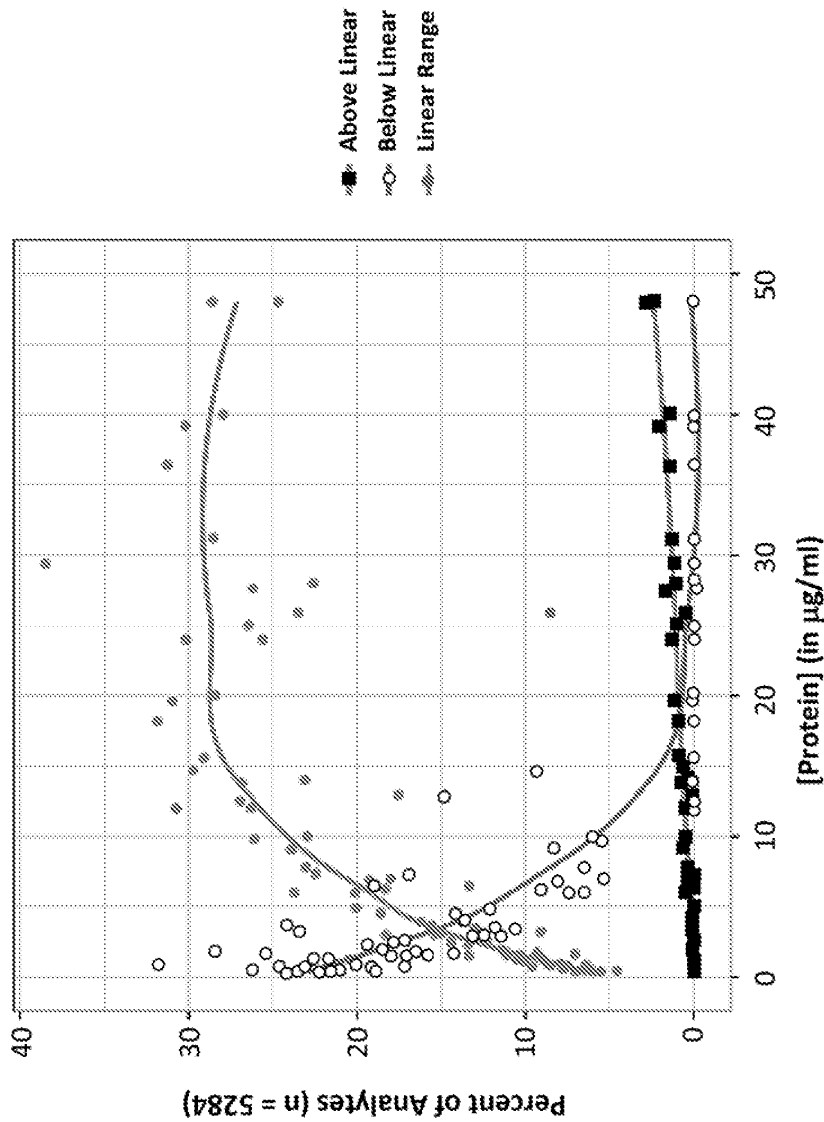
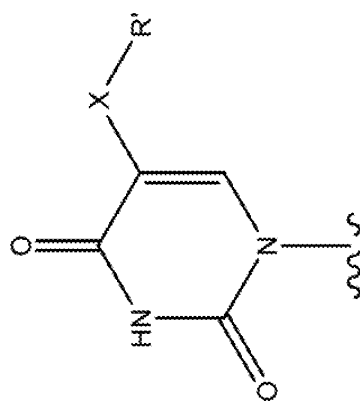


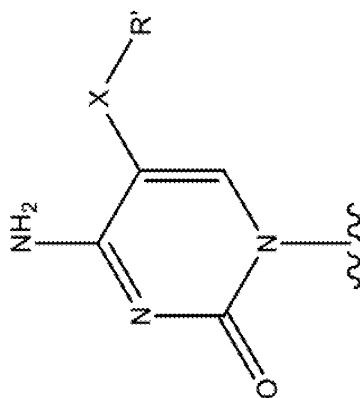
FIG. 7B

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URACIL



CYTOSINE



~~~~~ - denotes attachment to backbone of nucleic acid molecules (e.g., phosphate deoxyribose backbone)

X - denotes a linker attached to the 5-position of the pyrimidine molecule (uracil or cytosine)

R' - denotes a moiety attached to the 5-position of the pyrimidine molecule via the linker (X)

FIG. 8

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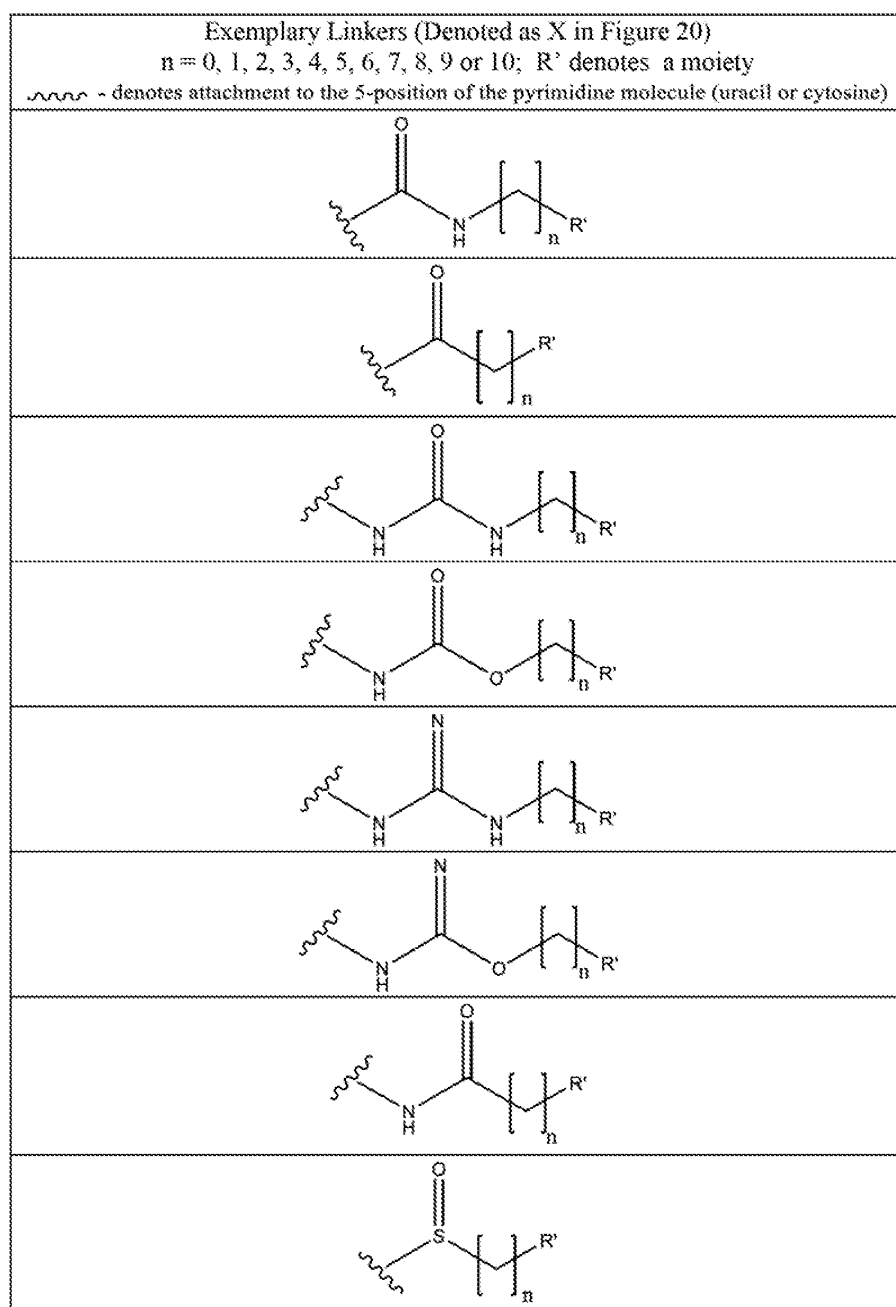


FIG. 8 (cont.)

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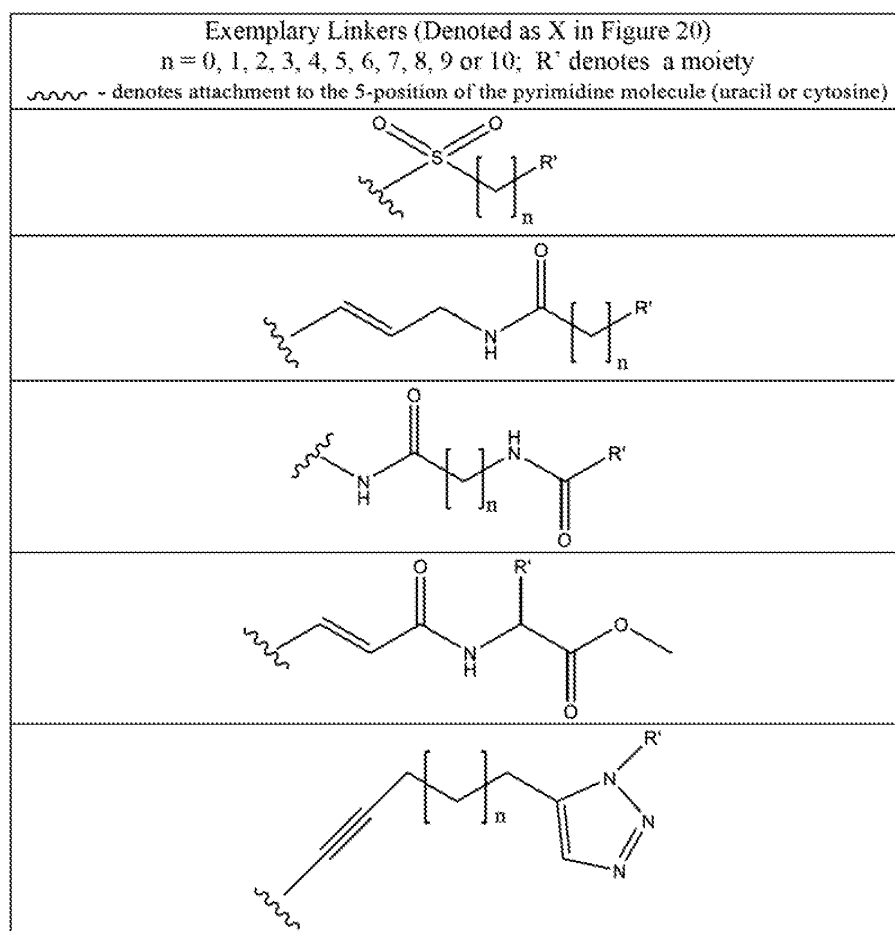


FIG. 8 (cont.)

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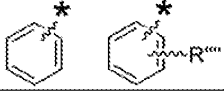
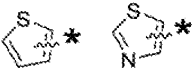
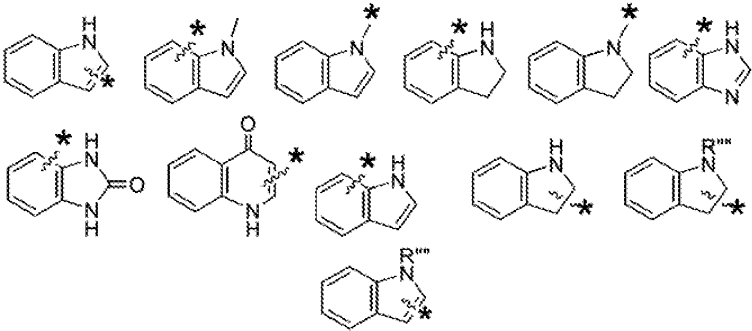
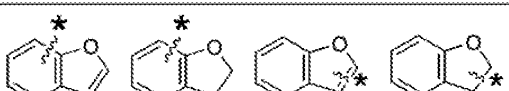
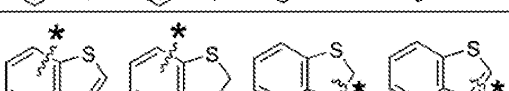
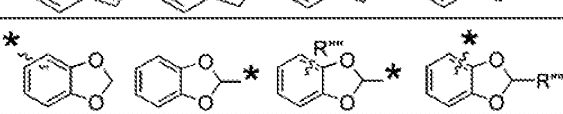
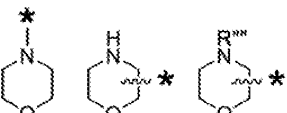
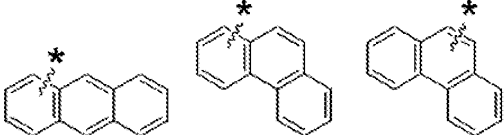
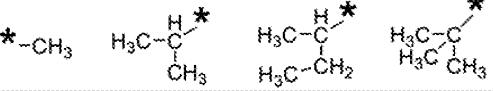
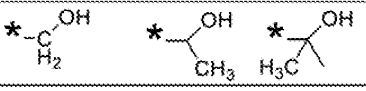
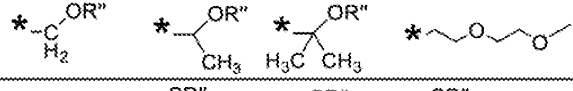
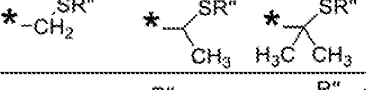
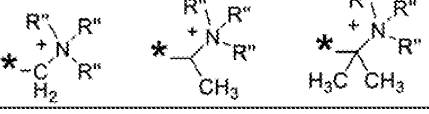
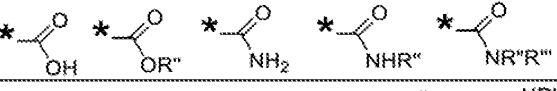
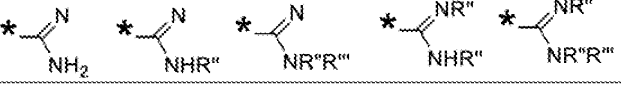
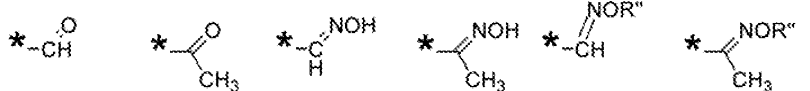
| Group | R' Structures (* denotes the point of attachment of the R' group to X (linker))      |
|-------|--------------------------------------------------------------------------------------|
| I     |     |
| II    |    |
| III   |     |
| IV    |     |
| V     |     |
| VI    |   |
| VII   |  |
| VIII  |  |
| IX    |  |
| X     |  |

FIG. 8 (cont.)

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| Group | R' Structures (* denotes the point of attachment of the R' group to X (linker))      |
|-------|--------------------------------------------------------------------------------------|
| XI    |    |
| XII   |     |
| XIII  |    |
| XIV   |    |
| XV    |    |
| XVI   |   |
| XVII  |  |
| XVIII |  |
| XIX   |  |
| XX    |  |

R'' and R''' are, independently, selected from a halogen (-F, -Cl, -Br, -I); nitrile (-CN); -NH<sub>2</sub>; -OH; branched lower alkyl (C1-C20); linear lower alkyl (C1-C20); primary amide; secondary amide; tertiary amide; alkoxy group.

FIG. 8 (cont.)

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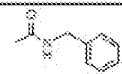
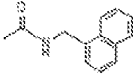
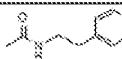
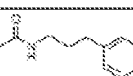
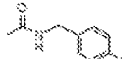
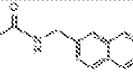
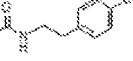
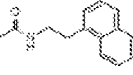
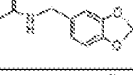
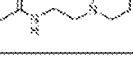
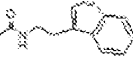
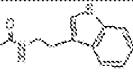
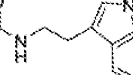
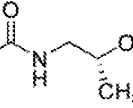
| Abbreviation | 5-dU Modification Attached via Amide Linkage | Chemical Structure                                                                    |
|--------------|----------------------------------------------|---------------------------------------------------------------------------------------|
| Bn           | benzyl                                       |    |
| Nap          | 1-naphthylmethyl                             |    |
| PE           | 2-phenylethyl                                |    |
| PP           | 3-phenylpropyl                               |    |
| iBu          | iso-butyl                                    |    |
| FBn          | 4-fluorobenzylmethyl                         |    |
| 2Nap         | 2-naphthylmethyl                             |   |
| Tyr          | tyrosyl                                      |  |
| NE           | 1-naphthylethyl                              |  |
| MBn          | 3,4-methylenedioxy benzyl                    |  |
| MOE          | morpholinoethyl                              |  |
| BF           | 3-benzofuranylethyl                          |  |
| BT           | 3-benzothiophenylethyl                       |  |
| Trp          | 3-indole-2-ethyl                             |  |
| Thr          | (R)-2-hydroxypropyl                          |  |

FIG. 9

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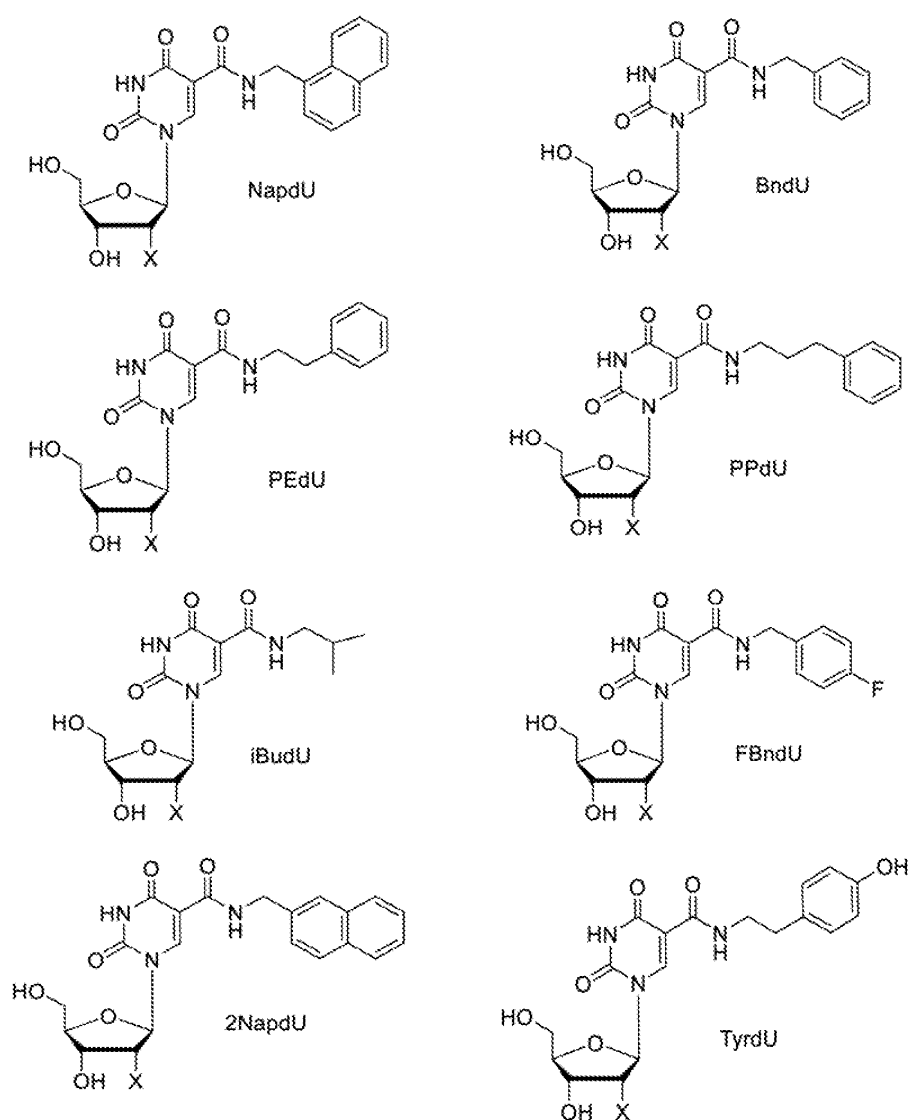


FIG. 9 (cont.)

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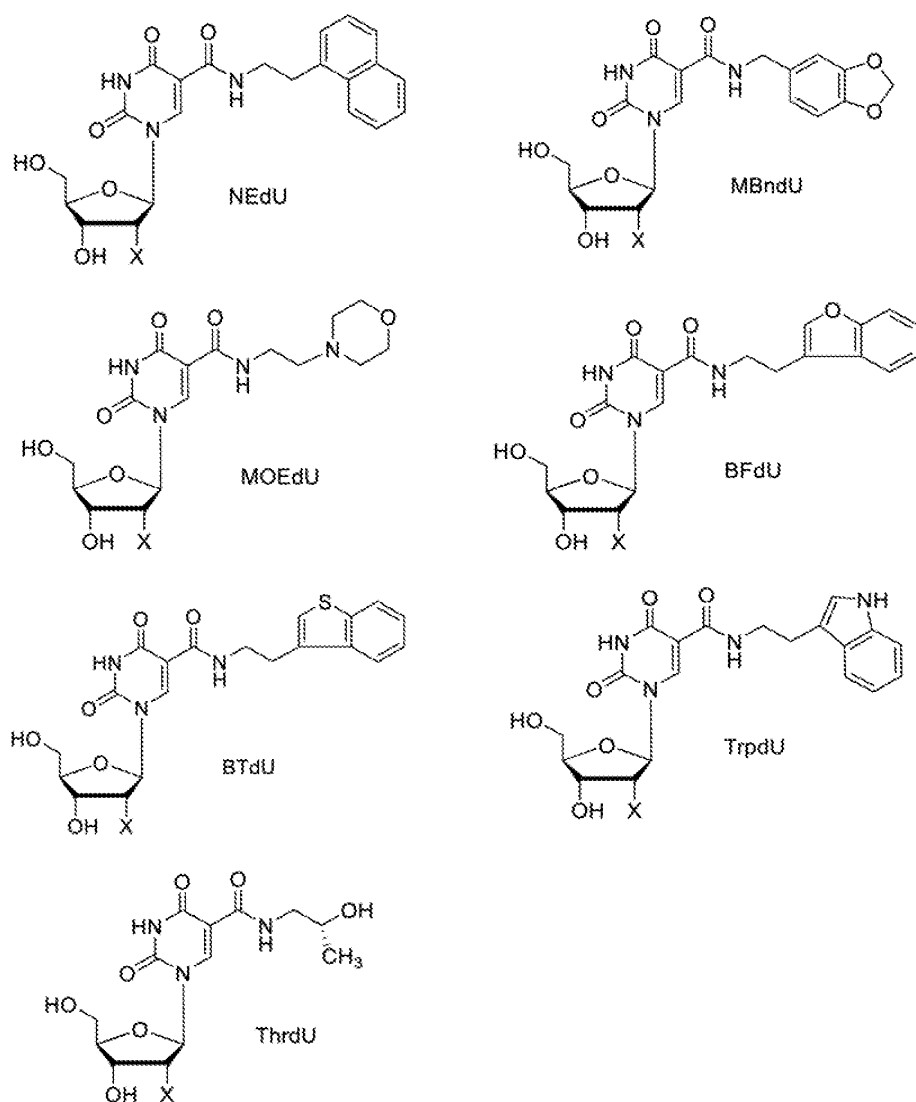


FIG. 9 (cont.)

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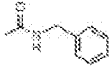
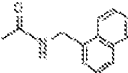
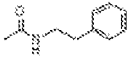
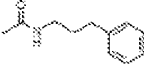
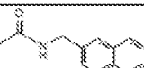
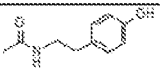
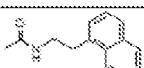
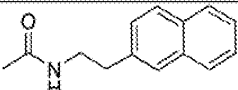
| Abbreviation | 5-dC Modification Attached via Amide Linkage | Chemical Structure                                                                    |
|--------------|----------------------------------------------|---------------------------------------------------------------------------------------|
| Bn           | benzyl                                       |    |
| Nap          | 1-naphthylmethyl                             |    |
| PE           | 2-phenylethyl                                |    |
| PP           | 3-phenylpropyl                               |    |
| 2Nap         | 2-naphthylmethyl                             |    |
| Tyr          | tyrosyl                                      |   |
| NE           | 1-naphthylethyl                              |  |
| 2NE          | 2-naphthyl-2-ethyl                           |  |

FIG. 10

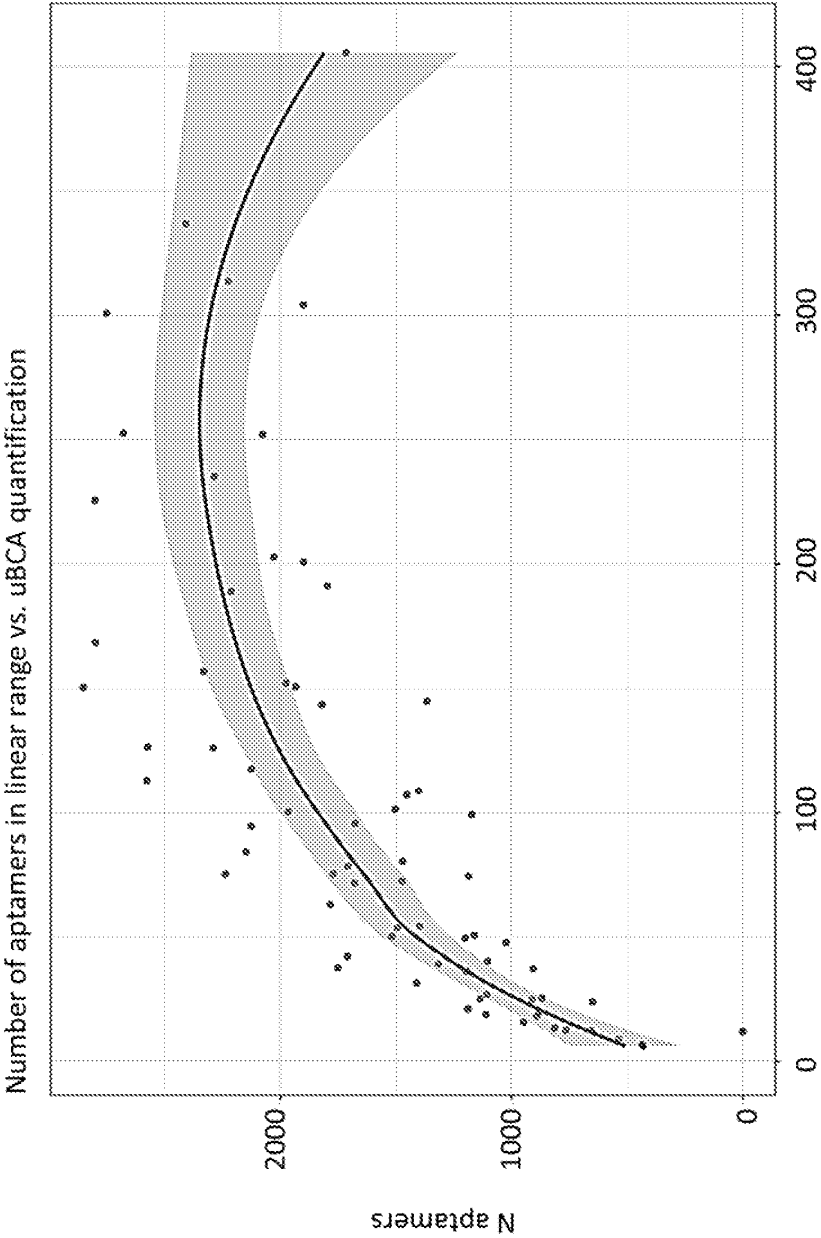


FIG. 11

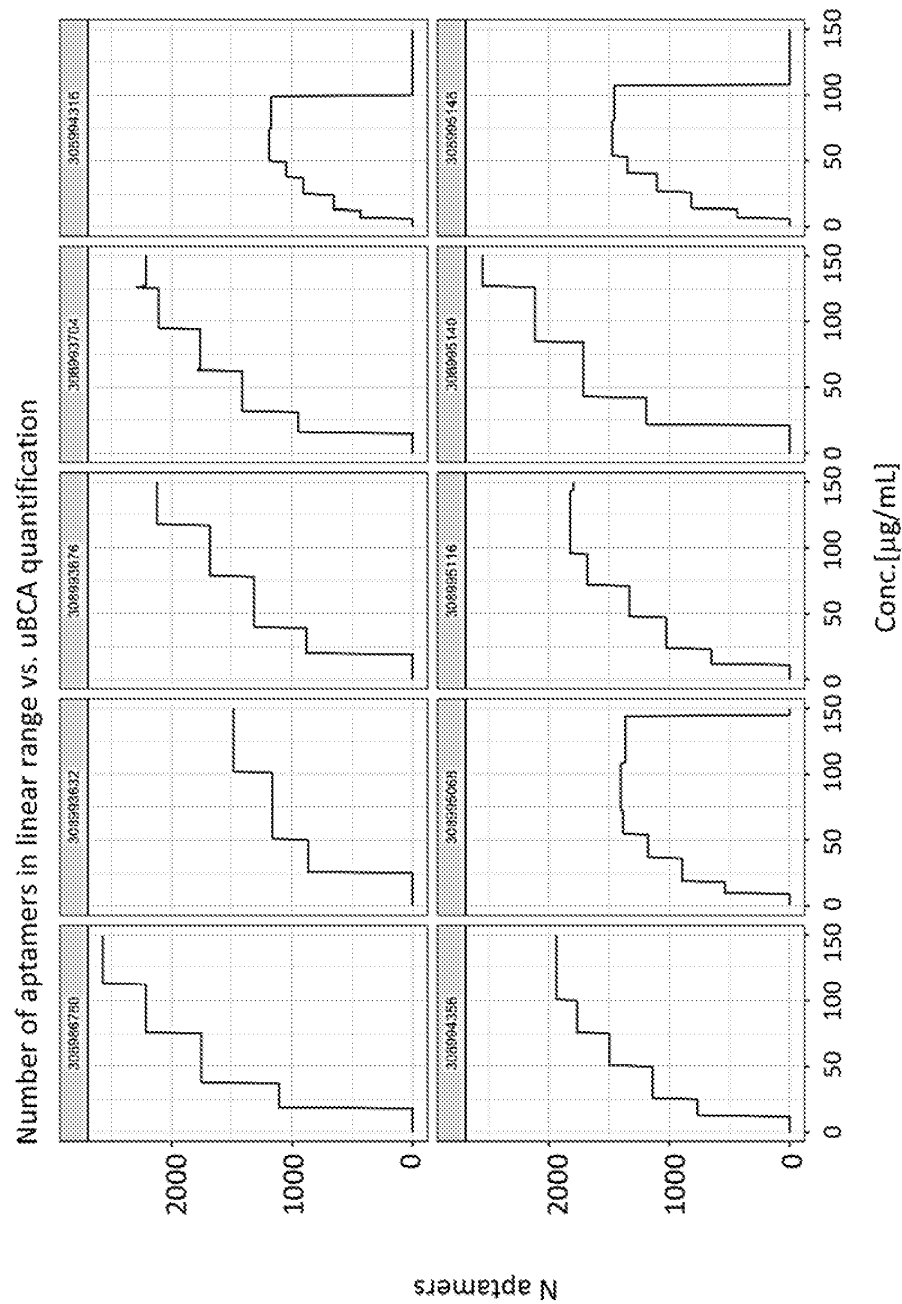


FIG. 12A

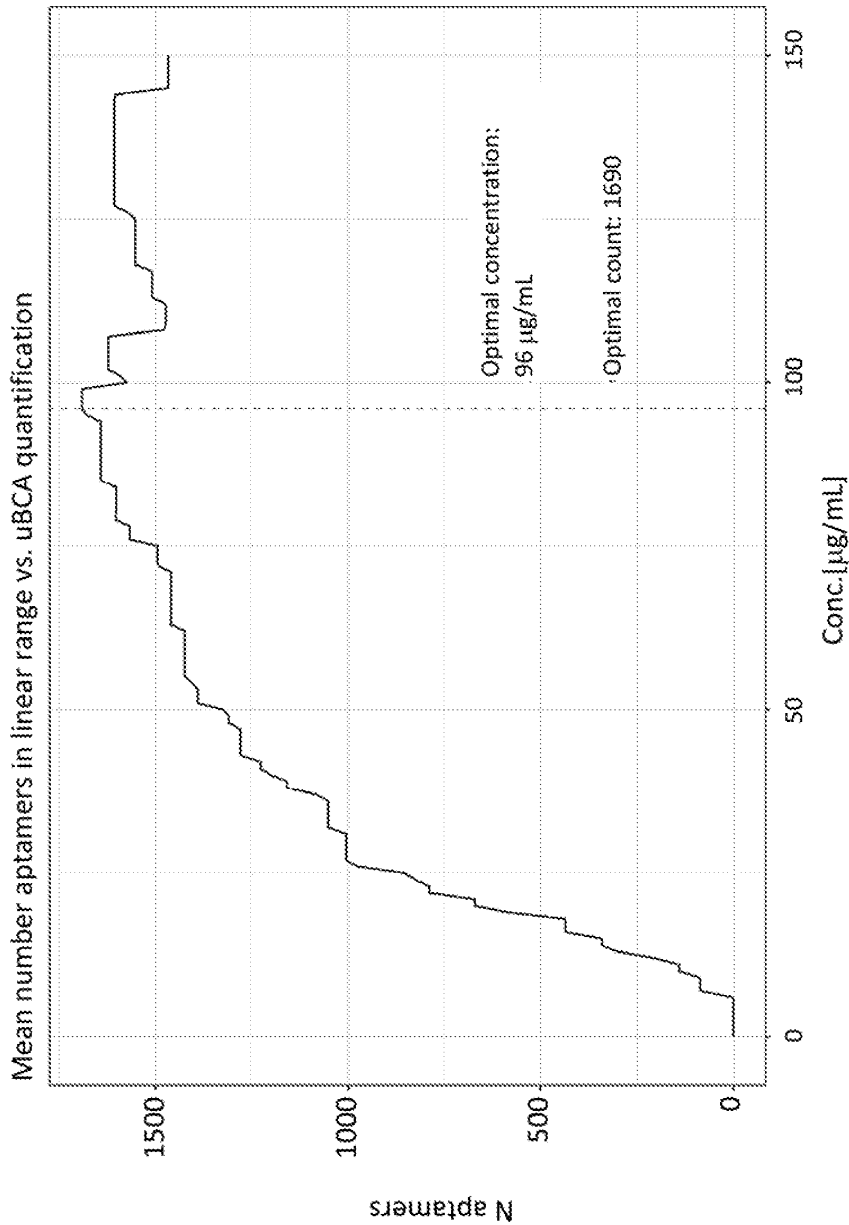


FIG. 12B