

# Residue Preference Mapping of Ligand Fragments in PDB

Lirong Wang<sup>1,2,3</sup>, Zhaojun Xie<sup>1</sup>, Peter Wipf<sup>1,2,3</sup>, Xiang-Qun Xie<sup>1,2,3,4\*</sup>

<sup>1</sup>Department of Pharmaceutical Sciences, School of Pharmacy, <sup>2</sup>Center for Chemical Methodologies & Library Development (UP-CMLD), <sup>3</sup>Drug Discovery Institute, <sup>4</sup>Departments of Computational Biology and Structural Biology, University of Pittsburgh, Pittsburgh, PA 15260, USA

## Supporting Information

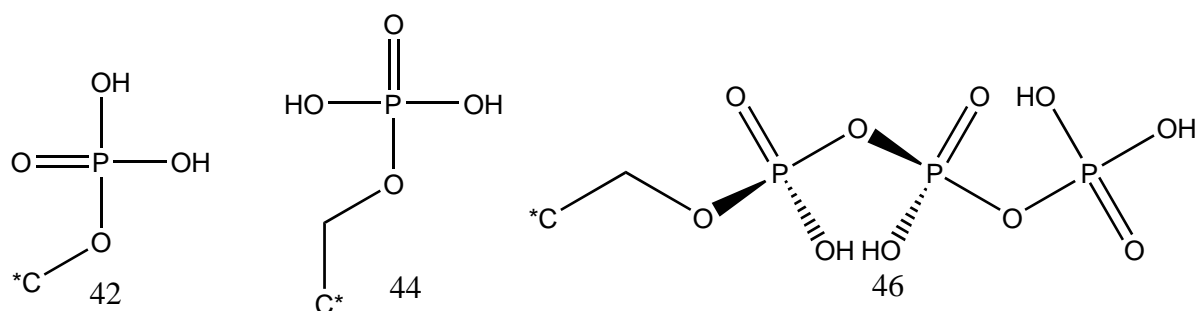
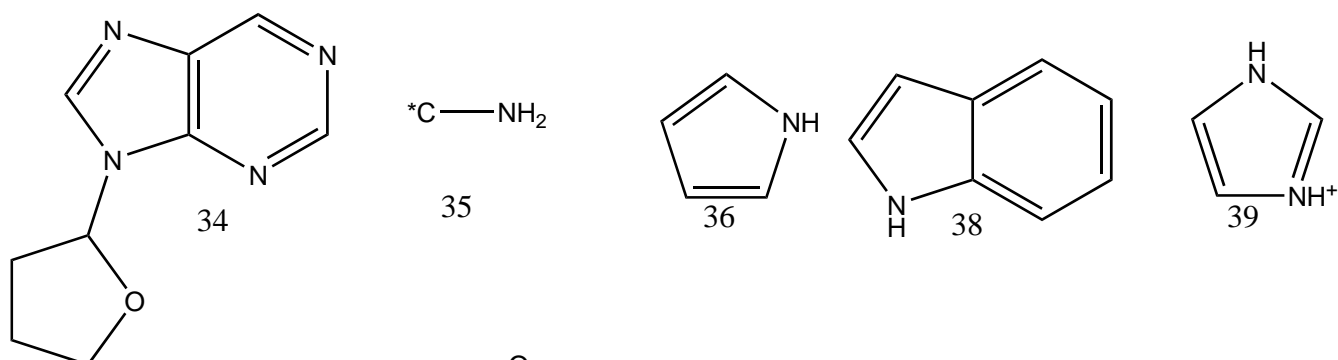
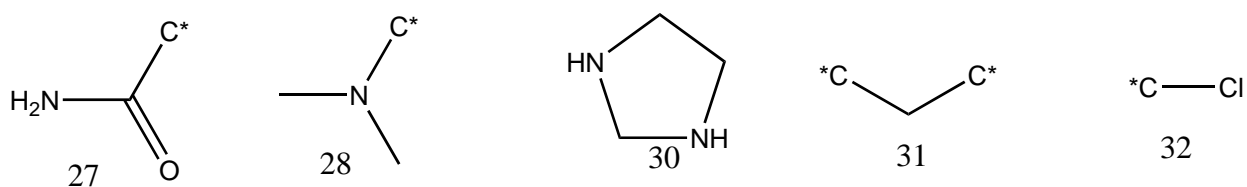
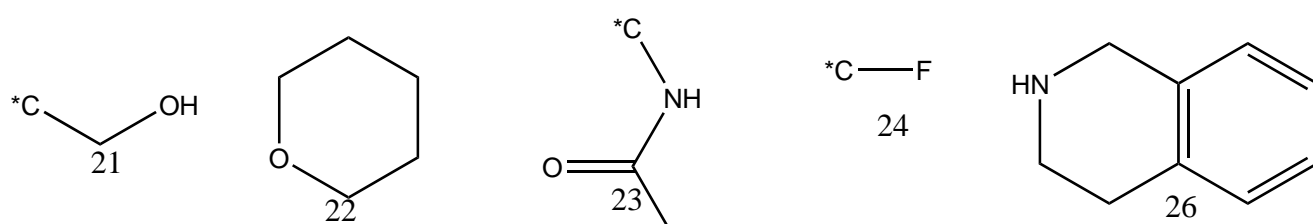
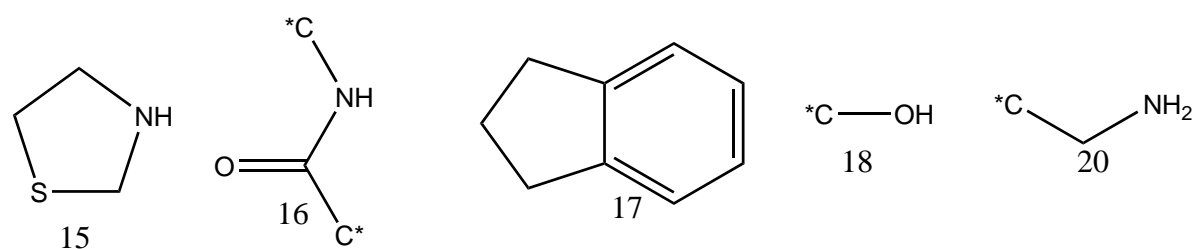
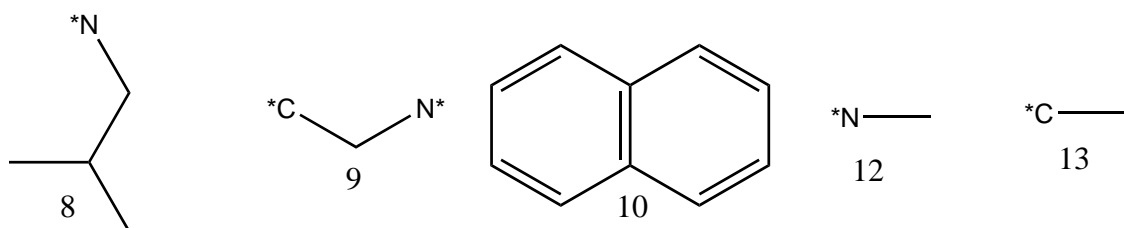
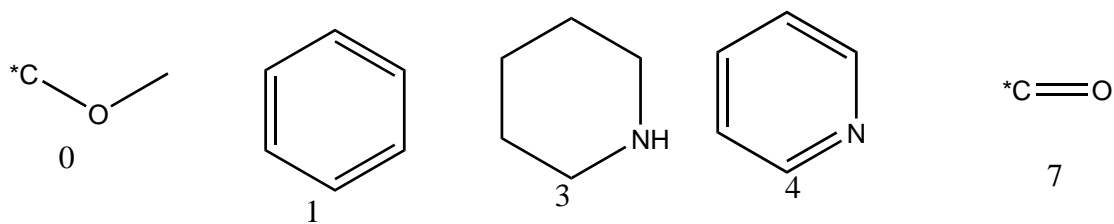
**Part 1. Structures of 315 popular PDB fragments-----S2-S14**

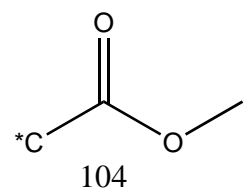
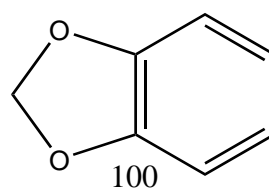
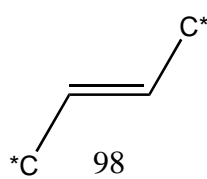
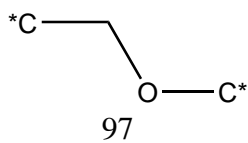
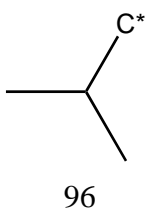
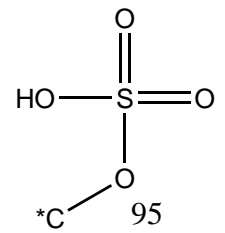
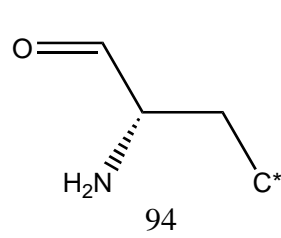
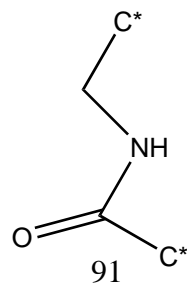
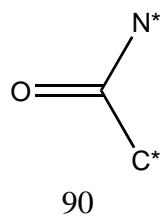
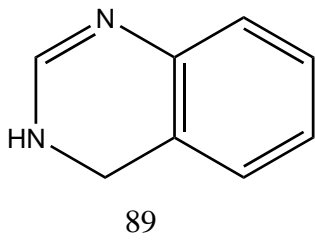
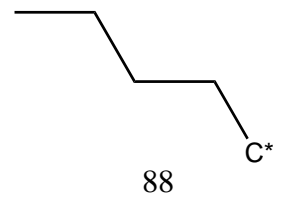
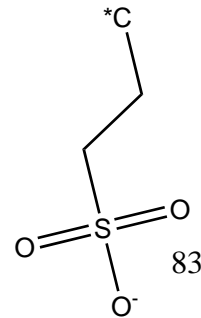
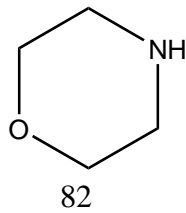
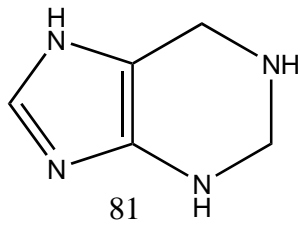
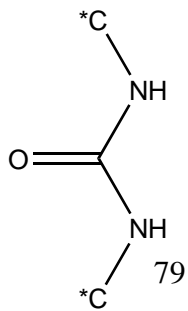
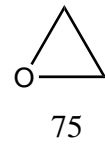
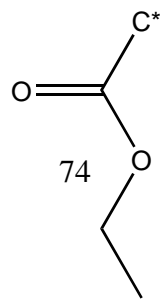
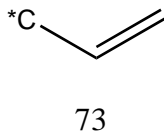
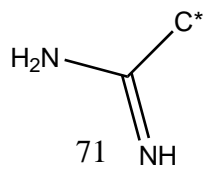
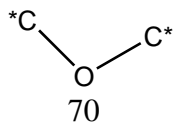
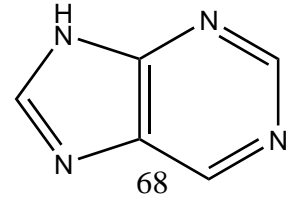
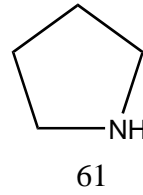
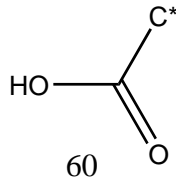
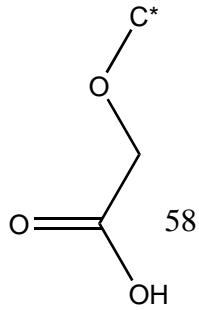
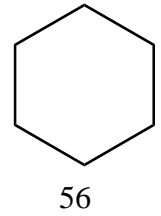
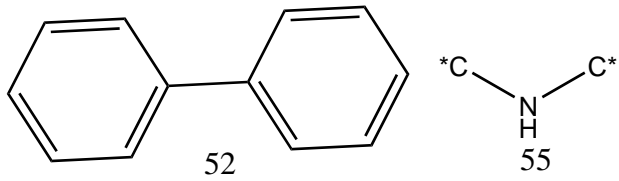
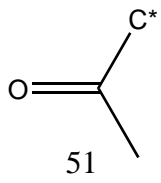
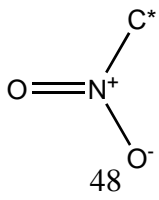
**Part 2. The 315 Fragment-Residue Interaction Profiles-----S15-S132**

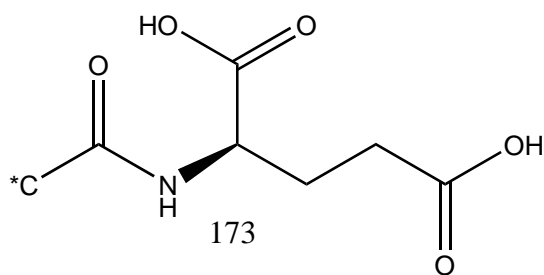
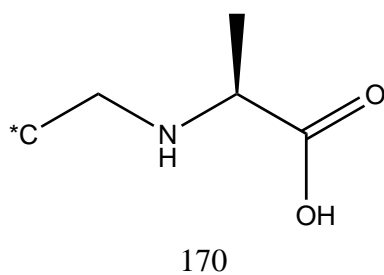
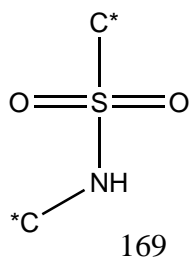
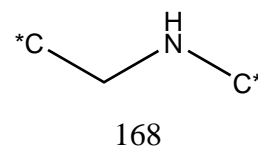
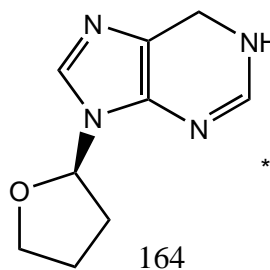
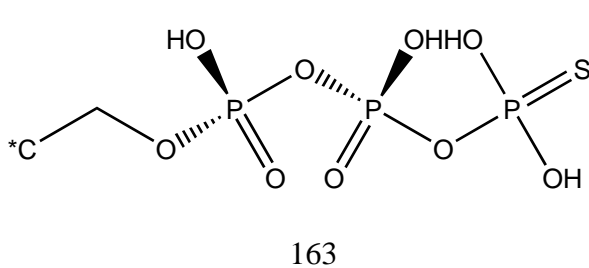
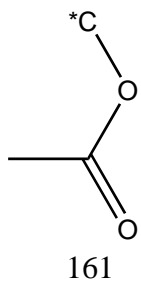
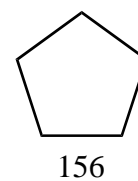
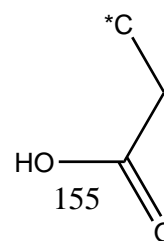
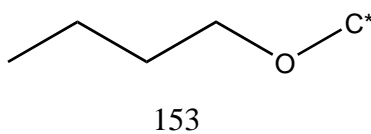
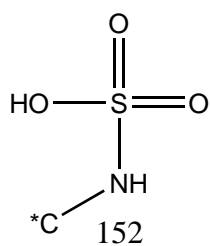
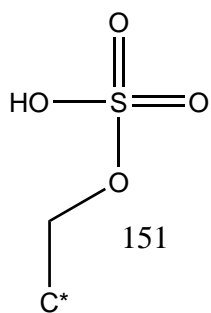
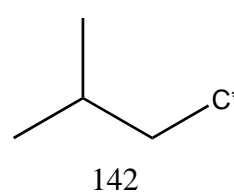
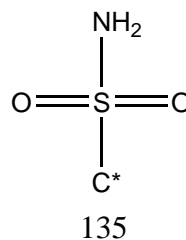
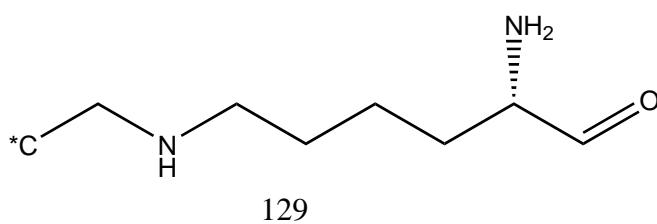
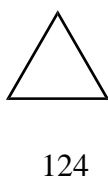
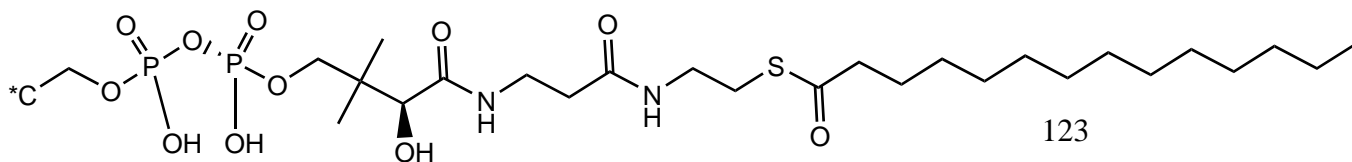
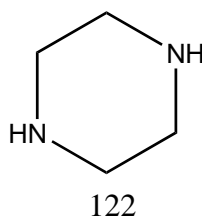
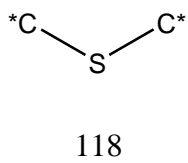
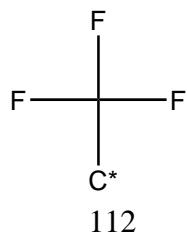
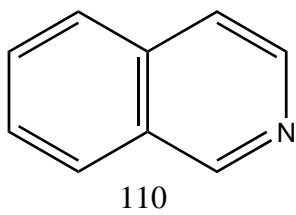
**Part 3. Four Additional Examples of PDB Fragment-Residue**

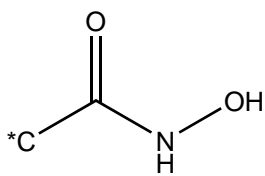
**Interaction Analysis-----S133-S136**

# Part 1. Structures of 315 popular PDB fragments

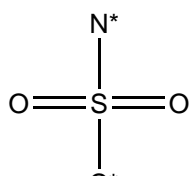




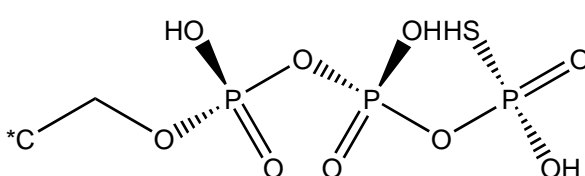




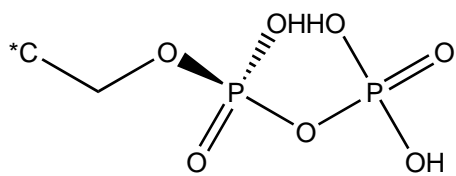
180



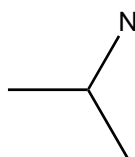
181



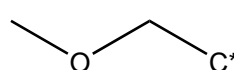
183



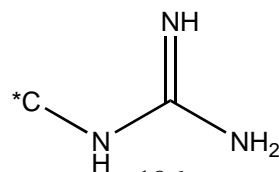
188



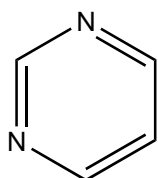
190



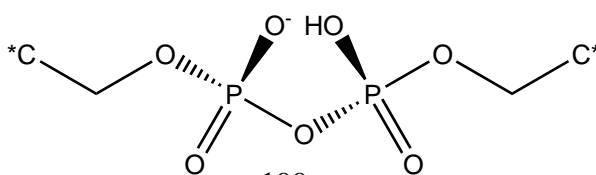
191



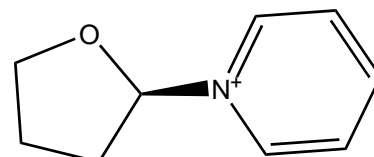
196



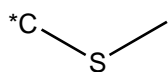
198



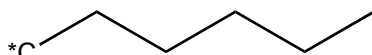
199



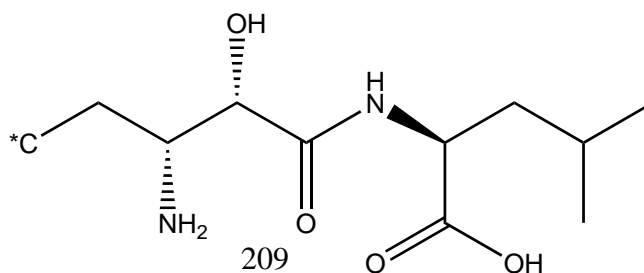
200



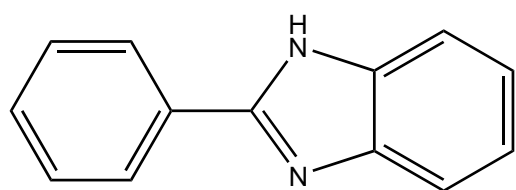
202



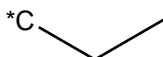
206



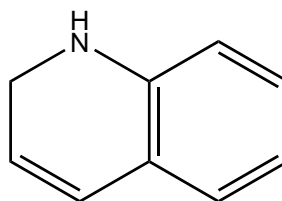
209



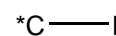
213



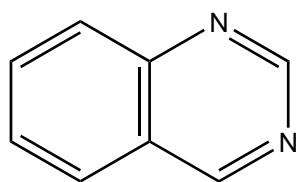
220



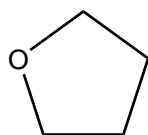
221



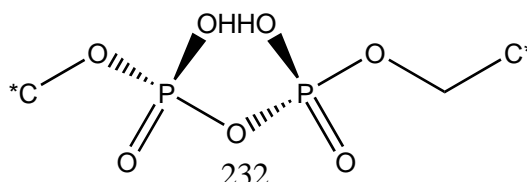
227



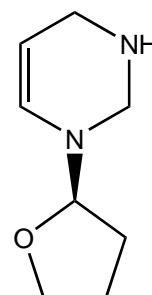
229



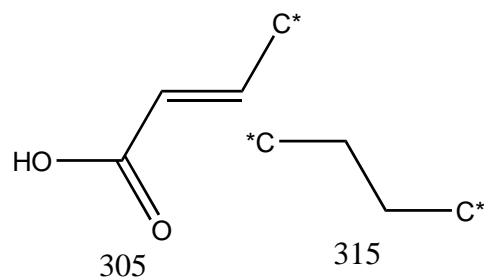
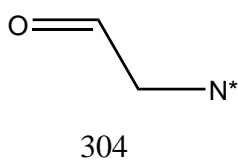
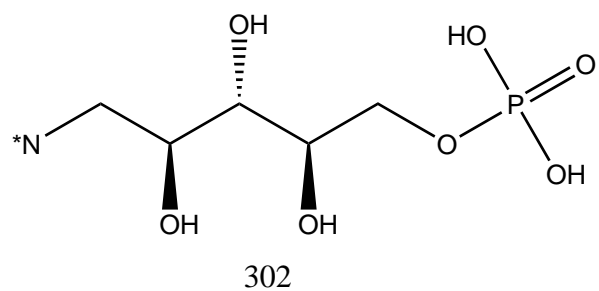
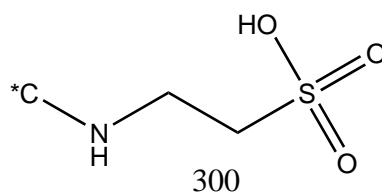
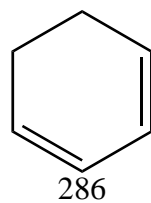
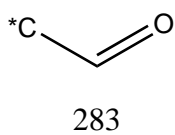
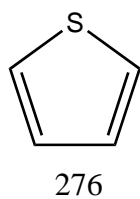
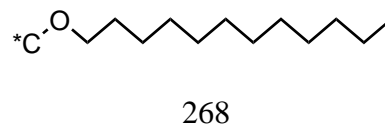
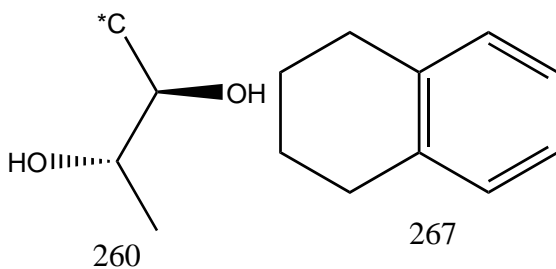
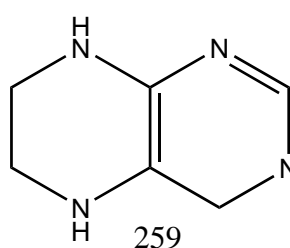
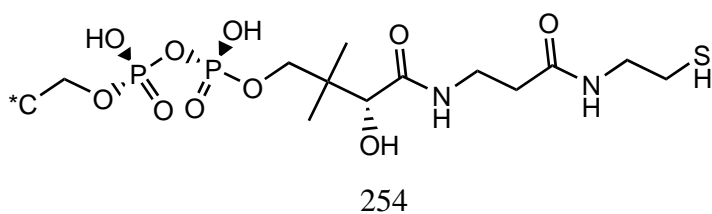
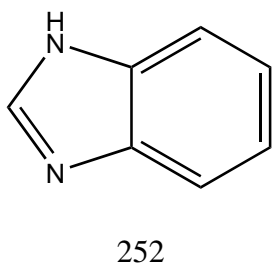
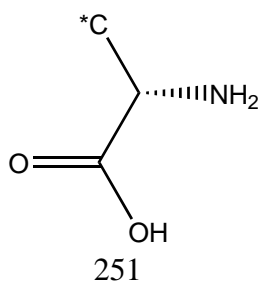
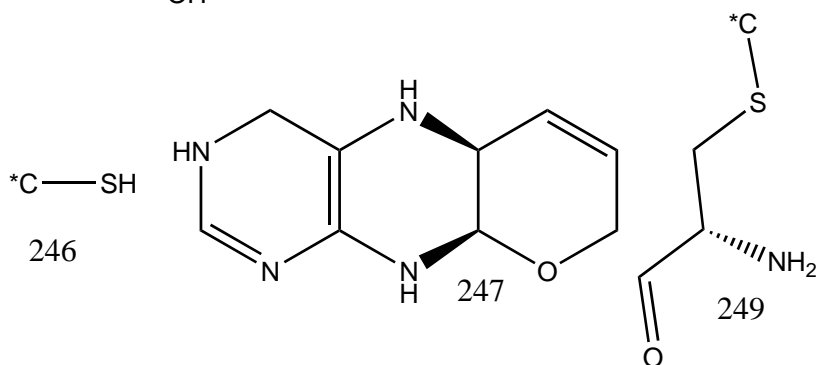
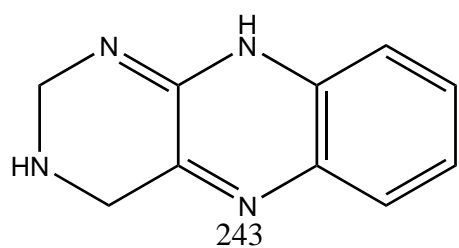
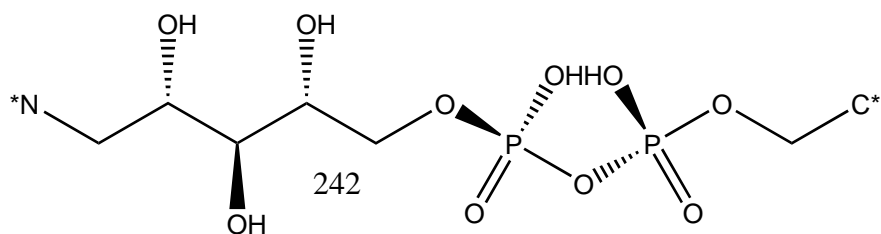
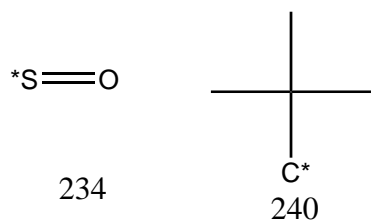
230

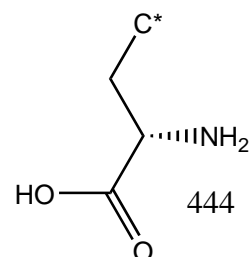
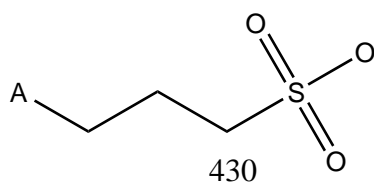
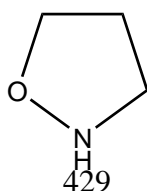
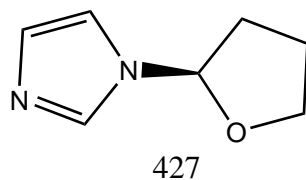
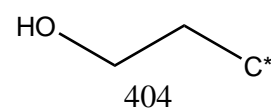
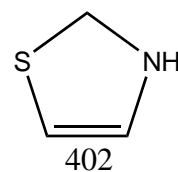
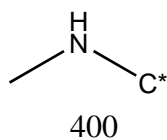
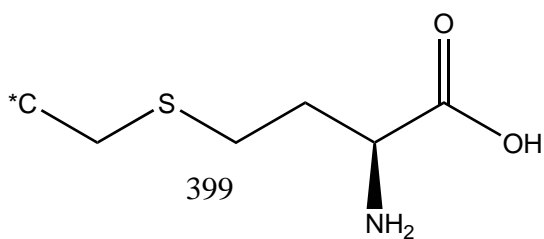
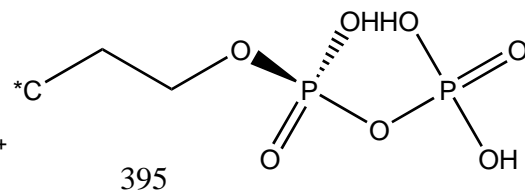
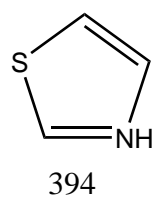
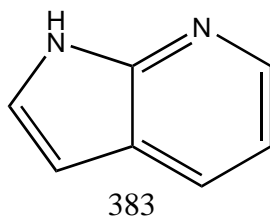
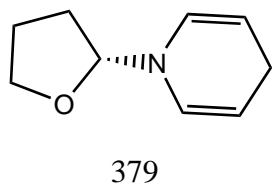
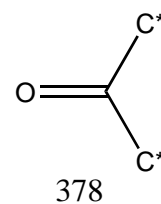
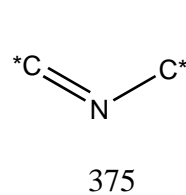
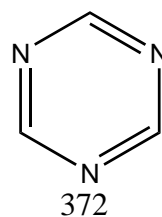
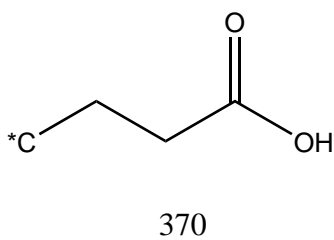
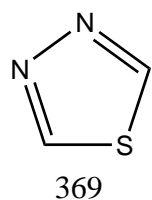
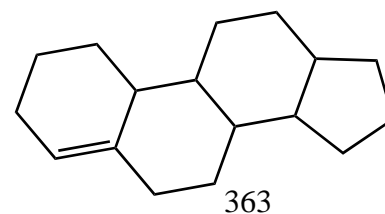
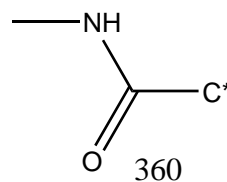
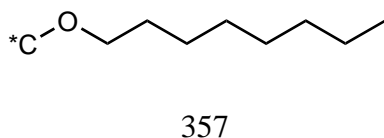
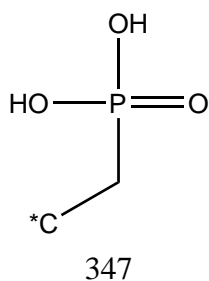
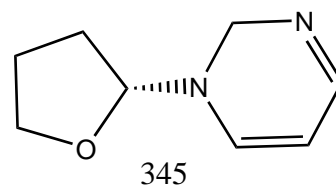
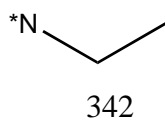
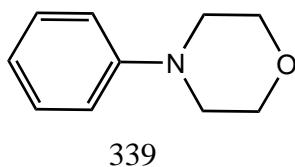
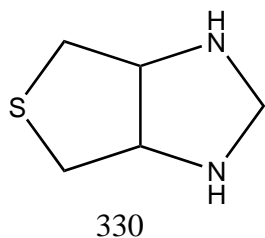
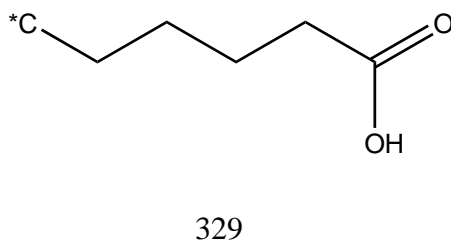
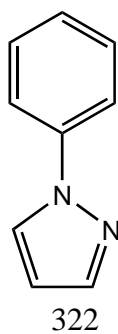
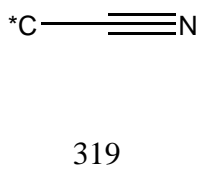
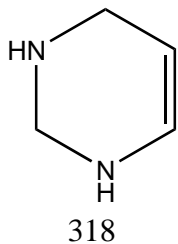


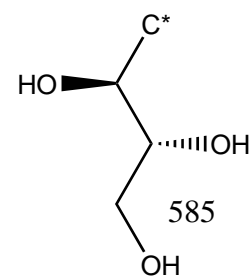
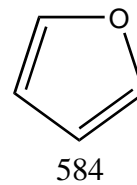
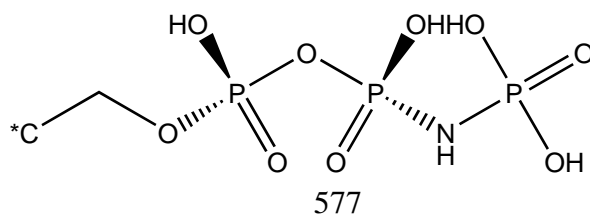
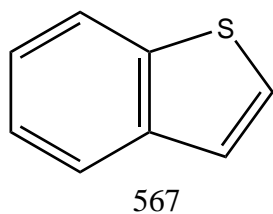
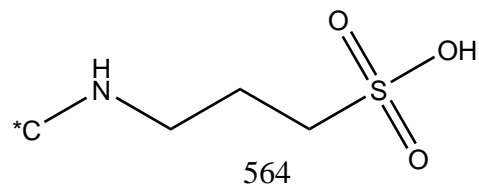
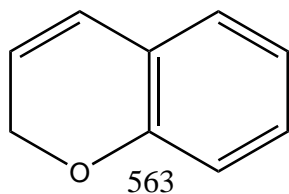
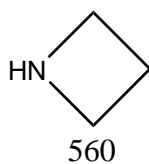
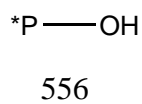
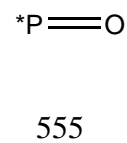
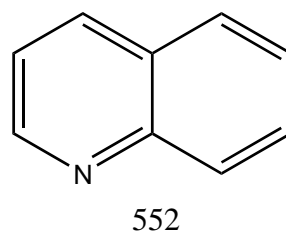
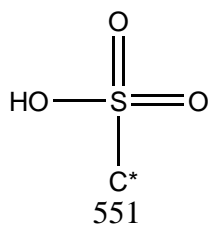
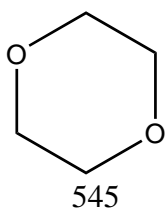
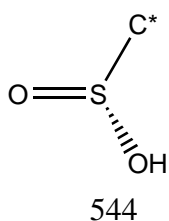
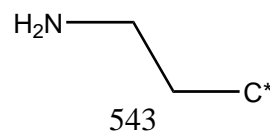
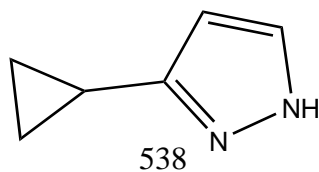
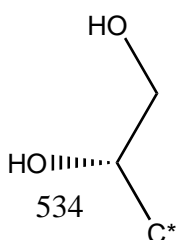
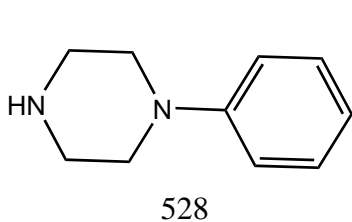
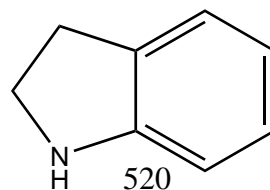
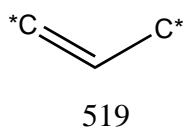
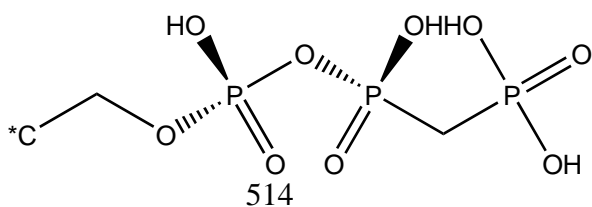
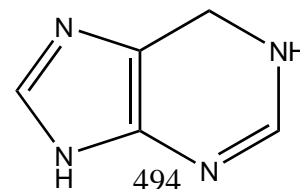
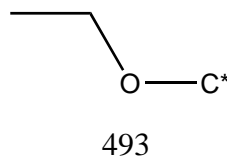
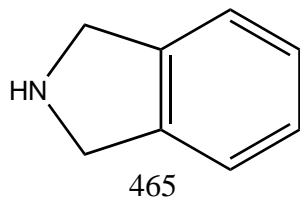
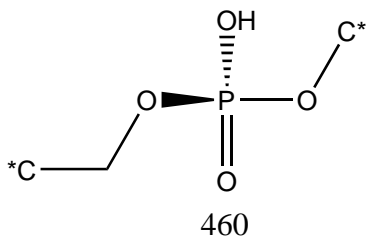
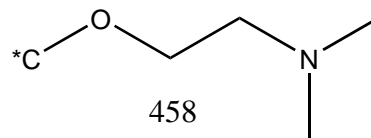
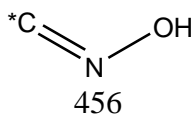
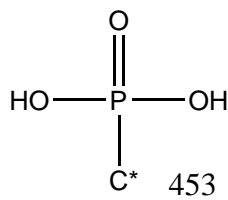
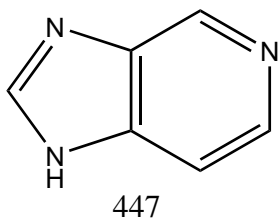
232



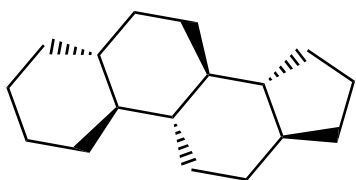
233



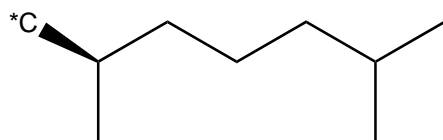




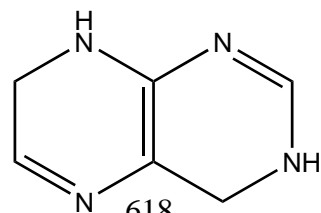




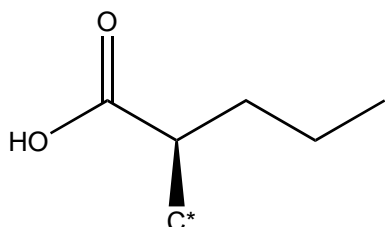
607



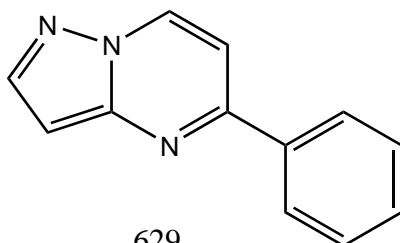
612



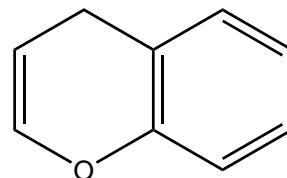
618



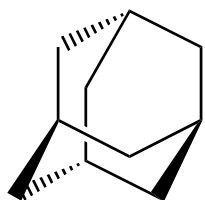
626



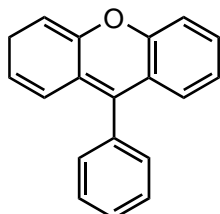
629



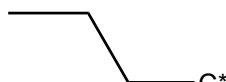
645



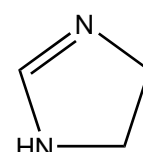
646



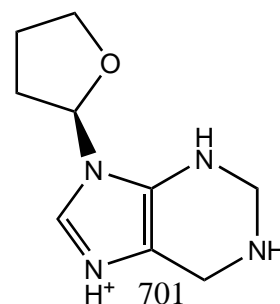
658



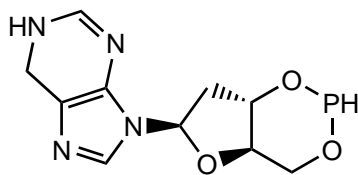
663



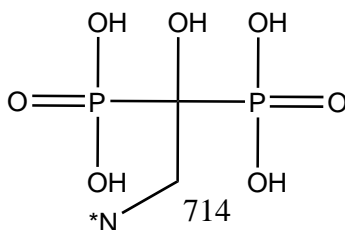
671



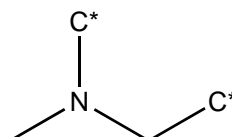
701



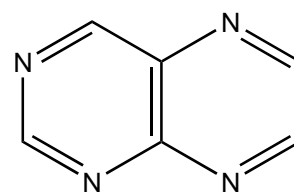
711



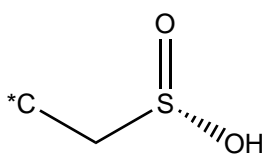
714



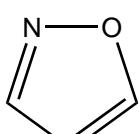
743



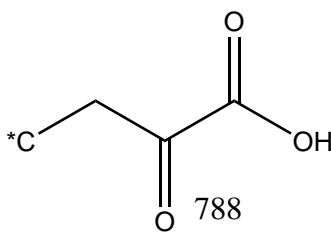
745



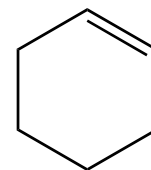
776



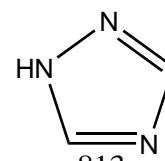
784



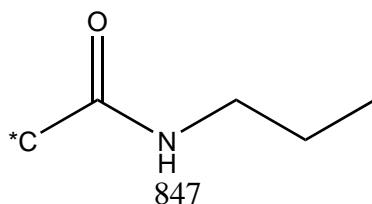
788



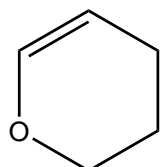
799



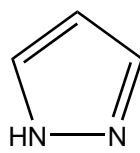
813



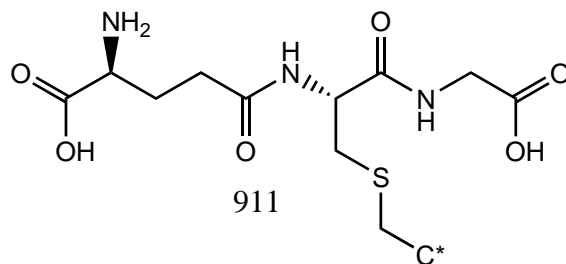
847



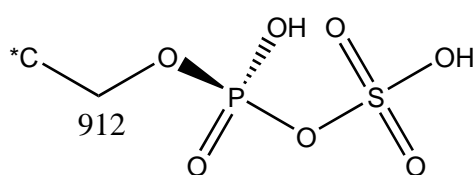
870



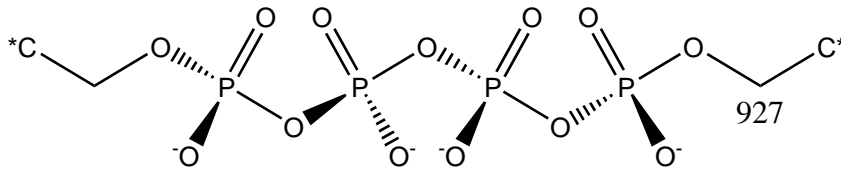
898



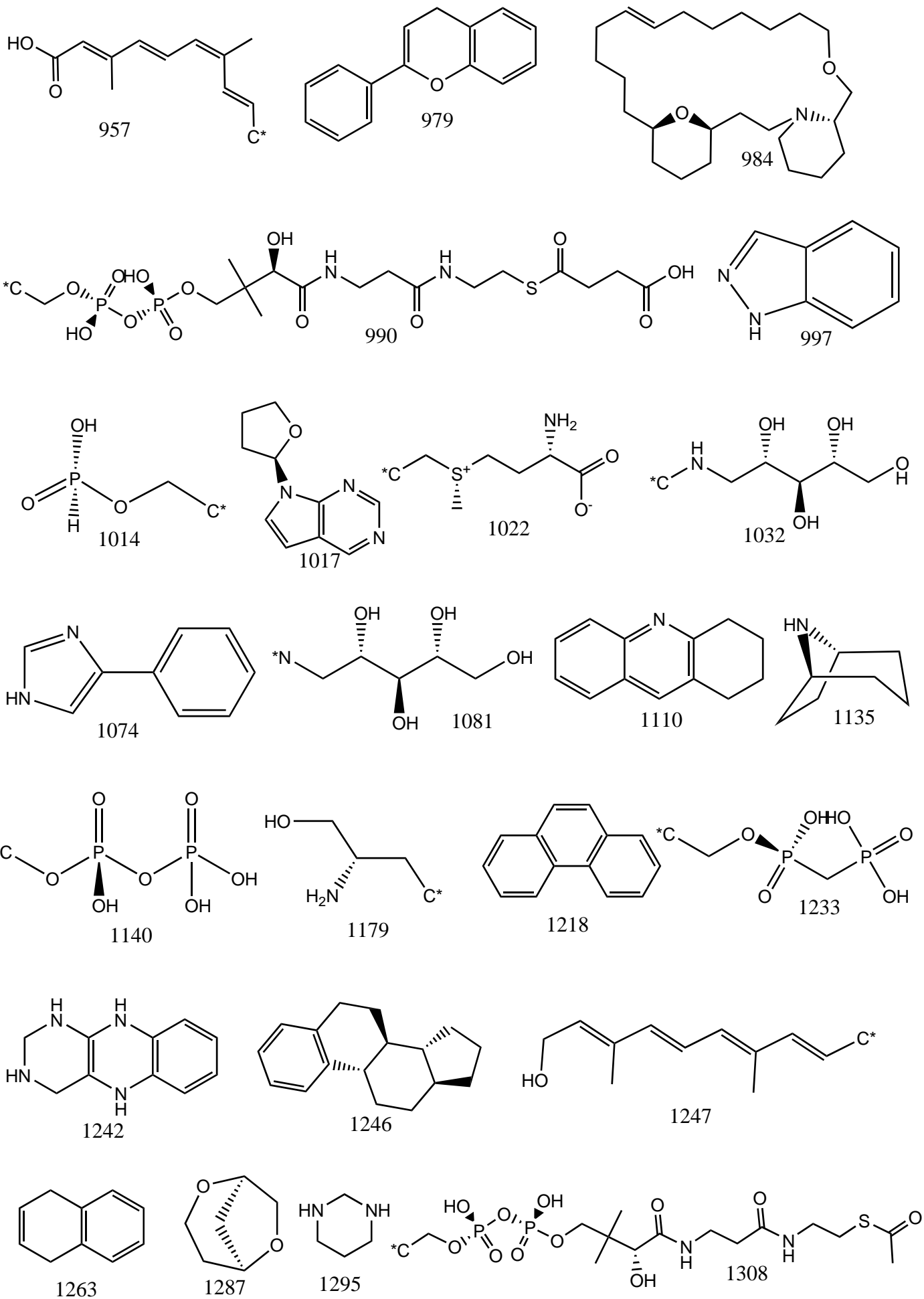
911

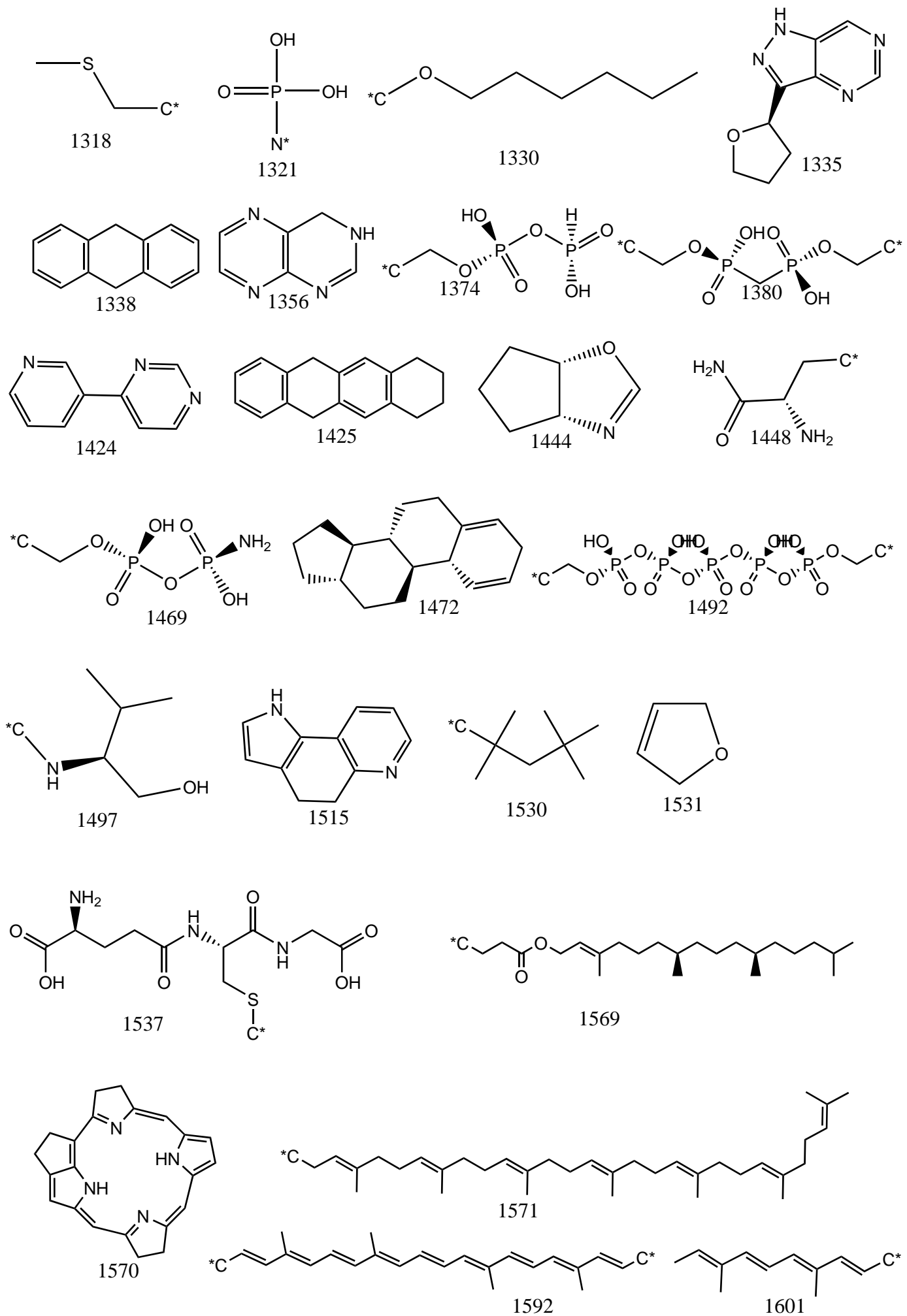


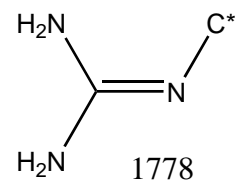
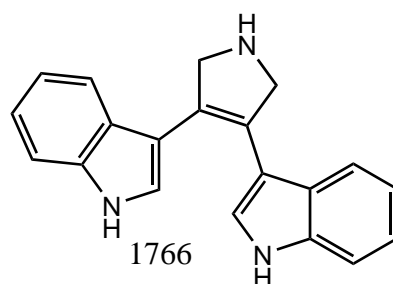
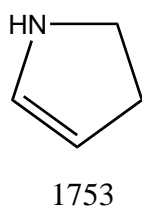
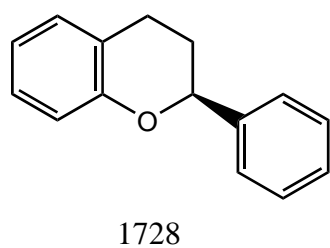
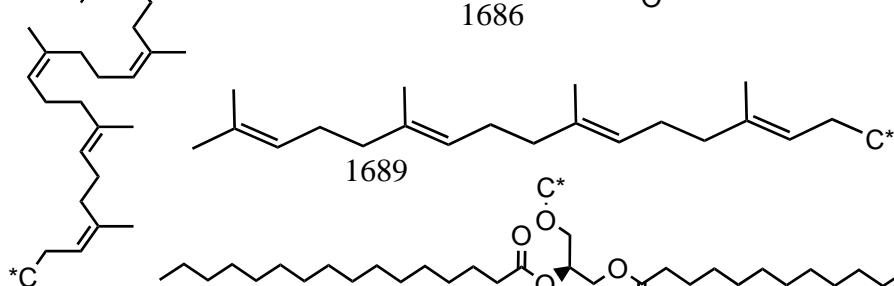
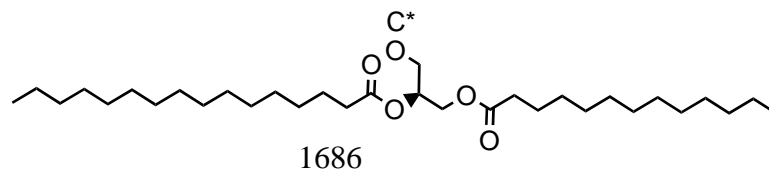
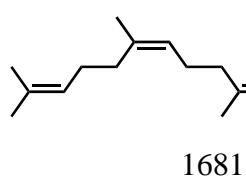
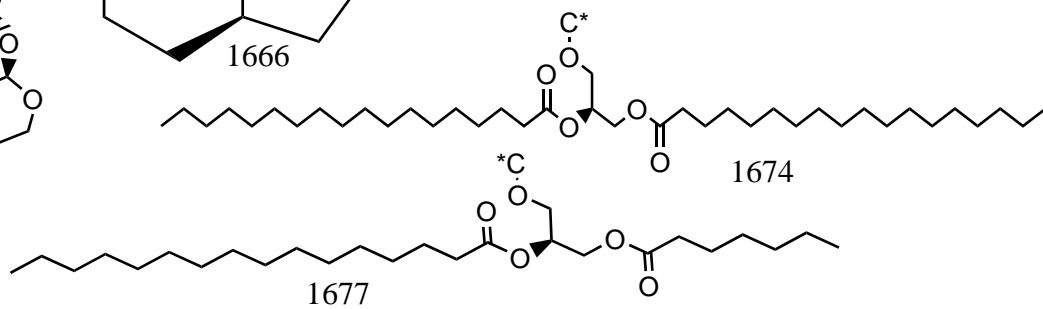
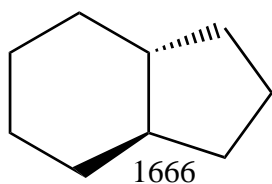
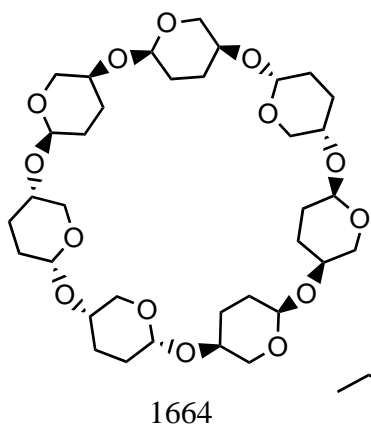
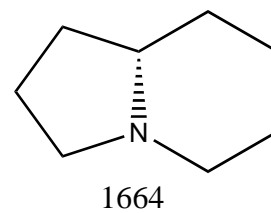
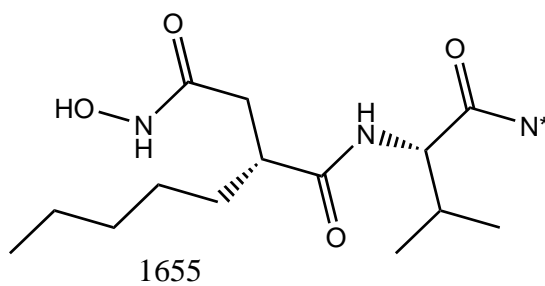
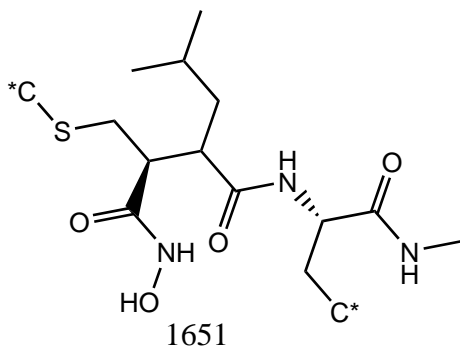
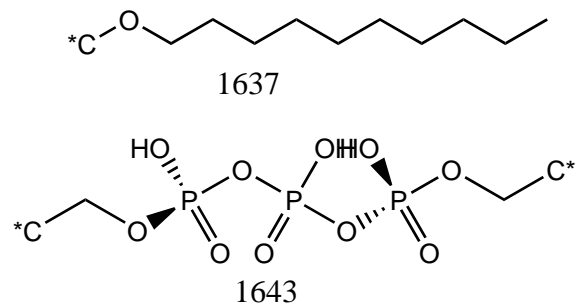
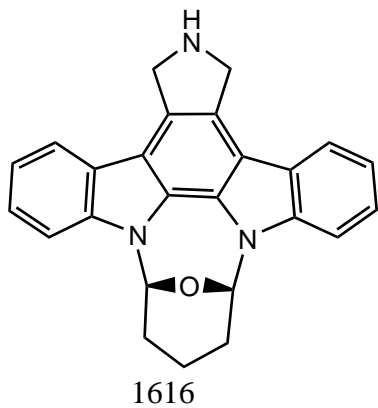
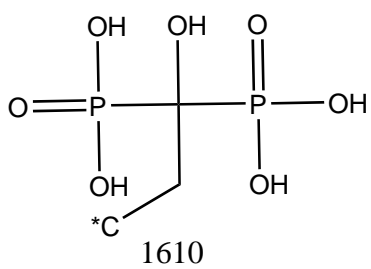
912

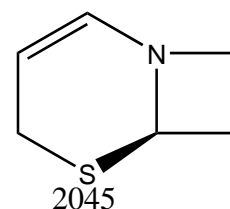
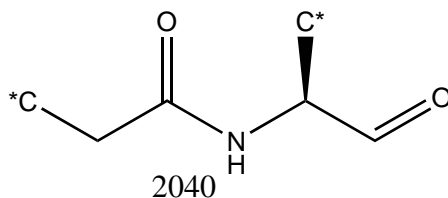
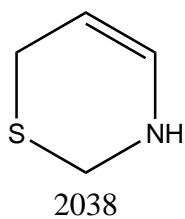
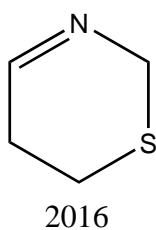
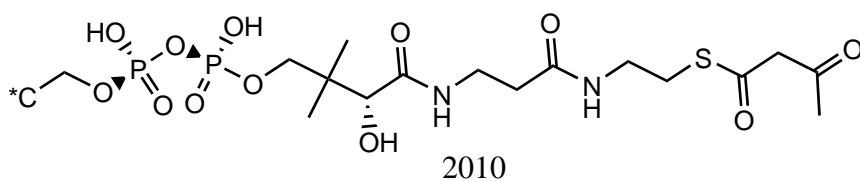
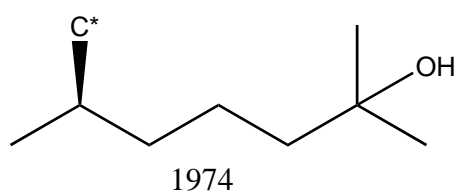
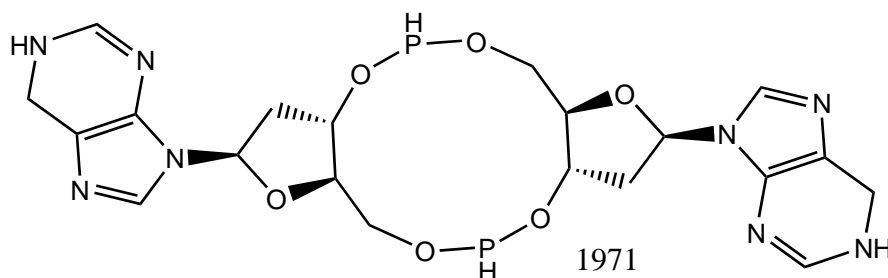
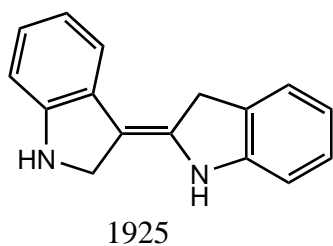
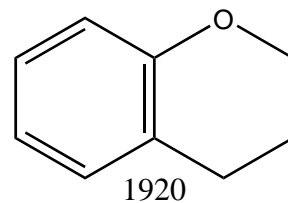
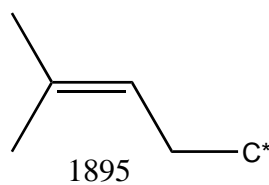
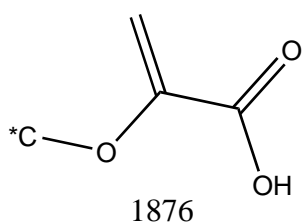
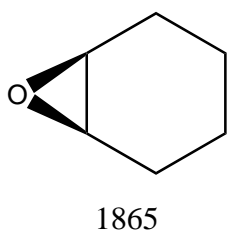
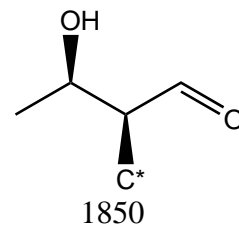
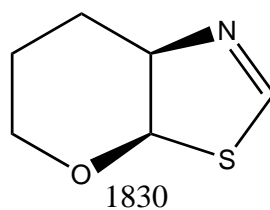
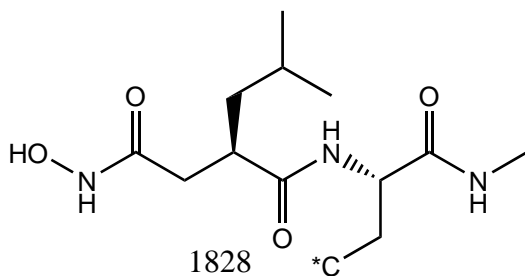
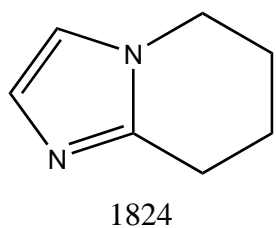
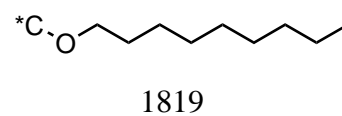
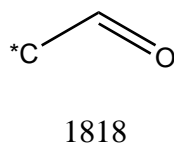
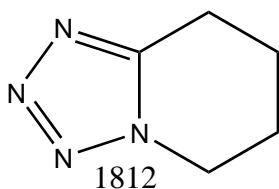
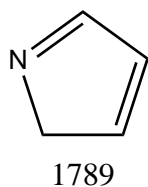
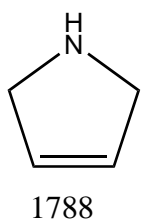


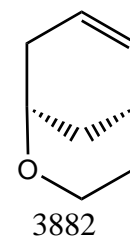
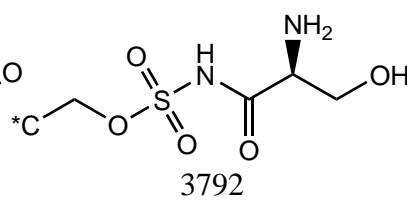
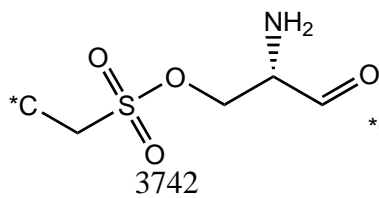
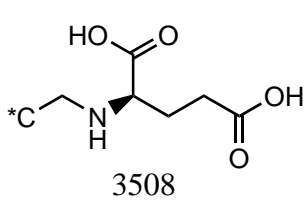
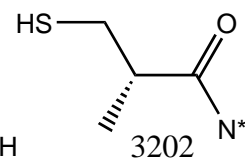
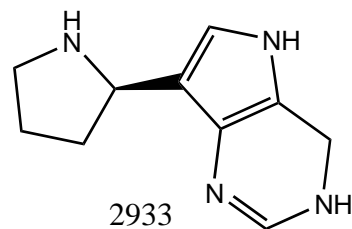
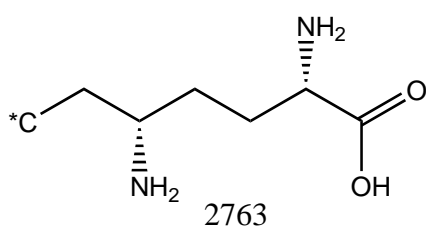
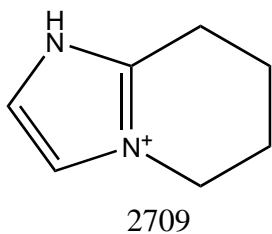
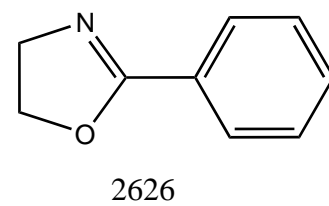
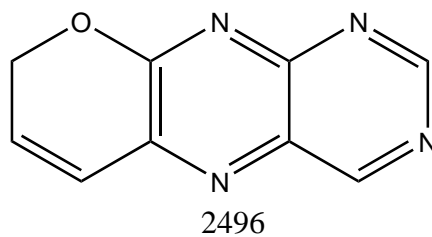
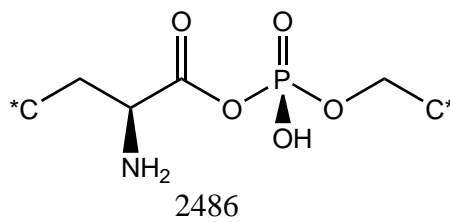
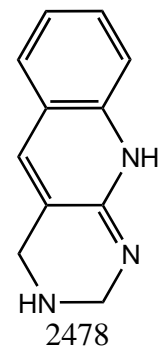
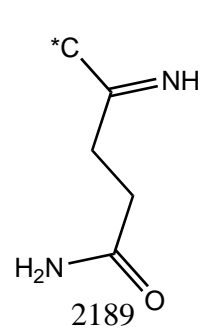
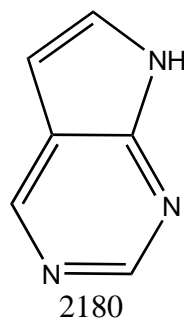
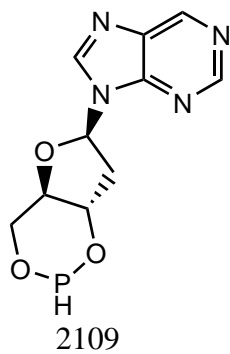
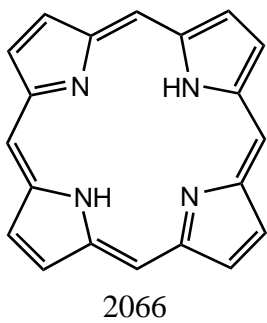
927











## Part 2. The 315 Fragment-Residue Interaction Profiles

For each profile, the first line indicates the fragment ID and the following lines are the profiles. Each line of these profiles starts with residue name, following with original residue count and normalized residue count. The normalized residue count is calculated as (original residue count)/(residue frequency in natural protein). We take the natural residue frequencies from the supplemental material of Halabi et al's paper[1], which is calculated from 36,498 unique eukaryotic proteins[2]. The natural residue frequencies are:

ALA	A	0.073
CYS	C	0.025
ASP	D	0.05
GLU	E	0.061
PHE	F	0.042
GLY	G	0.072
HIS	H	0.023
ILE	I	0.053
LYS	K	0.064
LEU	L	0.089
MET	M	0.023
ASN	N	0.043
PRO	P	0.052
GLN	Q	0.04
ARG	R	0.052
SER	S	0.073
THR	T	0.056
VAL	V	0.063
TRP	W	0.013
TYR	Y	0.033

Please see the references for details.

1. Halabi N, Rivoire O, Leibler S, Ranganathan R: Protein sectors: evolutionary units of three-dimensional structure. *Cell* 2009, 138(4):774-786.
2. Lockless SW, Ranganathan R: Evolutionarily conserved pathways of energetic connectivity in protein families. *Science* 1999, 286(5438):295.

Fragment:0

LEU 194 2179  
PHE 174 4142  
TYR 140 4242  
ILE 131 2471  
SER 104 1424  
ASN 102 2372  
GLY 93 1291  
ALA 89 1219  
TRP 85 6538  
MET 82 3565  
VAL 80 1269  
HIS 76 3304  
ASP 74 1480  
ARG 67 1288  
GLU 65 1065  
THR 62 1107  
LYS 51 796  
PRO 50 961  
GLN 48 1200  
CYS 36 1440

Fragment:1

LEU 1063 11943  
PHE 983 23404  
TYR 816 24727  
ILE 667 12584  
GLY 665 9236  
VAL 652 10349  
ALA 541 7410  
ARG 522 10038  
SER 517 7082  
HIS 465 20217  
THR 436 7785  
MET 432 18782  
GLU 429 7032  
TRP 384 29538  
ASP 375 7500  
PRO 328 6307  
ASN 324 7534  
LYS 324 5062  
GLN 287 7175  
CYS 197 7880

Fragment:3

TYR 87 2636  
TRP 84 6461  
ASP 76 1520  
GLU 72 1180  
GLY 61 847  
LEU 57 640  
PHE 53 1261  
HIS 49 2130  
ARG 40 769  
SER 40 547  
ASN 33 767  
VAL 29 460  
LYS 27 421  
GLN 26 650  
THR 26 464  
ALA 24 328  
ILE 24 452  
CYS 20 800  
MET 16 695  
PRO 11 211

Fragment:4

TYR 324 9818  
GLY 260 3611  
SER 248 3397  
LYS 247 3859  
ASP 239 4780  
ALA 216 2958  
ASN 216 5023  
THR 206 3678  
PHE 199 4738



LEU 198 2224  
VAL 188 2984  
HIS 178 7739  
GLU 136 2229  
ILE 128 2415  
ARG 111 2134  
TRP 107 8230  
MET 72 3130  
GLN 69 1725  
CYS 68 2720  
PRO 65 1250

Fragment:7

GLY 1004 13944  
PHE 978 23285  
TYR 931 28212  
ASN 785 18255  
THR 770 13750  
LEU 760 8539  
SER 721 9876  
ALA 695 9520  
HIS 688 29913  
ARG 676 13000  
ASP 633 12660  
LYS 613 9578  
VAL 587 9317  
ILE 571 10773  
GLN 554 13850  
GLU 502 8229  
TRP 502 38615  
PRO 448 8615  
MET 329 14304  
CYS 254 10160

Fragment:8

PHE 15 357  
TYR 5 151  
HIS 4 173  
ILE 3 56  
LEU 3 33  
MET 3 130  
LYS 2 31  
VAL 2 31  
SER 1 13  
TRP 1 76

Fragment:9

GLY 39 541  
PHE 37 880  
TYR 36 1090  
TRP 30 2307  
LEU 23 258  
SER 22 301  
ALA 20 273  
ILE 19 358

PRO 16 307  
THR 16 285  
ASP 15 300  
GLU 15 245  
GLN 15 375  
VAL 14 222  
HIS 12 521  
MET 10 434  
ASN 8 186  
ARG 6 115  
LYS 6 93  
CYS 4 160

Fragment:10  
LEU 106 1191  
PHE 86 2047  
VAL 71 1126  
ALA 69 945  
GLY 66 916  
ILE 63 1188  
LYS 58 906  
SER 58 794  
TYR 58 1757  
ARG 50 961  
HIS 44 1913  
TRP 40 3076  
ASP 39 780  
GLN 39 975  
THR 37 660  
PRO 30 576  
MET 29 1260  
GLU 28 459  
ASN 25 581  
CYS 20 800

Fragment:12  
TYR 91 2757  
TRP 79 6076  
PHE 76 1809  
GLU 39 639  
LEU 39 438  
GLY 38 527  
ASP 33 660  
MET 32 1391  
ARG 31 596  
ILE 30 566  
ALA 26 356  
ASN 26 604  
VAL 25 396  
HIS 23 1000  
SER 23 315  
GLN 18 450  
LYS 18 281  
THR 17 303  
PRO 16 307

CYS 6 240

Fragment:13

TYR 1204 36484  
PHE 1111 26452  
LEU 752 8449  
TRP 685 52692  
ILE 632 11924  
GLY 620 8611  
SER 598 8191  
HIS 559 24304  
ARG 553 10634  
VAL 541 8587  
THR 520 9285  
ALA 452 6191  
ASN 445 10348  
ASP 438 8760  
MET 392 17043  
GLU 373 6114  
LYS 338 5281  
PRO 327 6288  
GLN 258 6450  
CYS 165 6600

Fragment:15

SER 34 465  
TYR 22 666  
GLY 19 263  
THR 18 321  
ASN 15 348  
PHE 12 285  
ASP 11 220  
LYS 11 171  
LEU 10 112  
ARG 9 173  
ALA 8 109  
GLU 7 114  
HIS 7 304  
ILE 7 132  
VAL 6 95  
GLN 5 125  
TRP 5 384  
PRO 4 76  
CYS 3 120  
MET 1 43

Fragment:16

LEU 57 640  
VAL 37 587  
PHE 36 857  
ALA 34 465  
GLY 33 458  
ILE 33 622  
LYS 29 453  
TYR 26 787

ASP 25 500  
GLU 21 344  
MET 20 869  
GLN 18 450  
SER 18 246  
CYS 16 640  
ARG 15 288  
PRO 15 288  
HIS 13 565  
THR 13 232  
TRP 12 923  
ASN 7 162

Fragment:17

PHE 14 333  
ILE 11 207  
LEU 11 123  
TYR 9 272  
GLY 8 111  
ASP 7 140  
HIS 7 304  
THR 7 125  
VAL 7 111  
ALA 5 68  
ASN 4 93  
CYS 4 160  
GLN 4 100  
SER 4 54  
LYS 3 46  
TRP 3 230  
MET 2 86

Fragment:18

GLY 4250 59027  
ASP 3679 73580  
GLU 3066 50262  
ARG 2944 56615  
TYR 2899 87848  
ASN 2652 61674  
TRP 2502 192461  
SER 2290 31369  
LYS 2250 35156  
PHE 2153 51261  
HIS 2057 89434  
ALA 1911 26178  
THR 1832 32714  
LEU 1632 18337  
GLN 1532 38300  
ILE 1257 23716  
VAL 1226 19460  
PRO 1139 21903  
MET 725 31521  
CYS 374 14960

Fragment:20

TYR 58 1757  
GLY 37 513  
LYS 33 515  
GLU 32 524  
ASP 29 580  
PHE 29 690  
SER 25 342  
THR 25 446  
TRP 22 1692  
LEU 21 235  
ASN 20 465  
CYS 20 800  
VAL 20 317  
ALA 16 219  
MET 16 695  
HIS 14 608  
GLN 13 325  
ARG 9 173  
ILE 6 113  
PRO 4 76

Fragment:21

ASN 1581 36767  
TRP 953 73307  
TYR 949 28757  
GLU 709 11622  
ASP 699 13980  
PHE 656 15619  
THR 611 10910  
SER 603 8260  
ARG 602 11576  
GLY 575 7986  
LEU 482 5415  
GLN 442 11050  
HIS 437 19000  
ALA 404 5534  
VAL 381 6047  
LYS 331 5171  
PRO 288 5538  
ILE 286 5396  
MET 165 7173  
CYS 80 3200

Fragment:22

ASN 2338 54372  
TRP 1410 108461  
TYR 1352 40969  
ASP 1165 23300  
GLU 1138 18655  
ARG 1059 20365  
SER 867 11876  
GLY 856 11888  
THR 837 14946  
PHE 800 19047  
GLN 734 18350

HIS 701 30478  
LYS 562 8781  
LEU 530 5955  
ALA 511 7000  
VAL 417 6619  
ILE 348 6566  
PRO 344 6615  
MET 213 9260  
CYS 129 5160

Fragment:23

ASN 1632 37953  
TYR 457 13848  
SER 415 5684  
THR 403 7196  
GLU 334 5475  
ARG 325 6250  
ASP 321 6420  
GLY 303 4208  
PHE 294 7000  
LEU 287 3224  
GLN 277 6925  
TRP 273 21000  
VAL 260 4126  
ILE 211 3981  
LYS 203 3171  
HIS 192 8347  
PRO 188 3615  
ALA 187 2561  
MET 79 3434  
CYS 73 2920

Fragment:24

LEU 137 1539  
TYR 99 3000  
VAL 98 1555  
PHE 96 2285  
TRP 80 6153  
HIS 79 3434  
GLY 74 1027  
ILE 72 1358  
GLU 70 1147  
ALA 66 904  
ASN 60 1395  
SER 58 794  
MET 57 2478  
ASP 53 1060  
ARG 46 884  
GLN 43 1075  
LYS 41 640  
THR 41 732  
PRO 30 576  
CYS 23 920

Fragment:26

PHE 13 309  
TYR 12 363  
HIS 8 347  
ASP 7 140  
GLU 7 114  
ALA 6 82  
ILE 6 113  
MET 6 260  
VAL 5 79  
ARG 4 76  
GLN 4 100  
LEU 4 44  
LYS 4 62  
THR 4 71  
PRO 2 38  
SER 2 27  
TRP 2 153  
ASN 1 23  
CYS 1 40  
GLY 1 13

Fragment:27

GLY 287 3986  
LEU 286 3213  
THR 277 4946  
ILE 265 5000  
VAL 253 4015  
ASN 241 5604  
SER 210 2876  
ALA 206 2821  
PHE 206 4904  
TYR 201 6090  
HIS 165 7173  
ARG 129 2480  
GLU 122 2000  
TRP 113 8692  
ASP 99 1980  
LYS 98 1531  
PRO 92 1769  
MET 91 3956  
GLN 86 2150  
CYS 77 3080

Fragment:28

PHE 46 1095  
TYR 42 1272  
LEU 31 348  
TRP 30 2307  
GLU 24 393  
MET 21 913  
ILE 20 377  
ALA 18 246  
ASP 16 320  
ASN 14 325  
GLN 14 350

GLY 14 194  
HIS 14 608  
ARG 12 230  
SER 11 150  
VAL 10 158  
THR 9 160  
PRO 5 96  
LYS 4 62

Fragment:30

TYR 12 363  
THR 10 178  
LEU 9 101  
HIS 8 347  
ASP 7 140  
ASN 7 162  
GLN 7 175  
PHE 7 166  
ILE 6 113  
ARG 5 96  
SER 5 68  
TRP 5 384  
GLU 4 65  
GLY 4 55  
MET 4 173  
PRO 4 76  
VAL 3 47  
CYS 2 80  
ALA 1 13

Fragment:31

PHE 37 880  
TYR 34 1030  
GLY 27 375  
ASP 22 440  
HIS 22 956  
TRP 21 1615  
LEU 20 224  
ARG 17 326  
ILE 16 301  
VAL 16 253  
SER 15 205  
GLN 13 325  
GLU 12 196  
MET 12 521  
THR 12 214  
CYS 6 240  
LYS 6 93  
PRO 6 115  
ALA 5 68  
ASN 4 93

Fragment:32

PHE 185 4404  
LEU 151 1696



VAL 135 2142  
TYR 124 3757  
GLY 113 1569  
ILE 106 2000  
ALA 99 1356  
MET 82 3565  
TRP 72 5538  
LYS 62 968  
PRO 57 1096  
HIS 54 2347  
SER 52 712  
THR 50 892  
ARG 47 903  
ASN 47 1093  
GLU 45 737  
ASP 42 840  
GLN 29 725  
CYS 20 800

Fragment:34

GLY 3634 50472  
ALA 1905 26095  
LEU 1780 20000  
VAL 1716 27238  
ILE 1612 30415  
ARG 1517 29173  
SER 1405 19246  
THR 1387 24767  
ASP 1298 25960  
PHE 1131 26928  
GLU 1011 16573  
ASN 915 21279  
TYR 910 27575  
LYS 891 13921  
PRO 688 13230  
HIS 616 26782  
GLN 613 15325  
MET 546 23739  
CYS 336 13440  
TRP 268 20615

Fragment:35

LEU 1035 11629  
ASP 913 18260  
VAL 890 14126  
PHE 889 21166  
ILE 874 16490  
ARG 867 16673  
GLY 745 10347  
ALA 677 9273  
TYR 670 20303  
GLU 629 10311  
THR 566 10107  
LYS 558 8718  
SER 553 7575

ASN 513 11930  
PRO 426 8192  
HIS 394 17130  
GLN 368 9200  
MET 357 15521  
TRP 273 21000  
CYS 156 6240

Fragment:36  
TYR 40 1212  
LEU 38 426  
ASP 32 640  
GLY 24 333  
ARG 23 442  
HIS 23 1000  
LYS 22 343  
CYS 21 840  
PHE 21 500  
ALA 18 246  
VAL 17 269  
ASN 16 372  
ILE 16 301  
THR 16 285  
SER 13 178  
MET 12 521  
PRO 10 192  
GLU 7 114  
GLN 6 150  
TRP 6 461

Fragment:38  
LEU 131 1471  
PHE 124 2952  
TYR 93 2818  
VAL 91 1444  
ILE 86 1622  
GLY 76 1055  
ALA 67 917  
SER 53 726  
ASP 51 1020  
THR 42 750  
GLU 41 672  
HIS 41 1782  
MET 41 1782  
GLN 37 925  
PRO 37 711  
CYS 34 1360  
ARG 32 615  
ASN 29 674  
LYS 29 453  
TRP 28 2153

Fragment:39  
TYR 122 3696  
GLU 120 1967

ASP 119 2380  
LEU 118 1325  
GLY 116 1611  
PHE 114 2714  
HIS 112 4869  
ARG 90 1730  
ILE 89 1679  
ALA 87 1191  
VAL 81 1285  
THR 78 1392  
SER 74 1013  
ASN 62 1441  
GLN 59 1475  
LYS 56 875  
TRP 48 3692  
PRO 43 826  
MET 40 1739  
CYS 38 1520

Fragment:42

ARG 784 15076  
LYS 554 8656  
SER 410 5616  
GLY 256 3555  
THR 192 3428  
TYR 150 4545  
HIS 142 6173  
ASN 131 3046  
ASP 129 2580  
ALA 123 1684  
GLU 100 1639  
LEU 83 932  
GLN 71 1775  
PHE 61 1452  
VAL 53 841  
ILE 50 943  
PRO 36 692  
MET 29 1260  
TRP 26 1999  
CYS 13 520

Fragment:44

GLY 815 11319  
SER 585 8013  
ARG 532 10230  
THR 497 8875  
LYS 416 6500  
TYR 332 10060  
HIS 300 13043  
ALA 245 3356  
VAL 219 3476  
ASP 213 4260  
PHE 190 4523  
ASN 186 4325  
ILE 162 3056

LEU 162 1820  
GLU 152 2491  
PRO 107 2057  
GLN 102 2550  
MET 67 2913  
TRP 67 5153  
CYS 58 2320

Fragment:46

GLY 673 9347  
LYS 448 7000  
ARG 392 7538  
SER 355 4863  
THR 334 5964  
ASP 327 6540  
ALA 182 2493  
GLU 176 2885  
ASN 166 3860  
HIS 142 6173  
VAL 135 2142  
TYR 121 3666  
LEU 111 1247  
GLN 99 2475  
ILE 92 1735  
PHE 89 2119  
PRO 87 1673  
MET 38 1652  
CYS 23 920  
TRP 17 1307

Fragment:48

TYR 93 2818  
PHE 89 2119  
LEU 88 988  
TRP 75 5769  
ILE 56 1056  
ARG 52 999  
ALA 51 698  
VAL 51 809  
HIS 49 2130  
GLY 48 666  
MET 43 1869  
GLU 35 573  
ASN 34 790  
ASP 32 640  
GLN 32 800  
SER 32 438  
PRO 28 538  
THR 26 464  
LYS 25 390  
CYS 17 680

Fragment:51

PHE 30 714  
LEU 27 303

TYR 23 696  
ALA 18 246  
ASN 14 325  
VAL 14 222  
GLY 12 166  
ILE 11 207  
THR 10 178  
ASP 8 160  
CYS 8 320  
HIS 8 347  
TRP 8 615  
ARG 7 134  
LYS 7 109  
MET 6 260  
GLN 5 125  
GLU 4 65  
PRO 3 57  
SER 1 13

Fragment:52  
LEU 90 1011  
PHE 67 1595  
TYR 48 1454  
ALA 43 589  
GLY 42 583  
VAL 41 650  
HIS 40 1739  
ILE 35 660  
SER 34 465  
MET 27 1173  
THR 26 464  
ASN 23 534  
GLU 22 360  
TRP 21 1615  
ARG 19 365  
ASP 18 360  
GLN 16 400  
PRO 16 307  
LYS 10 156  
CYS 6 240

Fragment:55  
LEU 74 831  
GLY 38 527  
PHE 32 761  
VAL 31 492  
TYR 27 818  
GLU 24 393  
ALA 21 287  
ASP 20 400  
ILE 18 339  
MET 16 695  
TRP 16 1230  
CYS 13 520  
HIS 12 521

LYS 11 171  
ARG 9 173  
THR 9 160  
PRO 7 134  
SER 7 95  
ASN 6 139  
GLN 6 150

Fragment:56  
LEU 141 1584  
TYR 140 4242  
ARG 116 2230  
ILE 112 2113  
PHE 111 2642  
LYS 110 1718  
ASP 102 2040  
VAL 99 1571  
GLY 96 1333  
GLU 82 1344  
SER 80 1095  
HIS 76 3304  
TRP 71 5461  
THR 69 1232  
ASN 63 1465  
ALA 58 794  
MET 46 2000  
GLN 36 900  
PRO 30 576  
CYS 19 760

Fragment:57  
PHE 61 1452  
LEU 59 662  
TYR 45 1363  
ILE 44 830  
VAL 40 634  
GLY 38 527  
ALA 27 369  
SER 27 369  
MET 24 1043  
ARG 23 442  
LYS 22 343  
THR 22 392  
HIS 21 913  
GLU 19 311  
TRP 19 1461  
PRO 14 269  
ASN 13 302  
ASP 11 220  
GLN 11 275  
CYS 6 240

Fragment:58  
ARG 12 230  
LEU 11 123

PHE 10 238  
CYS 9 360  
SER 8 109  
HIS 6 260  
TYR 6 181  
GLU 5 81  
GLN 5 125  
GLY 5 69  
LYS 5 78  
TRP 5 384  
VAL 5 79  
ALA 3 41  
ASP 3 60  
ASN 3 69  
THR 3 53  
MET 2 86  
PRO 2 38

Fragment:60

ARG 476 9153  
TYR 285 8636  
SER 270 3698  
LYS 234 3656  
THR 212 3785  
GLY 210 2916  
HIS 199 8652  
ASN 187 4348  
PHE 164 3904  
TRP 158 12153  
LEU 153 1719  
ASP 133 2660  
ALA 119 1630  
GLU 118 1934  
GLN 92 2300  
PRO 91 1749  
ILE 86 1622  
VAL 85 1349  
MET 67 2913  
CYS 57 2280

Fragment:61

GLY 185 2569  
TYR 147 4454  
LEU 113 1269  
HIS 101 4391  
SER 97 1328  
PHE 95 2261  
GLU 94 1540  
ASP 92 1840  
THR 91 1625  
ALA 83 1136  
VAL 78 1238  
ARG 77 1480  
ASN 77 1790  
CYS 65 2600

ILE 65 1226  
TRP 64 4923  
PRO 61 1173  
GLN 51 1275  
MET 45 1956  
LYS 43 671

Fragment:68  
LEU 74 831  
VAL 68 1079  
ALA 59 808  
TYR 57 1727  
ILE 53 1000  
GLY 50 694  
PHE 46 1095  
GLU 44 721  
ASP 39 780  
THR 35 625  
ARG 34 653  
MET 30 1304  
SER 28 383  
HIS 22 956  
ASN 18 418  
GLN 18 450  
TRP 16 1230  
LYS 13 203  
PRO 13 249  
CYS 10 400

Fragment:70  
TRP 123 9461  
TYR 103 3121  
PHE 81 1928  
ASP 48 960  
ARG 47 903  
GLU 43 704  
ASN 40 930  
GLN 40 1000  
GLY 39 541  
HIS 39 1695  
LEU 39 438  
LYS 23 359  
SER 18 246  
VAL 18 285  
ALA 17 232  
MET 16 695  
PRO 14 269  
ILE 12 226  
THR 10 178  
CYS 7 280

Fragment:71  
GLY 75 1041  
CYS 46 1840  
ASP 40 800



SER 33 452  
PHE 29 690  
TRP 26 1999  
TYR 25 757  
THR 24 428  
GLU 20 327  
LEU 19 213  
ALA 16 219  
LYS 15 234  
VAL 15 238  
PRO 13 249  
GLN 12 300  
ILE 12 226  
ARG 10 192  
ASN 10 232  
HIS 9 391  
MET 6 260

Fragment:73  
LEU 39 438  
PHE 35 833  
TYR 28 848  
MET 26 1130  
VAL 24 380  
ILE 22 415  
ASP 16 320  
CYS 16 640  
SER 15 205  
THR 13 232  
TRP 13 999  
HIS 12 521  
LYS 12 187  
ALA 11 150  
ARG 11 211  
GLU 11 180  
GLY 11 152  
PRO 11 211  
ASN 8 186  
GLN 2 50

Fragment:74  
LEU 16 179  
GLY 13 180  
PHE 12 285  
GLU 11 180  
TYR 10 303  
ILE 9 169  
THR 7 125  
ALA 6 82  
ARG 6 115  
ASN 6 139  
PRO 6 115  
GLN 5 125  
LYS 5 78  
MET 5 217

HIS 4 173  
VAL 4 63  
SER 3 41  
TRP 3 230  
CYS 2 80

Fragment:75

HIS 14 608  
LEU 10 112  
GLU 7 114  
GLY 7 97  
TYR 6 181  
ARG 5 96  
ASP 5 100  
ASN 5 116  
ILE 5 94  
PHE 5 119  
THR 5 89  
TRP 5 384  
PRO 4 76  
ALA 3 41  
CYS 3 120  
VAL 3 47  
LYS 2 31  
SER 2 27  
GLN 1 25  
MET 1 43

Fragment:79

LEU 23 258  
ASP 18 360  
GLU 17 278  
LYS 16 250  
GLY 15 208  
PHE 14 333  
VAL 14 222  
TYR 13 393  
ILE 10 188  
GLN 9 225  
MET 9 391  
HIS 8 347  
ALA 7 95  
SER 7 95  
TRP 5 384  
ARG 3 57  
PRO 3 57  
THR 3 53  
ASN 2 46  
CYS 2 80

Fragment:81

PHE 28 666  
TYR 18 545  
LEU 13 146  
ALA 10 136

ASN 10 232  
GLU 9 147  
ASP 8 160  
GLN 8 200  
ILE 8 150  
TRP 8 615  
VAL 7 111  
GLY 6 83  
MET 5 217  
THR 4 71  
ARG 3 57  
PRO 3 57  
LYS 2 31  
SER 2 27  
CYS 1 40  
HIS 1 43

Fragment:82

TYR 136 4121  
GLU 109 1786  
LEU 91 1022  
GLY 90 1250  
ASN 81 1883  
ARG 80 1538  
ASP 79 1580  
PHE 79 1880  
THR 72 1285  
ILE 69 1301  
VAL 69 1095  
SER 65 890  
LYS 64 1000  
TRP 63 4846  
ALA 53 726  
HIS 48 2086  
GLN 45 1125  
PRO 44 846  
MET 23 1000  
CYS 13 520

Fragment:83

ARG 206 3961  
TYR 165 5000  
GLY 149 2069  
SER 138 1890  
LYS 132 2062  
ASP 121 2420  
GLU 119 1950  
THR 111 1982  
ASN 107 2488  
TRP 107 8230  
ALA 105 1438  
LEU 101 1134  
PHE 100 2380  
PRO 97 1865  
HIS 89 3869

ILE 81 1528  
VAL 81 1285  
GLN 79 1975  
CYS 32 1280  
MET 23 1000

Fragment:88

LEU 17 191  
ILE 11 207  
PHE 10 238  
ALA 8 109  
TYR 8 242  
GLY 5 69  
VAL 5 79  
MET 4 173  
ASN 3 69  
LYS 3 46  
SER 3 41  
ASP 2 40  
GLN 2 50  
ARG 1 19  
CYS 1 40  
GLU 1 16  
THR 1 17  
TRP 1 76

Fragment:89

LEU 24 269  
ASP 18 360  
GLY 18 250  
ILE 15 283  
TYR 15 454  
ASN 12 279  
VAL 12 190  
ALA 11 150  
MET 10 434  
SER 10 136  
TRP 10 769  
PHE 7 166  
GLU 6 98  
ARG 4 76  
THR 4 71  
HIS 3 130  
PRO 3 57  
CYS 2 80  
GLN 2 50  
LYS 1 15

Fragment:90

GLY 22 305  
TYR 19 575  
LEU 16 179  
HIS 13 565  
SER 12 164  
ARG 10 192

LYS 9 140  
THR 9 160  
ALA 8 109  
ILE 8 150  
MET 7 304  
PHE 7 166  
PRO 7 134  
GLU 6 98  
GLN 5 125  
TRP 5 384  
VAL 5 79  
ASP 2 40  
ASN 1 23

Fragment:91

LEU 18 202  
CYS 12 480  
SER 12 164  
TRP 11 846  
TYR 11 333  
ARG 10 192  
GLY 10 138  
HIS 10 434  
ALA 9 123  
GLN 9 225  
THR 9 160  
GLU 8 131  
ILE 7 132  
PHE 7 166  
ASP 6 120  
MET 5 217  
LYS 4 62  
PRO 4 76  
ASN 3 69  
VAL 3 47

Fragment:94

GLY 143 1986  
LEU 140 1573  
ALA 130 1780  
ASP 118 2360  
ARG 115 2211  
SER 115 1575  
ILE 111 2094  
VAL 103 1634  
LYS 97 1515  
THR 96 1714  
GLU 91 1491  
PHE 82 1952  
TYR 81 2454  
ASN 75 1744  
GLN 67 1675  
HIS 55 2391  
PRO 55 1057  
TRP 36 2769

MET 33 1434  
CYS 32 1280

Fragment:95  
ARG 88 1692  
LYS 67 1046  
ASN 28 651  
HIS 28 1217  
TYR 28 848  
GLY 25 347  
LEU 22 247  
ALA 16 219  
GLU 16 262  
GLN 16 400  
SER 16 219  
ASP 12 240  
PHE 12 285  
THR 12 214  
PRO 11 211  
VAL 11 174  
ILE 7 132  
TRP 7 538  
CYS 6 240  
MET 6 260

Fragment:96  
LEU 33 370  
PHE 26 619  
GLY 24 333  
VAL 22 349  
ALA 20 273  
TYR 18 545  
SER 14 191  
ARG 13 249  
THR 13 232  
ASN 12 279  
ILE 12 226  
MET 12 521  
ASP 11 220  
HIS 10 434  
GLN 9 225  
GLU 7 114  
TRP 7 538  
CYS 6 240  
LYS 5 78  
PRO 5 96

Fragment:97  
TYR 30 909  
PHE 28 666  
VAL 24 380  
GLY 23 319  
LEU 21 235  
ILE 19 358  
SER 16 219

ARG 15 288  
GLN 15 375  
ALA 14 191  
MET 11 478  
THR 11 196  
TRP 11 846  
ASN 10 232  
ASP 9 180  
LYS 9 140  
GLU 8 131  
HIS 8 347  
PRO 6 115  
CYS 4 160

Fragment:98

PHE 16 380  
THR 14 250  
ILE 12 226  
MET 10 434  
LYS 9 140  
VAL 9 142  
LEU 8 89  
TYR 8 242  
GLN 5 125  
PRO 5 96  
TRP 5 384  
ALA 4 54  
GLY 4 55  
SER 4 54  
ASN 3 69  
ARG 2 38  
GLU 2 32  
ASP 1 20  
CYS 1 40  
HIS 1 43

Fragment:100

ILE 14 264  
LEU 9 101  
TRP 9 692  
VAL 9 142  
GLY 7 97  
ALA 6 82  
ASP 6 120  
GLU 6 98  
TYR 6 181  
MET 5 217  
PHE 5 119  
ASN 4 93  
LYS 3 46  
SER 3 41  
THR 3 53  
ARG 2 38  
HIS 2 86  
GLN 1 25

PRO 1 19

Fragment:104

LEU 29 325  
VAL 28 444  
TYR 25 757  
MET 24 1043  
GLY 23 319  
PHE 20 476  
TRP 18 1384  
ILE 14 264  
ARG 13 249  
SER 13 178  
GLU 12 196  
ALA 11 150  
LYS 11 171  
THR 10 178  
GLN 9 225  
ASP 8 160  
PRO 8 153  
HIS 7 304  
ASN 6 139  
CYS 3 120

Fragment:110

VAL 17 269  
ILE 16 301  
PHE 16 380  
LEU 15 168  
MET 12 521  
GLY 11 152  
ALA 10 136  
ASP 10 200  
GLU 10 163  
SER 10 136  
TYR 9 272  
HIS 6 260  
THR 6 107  
CYS 5 200  
ASN 4 93  
GLN 4 100  
TRP 4 307  
PRO 2 38

Fragment:112

LEU 88 988  
PHE 65 1547  
VAL 48 761  
ILE 46 867  
MET 42 1826  
TYR 37 1121  
ALA 28 383  
GLY 28 388  
SER 24 328  
ARG 19 365



HIS 18 782  
GLU 16 262  
PRO 16 307  
THR 16 285  
TRP 15 1153  
ASP 14 280  
CYS 13 520  
GLN 12 300  
ASN 11 255  
LYS 6 93

Fragment:118

PHE 14 333  
LEU 13 146  
TRP 12 923  
TYR 11 333  
VAL 9 142  
ILE 8 150  
GLU 7 114  
THR 7 125  
ARG 5 96  
GLY 5 69  
ASN 4 93  
LYS 4 62  
PRO 4 76  
SER 4 54  
ASP 3 60  
GLN 3 75  
HIS 3 130  
MET 3 130  
CYS 1 40

Fragment:122

TYR 103 3121  
GLU 85 1393  
ASP 83 1660  
GLY 80 1111  
PHE 74 1761  
ARG 73 1403  
TRP 72 5538  
SER 66 904  
LEU 64 719  
VAL 53 841  
ALA 51 698  
THR 51 910  
GLN 49 1225  
HIS 45 1956  
LYS 44 687  
ASN 43 1000  
ILE 37 698  
MET 31 1347  
PRO 31 596  
CYS 14 560

Fragment:123

ILE 18 339  
VAL 15 238  
ALA 12 164  
ASN 12 279  
LEU 11 123  
TYR 11 333  
THR 10 178  
ARG 9 173  
PHE 9 214  
LYS 7 109  
TRP 6 461  
CYS 5 200  
PRO 5 96  
GLN 3 75  
SER 3 41  
GLU 2 32  
HIS 2 86  
ASP 1 20  
GLY 1 13  
MET 1 43

Fragment:124

LEU 35 393  
GLY 24 333  
SER 24 328  
TYR 22 666  
ASP 19 380  
VAL 19 301  
PHE 17 404  
ALA 15 205  
HIS 15 652  
ILE 14 264  
ASN 13 302  
LYS 12 187  
PRO 11 211  
THR 10 178  
ARG 9 173  
GLU 9 147  
GLN 9 225  
MET 9 391  
TRP 7 538  
CYS 3 120

Fragment:129

TYR 104 3151  
SER 96 1315  
GLY 83 1152  
ALA 81 1109  
PHE 60 1428  
LEU 54 606  
THR 52 928  
ASN 46 1069  
VAL 45 714  
ILE 33 622  
HIS 26 1130

MET 23 1000  
PRO 23 442  
ARG 21 403  
GLN 18 450  
ASP 17 340  
CYS 17 680  
TRP 15 1153  
GLU 9 147  
LYS 5 78

Fragment:135

HIS 33 1434  
VAL 19 301  
THR 18 321  
SER 16 219  
LEU 13 146  
TRP 12 923  
PHE 9 214  
LYS 8 125  
GLY 7 97  
ARG 6 115  
ASN 5 116  
MET 5 217  
ASP 4 80  
PRO 4 76  
ALA 3 41  
GLU 3 49  
GLN 3 75  
ILE 3 56  
TYR 2 60

Fragment:142

PHE 22 523  
LEU 21 235  
VAL 16 253  
ILE 15 283  
GLY 13 180  
TYR 13 393  
ALA 10 136  
SER 10 136  
ASP 9 180  
MET 9 391  
GLN 7 175  
GLU 6 98  
ARG 5 96  
ASN 5 116  
THR 5 89  
HIS 4 173  
PRO 4 76  
TRP 4 307  
CYS 2 80  
LYS 2 31

Fragment:151

LYS 27 421

ARG 19 365  
TYR 14 424  
ASN 10 232  
HIS 9 391  
GLY 7 97  
ALA 5 68  
THR 5 89  
PRO 4 76  
ILE 3 56  
SER 3 41  
VAL 3 47  
ASP 2 40  
GLN 2 50  
LEU 2 22  
TRP 2 153  
GLU 1 16  
MET 1 43

Fragment:152

LYS 26 406  
ARG 18 346  
GLY 10 138  
ALA 9 123  
TYR 8 242  
ASP 7 140  
HIS 7 304  
SER 7 95  
THR 7 125  
ASN 6 139  
GLN 5 125  
ILE 4 75  
CYS 2 80  
GLU 2 32  
LEU 2 22  
PHE 2 47  
PRO 2 38  
TRP 2 153  
VAL 2 31  
MET 1 43

Fragment:154

LEU 15 168  
TYR 8 242  
ALA 7 95  
ILE 7 132  
MET 6 260  
PHE 5 119  
VAL 5 79  
GLU 4 65  
GLN 3 75  
GLY 3 41  
THR 3 53  
ASP 2 40  
HIS 2 86  
LYS 2 31

SER 2 27  
TRP 2 153  
ARG 1 19  
ASN 1 23

Fragment:155

ARG 51 980  
TYR 40 1212  
SER 34 465  
LYS 31 484  
THR 31 553  
GLY 30 416  
PHE 30 714  
LEU 28 314  
HIS 26 1130  
VAL 24 380  
ALA 23 315  
TRP 23 1769  
GLU 22 360  
ASN 21 488  
CYS 20 800  
GLN 15 375  
ILE 14 264  
ASP 11 220  
MET 9 391  
PRO 3 57

Fragment:156

LEU 40 449  
GLU 35 573  
TYR 30 909  
ASP 29 580  
HIS 26 1130  
ILE 26 490  
GLY 25 347  
PHE 23 547  
ARG 21 403  
VAL 21 333  
SER 19 260  
ALA 18 246  
THR 18 321  
ASN 16 372  
TRP 16 1230  
LYS 14 218  
MET 11 478  
GLN 8 200  
CYS 6 240  
PRO 4 76

Fragment:161

LEU 29 325  
ALA 18 246  
PHE 17 404  
ILE 14 264  
MET 14 608

GLN 13 325  
GLY 13 180  
VAL 11 174  
LYS 9 140  
TYR 9 272  
SER 8 109  
TRP 8 615  
ARG 7 134  
ASN 7 162  
GLU 4 65  
HIS 4 173  
CYS 2 80  
ASP 1 20  
PRO 1 19  
THR 1 17

Fragment:163

GLY 81 1125  
THR 44 785  
LYS 37 578  
SER 28 383  
ALA 26 356  
ASP 23 460  
VAL 22 349  
GLU 17 278  
ARG 16 307  
GLN 15 375  
ASN 12 279  
ILE 10 188  
LEU 8 89  
PRO 8 153  
PHE 7 166  
TYR 6 181  
CYS 5 200  
HIS 3 130  
MET 3 130  
TRP 1 76

Fragment:164

GLY 426 5916  
ASP 358 7160  
SER 341 4671  
LYS 334 5218  
ASN 306 7116  
ALA 257 3520  
LEU 256 2876  
THR 252 4500  
VAL 232 3682  
PHE 222 5285  
ARG 221 4250  
GLU 184 3016  
TYR 160 4848  
ILE 156 2943  
HIS 110 4782  
PRO 98 1884

GLN 95 2375  
CYS 75 3000  
MET 71 3086  
TRP 68 5230

Fragment:168  
TYR 49 1484  
LEU 32 359  
PHE 30 714  
GLU 24 393  
TRP 23 1769  
ILE 22 415  
SER 22 301  
ASP 21 420  
VAL 19 301  
HIS 18 782  
ARG 17 326  
GLY 17 236  
ASN 15 348  
LYS 15 234  
GLN 13 325  
THR 12 214  
MET 8 347  
ALA 7 95  
PRO 7 134  
CYS 6 240

Fragment:169  
GLY 13 180  
ALA 10 136  
VAL 8 126  
ASN 7 162  
HIS 7 304  
LYS 7 109  
SER 7 95  
ARG 6 115  
ASP 6 120  
GLN 6 150  
ILE 6 113  
LEU 6 67  
PHE 5 119  
THR 5 89  
TYR 5 151  
CYS 4 160  
GLU 4 65  
MET 4 173  
PRO 4 76  
TRP 3 230

Fragment:170  
GLY 10 138  
SER 10 136  
TYR 8 242  
ARG 6 115  
HIS 6 260

LYS 6 93  
PHE 6 142  
THR 5 89  
ASN 4 93  
GLN 4 100  
TRP 3 230  
ILE 2 37  
LEU 2 22  
ALA 1 13  
ASP 1 20  
CYS 1 40  
MET 1 43  
PRO 1 19  
VAL 1 15

Fragment:173

PHE 53 1261  
ARG 51 980  
LEU 47 528  
LYS 35 546  
PRO 27 519  
ILE 26 490  
MET 22 956  
SER 21 287  
TYR 21 636  
GLY 17 236  
VAL 13 206  
ALA 12 164  
HIS 9 391  
THR 9 160  
GLU 8 131  
TRP 8 615  
ASN 6 139  
ASP 5 100  
GLN 5 125  
CYS 2 80

Fragment:180

HIS 27 1173  
GLY 9 125  
PRO 7 134  
GLU 6 98  
ARG 5 96  
TYR 5 151  
ALA 4 54  
ASP 4 80  
PHE 3 71  
GLN 2 50  
LEU 2 22  
TRP 2 153  
CYS 1 40  
ILE 1 18  
MET 1 43  
SER 1 13



Fragment:181  
GLY 21 291  
LEU 18 202  
PHE 18 428  
VAL 13 206  
GLN 11 275  
TYR 11 333  
ILE 10 188  
ALA 9 123  
CYS 9 360  
SER 8 109  
HIS 7 304  
LYS 7 109  
MET 7 304  
ASN 6 139  
ASP 5 100  
GLU 4 65  
THR 3 53  
ARG 2 38  
TRP 2 153  
PRO 1 19

Fragment:183  
GLY 60 833  
SER 37 506  
LYS 35 546  
THR 30 535  
ARG 29 557  
GLU 24 393  
ASN 21 488  
PRO 18 346  
ASP 16 320  
ALA 15 205  
VAL 12 190  
PHE 10 238  
LEU 6 67  
GLN 5 125  
ILE 5 94  
TYR 5 151  
HIS 4 173  
MET 4 173  
CYS 1 40

Fragment:188  
GLY 1205 16736  
LYS 649 10140  
THR 605 10803  
SER 551 7547  
ARG 518 9961  
ASP 376 7520  
ASN 284 6604  
VAL 274 4349  
ALA 268 3671  
GLU 235 3852  
HIS 208 9043

TYR 176 5333  
LEU 171 1921  
PRO 161 3096  
ILE 139 2622  
PHE 122 2904  
GLN 109 2725  
MET 65 2826  
CYS 48 1920  
TRP 48 3692

Fragment:190

LEU 20 224  
VAL 20 317  
ALA 10 136  
LYS 8 125  
PHE 7 166  
TYR 6 181  
GLU 5 81  
THR 5 89  
GLY 4 55  
ASP 3 60  
ILE 3 56  
MET 3 130  
SER 3 41  
ASN 2 46  
CYS 2 80  
TRP 2 153  
ARG 1 19  
HIS 1 43  
PRO 1 19

Fragment:191

LEU 12 134  
THR 6 107  
MET 5 217  
ALA 4 54  
ASP 4 80  
GLY 4 55  
TRP 4 307  
VAL 4 63  
ASN 3 69  
LYS 3 46  
PHE 3 71  
SER 3 41  
GLU 2 32  
GLN 2 50  
HIS 2 86  
ILE 2 37  
ARG 1 19  
TYR 1 30

Fragment:196

GLY 13 180  
ARG 10 192  
ASP 10 200

CYS 10 400  
GLU 8 131  
SER 8 109  
TRP 7 538  
ALA 4 54  
PRO 4 76  
ASN 3 69  
THR 3 53  
TYR 3 90  
LEU 2 22  
LYS 2 31  
VAL 2 31  
HIS 1 43  
ILE 1 18  
MET 1 43

Fragment:198

LEU 94 1056  
GLY 74 1027  
GLU 73 1196  
VAL 64 1015  
TYR 61 1848  
ILE 60 1132  
PHE 54 1285  
ALA 49 671  
MET 42 1826  
SER 40 547  
THR 37 660  
PRO 29 557  
HIS 25 1086  
ASP 23 460  
GLN 22 550  
ASN 21 488  
CYS 16 640  
TRP 13 999  
ARG 12 230  
LYS 6 93

Fragment:199

GLY 1112 15444  
ALA 454 6219  
THR 423 7553  
SER 384 5260  
ARG 360 6923  
VAL 275 4365  
ILE 269 5075  
LEU 269 3022  
ASN 237 5511  
PRO 198 3807  
PHE 190 4523  
TYR 154 4666  
LYS 152 2375  
HIS 130 5652  
GLN 121 3025  
MET 116 5043

ASP 100 2000  
CYS 89 3560  
TRP 69 5307  
GLU 66 1081

Fragment:200  
GLY 528 7333  
SER 443 6068  
THR 430 7678  
ALA 405 5547  
ILE 328 6188  
VAL 325 5158  
TYR 282 8545  
ASN 276 6418  
LEU 276 3101  
LYS 243 3796  
PRO 228 4384  
HIS 177 7695  
PHE 167 3976  
ASP 150 3000  
GLU 146 2393  
CYS 143 5720  
ARG 127 2442  
MET 116 5043  
GLN 80 2000  
TRP 74 5692

Fragment:202  
VAL 10 158  
LEU 9 101  
PHE 9 214  
THR 5 89  
ALA 4 54  
GLY 4 55  
HIS 4 173  
ILE 4 75  
TRP 4 307  
TYR 4 121  
ARG 3 57  
ASP 3 60  
GLU 3 49  
SER 3 41  
ASN 2 46  
GLN 2 50  
LYS 2 31  
MET 2 86  
PRO 1 19

Fragment:206  
LEU 18 202  
ILE 14 264  
TYR 10 303  
VAL 9 142  
PHE 8 190  
GLY 6 83

ALA 4 54  
PRO 4 76  
ASN 3 69  
TRP 3 230  
ASP 2 40  
GLU 2 32  
HIS 2 86  
MET 2 86  
THR 2 35  
ARG 1 19  
CYS 1 40  
SER 1 13

Fragment:209

GLU 18 295  
HIS 14 608  
TYR 10 303  
GLY 8 111  
ASP 6 120  
MET 6 260  
ARG 5 96  
VAL 5 79  
SER 4 54  
ALA 3 41  
ILE 2 37  
LEU 2 22  
LYS 2 31  
THR 2 35  
ASN 1 23  
CYS 1 40  
GLN 1 25  
PRO 1 19

Fragment:213

GLY 19 263  
SER 17 232  
CYS 12 480  
VAL 12 190  
HIS 7 304  
TRP 7 538  
TYR 7 212  
GLN 5 125  
LYS 5 78  
ALA 4 54  
ASP 4 80  
LEU 4 44  
GLU 3 49  
ILE 2 37  
PHE 2 47  
PRO 2 38  
ARG 1 19  
THR 1 17

Fragment:220

LEU 84 943

TYR 56 1696  
PHE 52 1238  
ALA 48 657  
VAL 42 666  
MET 37 1608  
ILE 35 660  
CYS 32 1280  
ASN 29 674  
ASP 20 400  
GLU 20 327  
SER 20 273  
GLY 19 263  
HIS 18 782  
TRP 17 1307  
ARG 15 288  
LYS 14 218  
THR 14 250  
GLN 12 300  
PRO 11 211

Fragment:221

LEU 11 123  
PHE 8 190  
VAL 7 111  
ILE 6 113  
TYR 6 181  
ASN 5 116  
GLU 5 81  
GLY 5 69  
ARG 3 57  
GLN 3 75  
LYS 3 46  
MET 3 130  
THR 3 53  
HIS 2 86  
PRO 2 38  
TRP 2 153  
ALA 1 13  
ASP 1 20

Fragment:227

PHE 57 1357  
LEU 56 629  
GLY 41 569  
TYR 39 1181  
LYS 36 562  
ARG 34 653  
VAL 30 476  
ALA 29 397  
ILE 27 509  
GLN 25 625  
MET 24 1043  
SER 23 315  
THR 22 392  
ASN 16 372

GLU 16 262  
ASP 15 300  
TRP 14 1076  
HIS 13 565  
CYS 9 360  
PRO 8 153

Fragment:229

LEU 31 348  
ILE 18 339  
VAL 17 269  
GLY 16 222  
ALA 15 205  
PHE 15 357  
TYR 11 333  
ASP 10 200  
GLU 10 163  
MET 8 347  
SER 8 109  
THR 7 125  
ASN 5 116  
HIS 5 217  
GLN 4 100  
PRO 4 76  
ARG 3 57  
TRP 3 230  
CYS 2 80  
LYS 2 31

Fragment:230

ASP 167 3340  
GLY 143 1986  
ARG 126 2423  
GLU 114 1868  
PHE 112 2666  
ASN 100 2325  
TYR 98 2969  
ALA 83 1136  
THR 81 1446  
HIS 80 3478  
TRP 77 5923  
SER 76 1041  
ILE 68 1283  
LEU 68 764  
VAL 68 1079  
GLN 62 1550  
LYS 60 937  
PRO 41 788  
MET 35 1521  
CYS 26 1040

Fragment:232

ARG 111 2134  
GLY 68 944  
ASN 56 1302

ASP 55 1100  
TYR 54 1636  
LYS 53 828  
HIS 47 2043  
PHE 35 833  
SER 35 479  
LEU 33 370  
VAL 30 476  
GLU 29 475  
THR 23 410  
ALA 22 301  
TRP 20 1538  
GLN 15 375  
ILE 14 264  
MET 13 565  
CYS 8 320  
PRO 6 115

Fragment:233  
ARG 237 4557  
GLY 223 3097  
ASP 197 3940  
TYR 188 5696  
PHE 169 4023  
ILE 162 3056  
LEU 145 1629  
VAL 136 2158  
SER 134 1835  
ASN 120 2790  
THR 120 2142  
ALA 115 1575  
GLN 113 2825  
HIS 112 4869  
GLU 102 1672  
PRO 89 1711  
LYS 86 1343  
MET 57 2478  
TRP 48 3692  
CYS 43 1720

Fragment:234  
SER 21 287  
GLY 11 152  
HIS 11 478  
LYS 11 171  
PHE 11 261  
ARG 10 192  
TYR 10 303  
THR 8 142  
TRP 8 615  
ASN 7 162  
ASP 6 120  
GLN 5 125  
VAL 5 79  
CYS 4 160



GLU 4 65  
ILE 4 75  
ALA 3 41  
LEU 3 33  
MET 1 43  
PRO 1 19

Fragment:240

LEU 26 292  
GLY 20 277  
TYR 17 515  
VAL 13 206  
GLU 12 196  
ILE 10 188  
MET 9 391  
SER 9 123  
PHE 8 190  
PRO 8 153  
ASN 7 162  
HIS 7 304  
ARG 6 115  
THR 6 107  
TRP 6 461  
ALA 5 68  
ASP 5 100  
LYS 5 78  
GLN 3 75  
CYS 2 80

Fragment:242

GLY 1019 14152  
ALA 486 6657  
THR 328 5857  
SER 317 4342  
LEU 232 2606  
ARG 214 4115  
ILE 163 3075  
TYR 157 4757  
VAL 153 2428  
ASN 151 3511  
PRO 132 2538  
ASP 131 2620  
HIS 122 5304  
CYS 116 4640  
PHE 112 2666  
GLU 84 1377  
GLN 82 2050  
TRP 82 6307  
LYS 61 953  
MET 61 2652

Fragment:243

GLY 489 6791  
TYR 420 12727  
THR 412 7357

LEU 359 4033  
SER 351 4808  
ALA 328 4493  
HIS 288 12521  
ARG 282 5423  
VAL 266 4222  
ILE 264 4981  
ASN 263 6116  
PHE 259 6166  
TRP 217 16692  
GLN 203 5075  
PRO 195 3749  
GLU 160 2622  
LYS 159 2484  
MET 152 6608  
ASP 146 2920  
CYS 133 5320

Fragment:246

HIS 67 2913  
ARG 47 903  
GLY 37 513  
TRP 35 2692  
CYS 25 1000  
GLN 25 625  
PHE 24 571  
SER 20 273  
GLU 19 311  
TYR 18 545  
ALA 16 219  
ASP 14 280  
MET 12 521  
LEU 11 123  
ASN 10 232  
VAL 9 142  
ILE 6 113  
LYS 6 93  
THR 6 107  
PRO 5 96

Fragment:247

HIS 57 2478  
ARG 33 634  
ASN 28 651  
GLN 27 675  
SER 24 328  
GLY 23 319  
THR 22 392  
CYS 20 800  
LYS 18 281  
TYR 18 545  
GLU 17 278  
MET 16 695  
PHE 15 357  
TRP 14 1076

VAL 12 190  
ASP 11 220  
LEU 11 123  
ALA 10 136  
ILE 9 169  
PRO 7 134

Fragment:249

GLY 10 138  
GLN 7 175  
HIS 6 260  
VAL 6 95  
LEU 4 44  
PHE 4 95  
ILE 3 56  
PRO 3 57  
ASN 2 46  
ARG 1 19  
ASP 1 20  
MET 1 43  
THR 1 17  
TRP 1 76  
TYR 1 30

Fragment:251

SER 10 136  
GLY 9 125  
TYR 8 242  
ASP 5 100  
GLN 5 125  
ASN 4 93  
HIS 4 173  
PHE 4 95  
THR 4 71  
GLU 3 49  
MET 3 130  
ARG 2 38  
LEU 2 22  
LYS 2 31  
ALA 1 13  
ILE 1 18  
PRO 1 19  
TRP 1 76  
VAL 1 15

Fragment:252

SER 25 342  
LEU 23 258  
GLY 22 305  
PHE 18 428  
VAL 16 253  
ASP 14 280  
TYR 13 393  
GLU 12 196  
CYS 11 440

GLN 10 250  
MET 10 434  
TRP 10 769  
ILE 9 169  
THR 9 160  
LYS 8 125  
HIS 7 304  
ARG 6 115  
ALA 5 68  
ASN 3 69  
PRO 2 38

Fragment:254  
GLY 176 2444  
LEU 147 1651  
ALA 141 1931  
VAL 132 2095  
ARG 121 2326  
PHE 116 2761  
SER 112 1534  
TYR 107 3242  
ILE 101 1905  
LYS 82 1281  
THR 82 1464  
HIS 68 2956  
ASN 63 1465  
PRO 55 1057  
GLN 52 1300  
ASP 45 900  
MET 45 1956  
GLU 37 606  
TRP 26 1999  
CYS 21 840

Fragment:259  
LEU 20 224  
VAL 19 301  
ASP 17 340  
TYR 16 484  
ASN 15 348  
GLU 15 245  
GLY 13 180  
SER 12 164  
TRP 12 923  
ARG 11 211  
PHE 11 261  
THR 11 196  
HIS 10 434  
ILE 10 188  
MET 8 347  
ALA 7 95  
LYS 5 78  
PRO 5 96  
GLN 4 100  
CYS 3 120

Fragment:260

HIS 12 521  
TRP 11 846  
LEU 10 112  
PHE 10 238  
TYR 9 272  
GLU 8 131  
SER 8 109  
GLN 6 150  
ILE 6 113  
ALA 5 68  
VAL 5 79  
ASP 4 80  
MET 3 130  
CYS 2 80  
GLY 2 27  
PRO 2 38  
THR 2 35  
ARG 1 19  
ASN 1 23

Fragment:267

LEU 10 112  
PHE 9 214  
VAL 8 126  
ALA 7 95  
ARG 7 134  
MET 7 304  
ILE 6 113  
TYR 6 181  
HIS 5 217  
GLY 3 41  
THR 3 53  
ASP 2 40  
ASN 2 46  
CYS 2 80  
LYS 2 31  
GLU 1 16  
GLN 1 25  
PRO 1 19  
SER 1 13  
TRP 1 76

Fragment:268

LEU 56 629  
ILE 39 735  
PHE 39 928  
VAL 29 460  
ALA 28 383  
MET 16 695  
TRP 13 999  
TYR 13 393  
GLY 10 138  
THR 8 142

LYS 6 93  
ASN 5 116  
PRO 4 76  
SER 4 54  
ARG 3 57  
CYS 3 120  
GLU 3 49  
HIS 3 130  
GLN 1 25

Fragment:276

GLY 36 500  
PHE 31 738  
TYR 31 939  
LEU 29 325  
ILE 26 490  
ALA 25 342  
VAL 24 380  
THR 22 392  
TRP 21 1615  
ASN 19 441  
SER 19 260  
PRO 18 346  
MET 17 739  
HIS 15 652  
GLU 13 213  
ASP 12 240  
GLN 12 300  
LYS 12 187  
ARG 11 211  
CYS 9 360

Fragment:283

GLY 128 1777  
SER 81 1109  
TYR 74 2242  
LEU 71 797  
THR 67 1196  
ALA 66 904  
LYS 58 906  
HIS 57 2478  
PHE 50 1190  
VAL 50 793  
ASP 49 980  
GLU 47 770  
PRO 46 884  
ARG 41 788  
ASN 39 906  
CYS 39 1560  
ILE 39 735  
GLN 38 950  
TRP 23 1769  
MET 21 913

Fragment:286

ILE 40 754  
PHE 39 928  
TYR 39 1181  
LEU 33 370  
HIS 29 1260  
ALA 26 356  
VAL 21 333  
SER 20 273  
GLY 19 263  
MET 18 782  
TRP 18 1384  
ASN 14 325  
ASP 13 260  
ARG 11 211  
THR 11 196  
GLU 10 163  
LYS 10 156  
CYS 7 280  
PRO 7 134  
GLN 3 75

Fragment:300

TYR 18 545  
ARG 16 307  
LEU 15 168  
ALA 13 178  
HIS 13 565  
ILE 13 245  
GLU 11 180  
ASN 10 232  
GLY 10 138  
PRO 10 192  
TRP 10 769  
VAL 9 142  
LYS 8 125  
SER 8 109  
THR 8 142  
ASP 7 140  
PHE 7 166  
GLN 6 150  
MET 2 86

Fragment:302

GLY 354 4916  
ARG 295 5673  
SER 267 3657  
THR 195 3482  
ALA 186 2547  
PRO 141 2711  
TYR 106 3212  
ASN 100 2325  
LYS 94 1468  
LEU 84 943  
PHE 81 1928  
ILE 77 1452

HIS 74 3217  
VAL 69 1095  
TRP 65 5000  
ASP 55 1100  
MET 53 2304  
GLN 49 1225  
GLU 37 606  
CYS 21 840

Fragment:304

PHE 25 595  
THR 22 392  
TYR 22 666  
ASN 20 465  
GLN 18 450  
SER 17 232  
ILE 16 301  
TRP 16 1230  
VAL 16 253  
ARG 15 288  
LEU 12 134  
GLY 10 138  
HIS 9 391  
ASP 6 120  
MET 6 260  
PRO 6 115  
ALA 5 68  
CYS 5 200  
LYS 5 78  
GLU 2 32

Fragment:305

ILE 12 226  
LEU 9 101  
MET 9 391  
ALA 8 109  
PHE 8 190  
ASN 7 162  
GLY 7 97  
HIS 7 304  
TYR 7 212  
ASP 5 100  
GLN 4 100  
ARG 3 57  
LYS 3 46  
THR 3 53  
TRP 3 230  
VAL 3 47  
GLU 2 32  
PRO 2 38  
SER 2 27

Fragment:315

TYR 18 545  
PHE 16 380



LEU 13 146  
ASP 9 180  
ILE 8 150  
TRP 7 538  
GLU 6 98  
THR 6 107  
VAL 6 95  
GLY 5 69  
PRO 5 96  
GLN 4 100  
ALA 3 41  
ARG 3 57  
LYS 3 46  
MET 3 130  
SER 3 41  
HIS 2 86  
ASN 1 23

Fragment:318

ASN 48 1116  
PHE 33 785  
GLY 28 388  
THR 28 500  
ILE 27 509  
SER 27 369  
VAL 27 428  
HIS 25 1086  
LEU 23 258  
TYR 21 636  
PRO 20 384  
ALA 19 260  
ARG 18 346  
TRP 16 1230  
GLN 15 375  
CYS 14 560  
GLU 14 229  
LYS 14 218  
ASP 13 260  
MET 9 391

Fragment:319

LEU 28 314  
PHE 20 476  
VAL 20 317  
ALA 18 246  
TYR 17 515  
ILE 15 283  
MET 15 652  
GLY 14 194  
LYS 14 218  
ARG 13 249  
ASP 11 220  
PRO 11 211  
SER 11 150  
THR 11 196

TRP 11 846  
GLU 10 163  
HIS 9 391  
GLN 8 200  
ASN 7 162  
CYS 4 160

Fragment:322

LEU 20 224  
VAL 11 174  
ALA 10 136  
PHE 9 214  
GLU 8 131  
ARG 7 134  
GLY 7 97  
MET 7 304  
SER 7 95  
ASP 6 120  
GLN 6 150  
ILE 6 113  
CYS 4 160  
ASN 3 69  
TYR 3 90  
PRO 2 38  
THR 2 35  
HIS 1 43  
LYS 1 15  
TRP 1 76

Fragment:329

GLY 26 361  
THR 19 339  
SER 17 232  
ALA 16 219  
TRP 15 1153  
ARG 13 249  
VAL 13 206  
LEU 12 134  
PHE 10 238  
ILE 8 150  
ASP 6 120  
LYS 6 93  
TYR 5 151  
ASN 4 93  
CYS 3 120  
HIS 3 130  
PRO 3 57  
GLU 1 16  
GLN 1 25

Fragment:330

TRP 28 2153  
SER 24 328  
THR 23 410  
LEU 21 235

ASN 19 441  
GLY 19 263  
TYR 19 575  
GLN 12 300  
PHE 8 190  
VAL 8 126  
ALA 7 95  
ARG 6 115  
ILE 5 94  
LYS 4 62  
ASP 3 60  
MET 2 86  
PRO 2 38  
GLU 1 16  
HIS 1 43

Fragment:339

ILE 11 207  
LEU 10 112  
GLY 9 125  
GLU 5 81  
PHE 5 119  
ALA 3 41  
ARG 3 57  
ASP 3 60  
LYS 3 46  
MET 3 130  
VAL 3 47  
HIS 2 86  
THR 2 35  
ASN 1 23  
CYS 1 40  
GLN 1 25  
PRO 1 19  
SER 1 13  
TYR 1 30

Fragment:342

LEU 14 157  
VAL 14 222  
GLY 12 166  
THR 10 178  
TYR 9 272  
PHE 8 190  
GLN 6 150  
TRP 6 461  
ASN 5 116  
GLU 5 81  
ILE 5 94  
MET 5 217  
ARG 4 76  
LYS 4 62  
ALA 3 41  
ASP 3 60  
CYS 3 120

HIS 3 130  
PRO 2 38  
SER 2 27

Fragment:345  
GLY 92 1277  
ARG 70 1346  
ASP 65 1300  
ALA 58 794  
THR 54 964  
SER 52 712  
ILE 49 924  
TYR 45 1363  
LEU 42 471  
LYS 42 656  
PHE 41 976  
HIS 39 1695  
VAL 38 603  
ASN 35 813  
GLN 29 725  
PRO 28 538  
GLU 25 409  
CYS 15 600  
MET 13 565  
TRP 9 692

Fragment:347  
LYS 10 156  
ARG 9 173  
HIS 9 391  
ASN 7 162  
SER 4 54  
TYR 4 121  
GLU 3 49  
GLY 3 41  
GLN 2 50  
MET 2 86  
ALA 1 13  
ASP 1 20  
LEU 1 11  
PHE 1 23  
PRO 1 19

Fragment:357  
LEU 159 1786  
ILE 89 1679  
PHE 73 1738  
VAL 60 952  
TYR 55 1666  
ALA 50 684  
TRP 50 3846  
GLY 39 541  
ARG 37 711  
GLU 30 491  
PRO 29 557

THR 29 517  
MET 26 1130  
SER 26 356  
HIS 22 956  
ASN 20 465  
LYS 17 265  
ASP 14 280  
GLN 9 225  
CYS 2 80

Fragment:360

LEU 10 112  
ASP 9 180  
PHE 7 166  
LYS 6 93  
VAL 6 95  
ALA 5 68  
GLY 5 69  
ARG 4 76  
CYS 4 160  
ILE 4 75  
SER 4 54  
ASN 2 46  
GLU 2 32  
HIS 2 86  
TRP 2 153  
GLN 1 25  
TYR 1 30

Fragment:363

LEU 66 741  
PHE 60 1428  
TYR 46 1393  
VAL 45 714  
MET 39 1695  
ILE 35 660  
TRP 34 2615  
SER 29 397  
THR 29 517  
ALA 28 383  
GLY 25 347  
ARG 19 365  
PRO 18 346  
GLU 17 278  
ASN 15 348  
GLN 13 325  
HIS 10 434  
ASP 9 180  
LYS 6 93  
CYS 5 200

Fragment:369

THR 12 214  
HIS 11 478  
LEU 7 78

VAL 7 111  
GLN 5 125  
ALA 3 41  
GLU 2 32  
ASP 1 20  
GLY 1 13  
PHE 1 23  
TRP 1 76  
TYR 1 30

Fragment:370  
ARG 104 1999  
LEU 55 617  
PHE 52 1238  
TYR 48 1454  
SER 43 589  
LYS 42 656  
HIS 41 1782  
ALA 35 479  
ILE 35 660  
GLY 34 472  
THR 34 607  
ASN 32 744  
VAL 20 317  
PRO 19 365  
GLN 17 425  
TRP 16 1230  
MET 13 565  
GLU 10 163  
ASP 7 140  
CYS 7 280

Fragment:372  
ILE 10 188  
LEU 7 78  
MET 7 304  
PHE 7 166  
GLY 5 69  
SER 5 68  
TYR 5 151  
LYS 4 62  
ALA 3 41  
ARG 3 57  
TRP 3 230  
VAL 3 47  
GLU 2 32  
THR 2 35  
ASP 1 20  
ASN 1 23  
HIS 1 43

Fragment:375  
LEU 12 134  
GLY 7 97  
ILE 6 113

LYS 4 62  
PHE 4 95  
ASP 3 60  
MET 3 130  
TYR 3 90  
VAL 3 47  
ASN 2 46  
PRO 2 38  
CYS 1 40  
GLN 1 25  
HIS 1 43  
SER 1 13  
THR 1 17

Fragment:378

PHE 26 619  
LEU 22 247  
HIS 13 565  
MET 12 521  
GLY 10 138  
ILE 10 188  
ALA 9 123  
TRP 8 615  
TYR 8 242  
GLU 7 114  
GLN 6 150  
SER 6 82  
LYS 5 78  
PRO 5 96  
VAL 4 63  
ARG 3 57  
ASN 3 69  
THR 3 53  
ASP 2 40  
CYS 1 40

Fragment:379

GLY 174 2416  
SER 132 1808  
ALA 131 1794  
THR 122 2178  
ILE 104 1962  
VAL 102 1619  
LEU 95 1067  
TYR 88 2666  
LYS 82 1281  
ASN 73 1697  
ASP 51 1020  
PHE 51 1214  
PRO 51 980  
HIS 45 1956  
MET 43 1869  
ARG 41 788  
GLN 36 900  
CYS 31 1240

GLU 30 491  
TRP 20 1538

Fragment:383

LEU 22 247  
ALA 15 205  
VAL 11 174  
ILE 9 169  
GLU 7 114  
PHE 7 166  
TYR 7 212  
MET 6 260  
CYS 5 200  
GLY 5 69  
SER 5 68  
ARG 4 76  
ASP 4 80  
TRP 4 307  
THR 3 53  
GLN 2 50  
PRO 2 38  
ASN 1 23  
HIS 1 43  
LYS 1 15

Fragment:394

LEU 59 662  
ILE 48 905  
TYR 45 1363  
MET 44 1913  
HIS 41 1782  
VAL 40 634  
GLY 39 541  
THR 36 642  
PHE 35 833  
ALA 34 465  
SER 27 369  
GLU 22 360  
ASP 20 400  
PRO 14 269  
TRP 14 1076  
CYS 13 520  
GLN 13 325  
ASN 12 279  
ARG 8 153  
LYS 4 62

Fragment:395

GLY 101 1402  
ASP 53 1060  
ASN 44 1023  
ILE 41 773  
SER 32 438  
TYR 30 909  
ALA 29 397



LEU 26 292  
HIS 25 1086  
THR 24 428  
MET 21 913  
VAL 16 253  
GLU 15 245  
PHE 15 357  
ARG 12 230  
GLN 12 300  
LYS 6 93  
TRP 6 461  
CYS 1 40  
PRO 1 19

Fragment:399  
GLY 253 3513  
TYR 108 3272  
SER 107 1465  
PHE 82 1952  
THR 82 1464  
ASP 78 1560  
ALA 74 1013  
LEU 64 719  
VAL 58 920  
PRO 56 1076  
ARG 55 1057  
ILE 53 1000  
ASN 50 1162  
GLU 46 754  
CYS 44 1760  
TRP 36 2769  
MET 33 1434  
HIS 32 1391  
GLN 25 625  
LYS 25 390

Fragment:400  
ASP 22 440  
GLU 22 360  
ASN 18 418  
TYR 13 393  
ALA 12 164  
ARG 12 230  
GLY 12 166  
LEU 12 134  
SER 12 164  
ILE 7 132  
VAL 7 111  
LYS 6 93  
MET 6 260  
PHE 5 119  
PRO 5 96  
THR 5 89  
CYS 4 160  
GLN 3 75

HIS 1 43  
TRP 1 76

Fragment:402

LEU 12 134  
GLY 7 97  
HIS 7 304  
ILE 6 113  
MET 5 217  
TYR 5 151  
VAL 5 79  
ALA 3 41  
ASP 3 60  
LYS 2 31  
SER 2 27  
CYS 1 40  
GLU 1 16  
PHE 1 23  
THR 1 17  
TRP 1 76

Fragment:404

GLU 64 1049  
ASP 63 1260  
TYR 63 1909  
TRP 43 3307  
ARG 41 788  
PHE 39 928  
GLY 38 527  
LEU 34 382  
SER 33 452  
THR 33 589  
ASN 32 744  
LYS 29 453  
VAL 29 460  
HIS 26 1130  
ALA 24 328  
GLN 24 600  
ILE 19 358  
PRO 16 307  
MET 14 608  
CYS 9 360

Fragment:427

GLY 26 361  
ASP 19 380  
SER 17 232  
ALA 15 205  
ARG 15 288  
ILE 15 283  
GLU 8 131  
LYS 8 125  
THR 8 142  
TYR 8 242  
LEU 7 78

ASN 6 139  
VAL 6 95  
HIS 5 217  
PHE 4 95  
MET 3 130  
CYS 2 80  
GLN 1 25  
TRP 1 76

Fragment:429

TYR 15 454  
HIS 9 391  
LYS 8 125  
ARG 7 134  
GLN 7 175  
SER 5 68  
ASP 4 80  
MET 4 173  
THR 4 71  
VAL 4 63  
ALA 3 41  
GLY 3 41  
LEU 3 33  
PHE 3 71  
CYS 2 80  
TRP 2 153  
ASN 1 23  
ILE 1 18  
PRO 1 19

Fragment:430

GLY 32 444  
GLN 14 350  
LYS 13 203  
TYR 13 393  
GLU 11 180  
HIS 8 347  
VAL 8 126  
SER 7 95  
ALA 6 82  
ARG 6 115  
ASP 6 120  
PHE 5 119  
THR 5 89  
LEU 4 44  
TRP 4 307  
ASN 3 69  
ILE 3 56  
PRO 3 57  
CYS 1 40

Fragment:444

GLY 23 319  
PHE 22 523  
TYR 20 606

GLU 19 311  
ARG 18 346  
GLN 17 425  
LEU 17 191  
SER 17 232  
THR 16 285  
HIS 14 608  
ASP 13 260  
LYS 10 156  
PRO 10 192  
ALA 9 123  
ASN 9 209  
ILE 9 169  
MET 8 347  
TRP 8 615  
VAL 6 95

Fragment:447

PHE 11 261  
ALA 8 109  
VAL 7 111  
GLU 6 98  
ARG 5 96  
ILE 5 94  
MET 5 217  
SER 5 68  
ASP 4 80  
ASN 4 93  
GLY 4 55  
HIS 4 173  
LEU 4 44  
THR 4 71  
TRP 4 307  
LYS 2 31  
TYR 2 60  
CYS 1 40

Fragment:453

ARG 33 634  
TYR 15 454  
SER 13 178  
GLY 10 138  
LYS 10 156  
HIS 7 304  
GLU 6 98  
ASP 5 100  
ASN 5 116  
GLN 5 125  
THR 5 89  
CYS 4 160  
MET 2 86  
ALA 1 13  
ILE 1 18  
PHE 1 23  
PRO 1 19

TRP 1 76

Fragment:456

GLU 13 213  
LEU 7 78  
TYR 6 181  
ASP 5 100  
VAL 5 79  
ILE 4 75  
TRP 4 307  
ALA 3 41  
ASN 3 69  
GLN 3 75  
GLY 3 41  
LYS 3 46  
MET 3 130  
ARG 2 38  
HIS 2 86  
CYS 1 40  
PHE 1 23  
PRO 1 19  
SER 1 13

Fragment:458

LEU 10 112  
ALA 4 54  
ASP 3 60  
ILE 3 56  
TRP 3 230  
MET 2 86  
PHE 2 47  
SER 2 27  
THR 2 35  
CYS 1 40  
GLU 1 16  
GLN 1 25  
GLY 1 13  
HIS 1 43  
LYS 1 15  
TYR 1 30  
VAL 1 15

Fragment:460

HIS 11 478  
LYS 9 140  
ASN 8 186  
TYR 8 242  
ASP 7 140  
GLN 7 175  
PHE 7 166  
SER 7 95  
GLY 6 83  
ARG 5 96  
CYS 4 160  
GLU 4 65

THR 4 71  
LEU 3 33  
TRP 3 230  
PRO 2 38  
VAL 2 31  
MET 1 43

Fragment:465

LEU 11 123  
TYR 11 333  
GLY 8 111  
PHE 8 190  
SER 8 109  
ASN 7 162  
ILE 7 132  
VAL 6 95  
ALA 4 54  
GLU 4 65  
HIS 4 173  
ASP 3 60  
TRP 3 230  
ARG 2 38  
GLN 2 50  
THR 2 35  
PRO 1 19

Fragment:493

LEU 23 258  
PHE 20 476  
VAL 13 206  
ALA 10 136  
GLY 9 125  
LYS 9 140  
ILE 8 150  
TYR 8 242  
HIS 7 304  
THR 7 125  
GLN 6 150  
MET 6 260  
PRO 6 115  
TRP 6 461  
ARG 4 76  
ASP 4 80  
CYS 4 160  
GLU 3 49  
SER 2 27  
ASN 1 23

Fragment:494

GLY 23 319  
LEU 22 247  
PHE 20 476  
ALA 19 260  
GLU 18 295  
VAL 17 269

TYR 16 484  
ILE 15 283  
ARG 14 269  
ASP 14 280  
HIS 12 521  
MET 11 478  
SER 11 150  
THR 10 178  
ASN 8 186  
GLN 7 175  
LYS 7 109  
TRP 6 461  
CYS 4 160  
PRO 4 76

Fragment:514  
GLY 153 2125  
LYS 88 1375  
ASP 80 1600  
THR 72 1285  
ARG 62 1192  
SER 62 849  
ASN 42 976  
GLU 41 672  
ALA 37 506  
HIS 29 1260  
VAL 29 460  
GLN 22 550  
TYR 22 666  
LEU 21 235  
PHE 17 404  
ILE 16 301  
PRO 16 307  
MET 10 434  
CYS 6 240  
TRP 1 76

Fragment:519  
ARG 59 1134  
ASP 54 1080  
HIS 38 1652  
TYR 38 1151  
LEU 28 314  
ILE 23 433  
THR 23 410  
GLU 22 360  
CYS 18 720  
LYS 16 250  
PHE 15 357  
ASN 14 325  
PRO 13 249  
VAL 11 174  
ALA 8 109  
GLN 7 175  
TRP 7 538

MET 5 217  
SER 4 54  
GLY 3 41

Fragment:520

LEU 40 449  
VAL 25 396  
ALA 22 301  
PHE 14 333  
TYR 14 424  
GLU 13 213  
ILE 12 226  
ASP 10 200  
CYS 10 400  
GLY 10 138  
LYS 9 140  
MET 9 391  
THR 7 125  
HIS 4 173  
GLN 3 75  
ARG 2 38  
PRO 2 38  
ASN 1 23  
SER 1 13  
TRP 1 76

Fragment:528

LEU 29 325  
GLY 18 250  
TYR 15 454  
ARG 11 211  
MET 11 478  
PHE 11 261  
ALA 9 123  
SER 9 123  
ASP 7 140  
ASN 6 139  
CYS 6 240  
ILE 6 113  
TRP 6 461  
PRO 5 96  
VAL 5 79  
GLU 4 65  
GLN 4 100  
THR 4 71  
HIS 3 130  
LYS 2 31

Fragment:534

ARG 19 365  
TYR 15 454  
LYS 9 140  
ASP 8 160  
ASN 8 186  
LEU 8 89



PHE 8 190  
TRP 7 538  
GLN 5 125  
GLY 5 69  
HIS 4 173  
SER 4 54  
GLU 3 49  
THR 3 53  
VAL 3 47  
PRO 2 38  
CYS 1 40  
ILE 1 18

Fragment:538

LEU 14 157  
ALA 9 123  
VAL 9 142  
GLU 5 81  
ILE 4 75  
PHE 4 95  
CYS 2 80  
LYS 2 31  
MET 2 86  
THR 2 35  
TYR 2 60  
ASP 1 20  
SER 1 13

Fragment:543

ASP 20 400  
GLY 18 250  
GLU 13 213  
LEU 12 134  
PHE 12 285  
TYR 12 363  
SER 10 136  
VAL 9 142  
TRP 8 615  
ASN 7 162  
HIS 5 217  
CYS 4 160  
GLN 4 100  
PRO 4 76  
THR 4 71  
ALA 3 41  
ARG 3 57  
LYS 3 46  
ILE 2 37  
MET 2 86

Fragment:544

GLY 16 222  
SER 14 191  
ASP 5 100  
HIS 5 217

CYS 3 120  
GLU 3 49  
MET 3 130  
TRP 3 230  
TYR 3 90  
ALA 2 27  
ARG 2 38  
LEU 2 22  
PHE 2 47  
THR 2 35  
GLN 1 25  
PRO 1 19

Fragment:545

LEU 81 910  
TYR 55 1666  
ARG 51 980  
VAL 49 777  
SER 47 643  
GLU 46 754  
GLY 46 638  
ALA 43 589  
PHE 37 880  
LYS 35 546  
GLN 34 850  
ILE 34 641  
TRP 33 2538  
ASN 28 651  
THR 28 500  
PRO 27 519  
ASP 25 500  
HIS 23 1000  
MET 21 913  
CYS 7 280

Fragment:551

ARG 42 807  
LYS 38 593  
GLY 25 347  
VAL 21 333  
PHE 18 428  
TYR 18 545  
LEU 16 179  
PRO 16 307  
SER 15 205  
ALA 13 178  
TRP 11 846  
GLN 10 250  
ILE 10 188  
ASN 9 209  
THR 9 160  
GLU 8 131  
HIS 7 304  
CYS 4 160  
MET 4 173

ASP 2 40

Fragment:552

PHE 25 595  
VAL 24 380  
GLY 21 291  
TYR 21 636  
LEU 19 213  
ILE 17 320  
ALA 16 219  
THR 16 285  
ASP 15 300  
GLU 15 245  
ARG 13 249  
TRP 13 999  
ASN 11 255  
HIS 11 478  
SER 11 150  
MET 9 391  
GLN 7 175  
LYS 7 109  
PRO 5 96  
CYS 3 120

Fragment:555

ARG 29 557  
SER 17 232  
GLY 15 208  
HIS 15 652  
ASP 14 280  
ALA 10 136  
GLU 10 163  
ILE 9 169  
LEU 9 101  
LYS 7 109  
GLN 6 150  
PHE 5 119  
PRO 5 96  
THR 5 89  
TYR 5 151  
CYS 3 120  
MET 3 130  
ASN 2 46  
TRP 1 76  
VAL 1 15

Fragment:556

ARG 35 673  
GLU 20 327  
GLY 20 277  
HIS 15 652  
ALA 11 150  
ASP 11 220  
LYS 10 156  
SER 10 136

LEU 9 101  
ILE 7 132  
PHE 6 142  
PRO 6 115  
THR 6 107  
ASN 5 116  
CYS 4 160  
GLN 4 100  
TYR 4 121  
MET 3 130  
TRP 3 230  
VAL 1 15

Fragment:560

SER 10 136  
TYR 7 212  
GLY 4 55  
HIS 4 173  
LYS 4 62  
PHE 4 95  
ASP 3 60  
ASN 3 69  
LEU 3 33  
TRP 3 230  
CYS 2 80  
MET 2 86  
ARG 1 19  
GLU 1 16  
GLN 1 25  
ILE 1 18  
THR 1 17  
VAL 1 15

Fragment:563

PHE 22 523  
TYR 18 545  
ILE 17 320  
LEU 15 168  
ARG 14 269  
PRO 14 269  
GLY 13 180  
VAL 10 158  
GLU 9 147  
HIS 8 347  
ALA 7 95  
ASP 7 140  
ASN 7 162  
SER 6 82  
LYS 5 78  
TRP 4 307  
CYS 3 120  
MET 3 130  
THR 3 53  
GLN 2 50

Fragment:564  
SER 15 205  
ARG 11 211  
TYR 9 272  
GLU 7 114  
THR 7 125  
TRP 7 538  
ALA 6 82  
GLY 6 83  
ASP 5 100  
LEU 5 56  
ASN 4 93  
GLN 4 100  
HIS 4 173  
LYS 4 62  
PRO 4 76  
VAL 4 63  
PHE 3 71  
ILE 2 37  
CYS 1 40  
MET 1 43

Fragment:567  
SER 17 232  
CYS 11 440  
GLY 11 152  
VAL 6 95  
ASP 5 100  
HIS 5 217  
PHE 5 119  
ALA 4 54  
GLN 4 100  
LEU 4 44  
TRP 4 307  
ILE 3 56  
LYS 3 46  
MET 3 130  
TYR 3 90  
ARG 2 38  
THR 2 35  
GLU 1 16

Fragment:577  
GLY 533 7402  
LYS 282 4406  
THR 282 5035  
SER 259 3547  
ASP 181 3620  
ALA 139 1904  
ARG 133 2557  
VAL 128 2031  
GLU 117 1918  
ASN 116 2697  
GLN 78 1950  
LEU 75 842

PRO 73 1403  
HIS 71 3086  
TYR 64 1939  
ILE 57 1075  
PHE 46 1095  
CYS 25 1000  
MET 22 956  
TRP 8 615

Fragment:584

LEU 27 303  
PHE 14 333  
TYR 13 393  
VAL 12 190  
ALA 11 150  
ILE 11 207  
LYS 11 171  
THR 11 196  
GLY 10 138  
MET 10 434  
GLN 8 200  
ARG 7 134  
SER 7 95  
GLU 6 98  
HIS 6 260  
PRO 6 115  
ASN 5 116  
CYS 5 200  
ASP 4 80  
TRP 4 307

Fragment:585

TYR 57 1727  
GLU 46 754  
ARG 43 826  
ASN 36 837  
ASP 29 580  
SER 29 397  
TRP 24 1846  
GLN 22 550  
THR 19 339  
LEU 18 202  
PHE 16 380  
GLY 15 208  
LYS 14 218  
ALA 12 164  
HIS 11 478  
PRO 11 211  
VAL 9 142  
ILE 8 150  
CYS 2 80  
MET 2 86

Fragment:607

LEU 87 977

PHE 81 1928  
TYR 75 2272  
ILE 69 1301  
MET 50 2173  
VAL 47 746  
TRP 39 3000  
SER 36 493  
ARG 35 673  
THR 35 625  
HIS 34 1478  
GLY 28 388  
PRO 26 499  
ALA 25 342  
LYS 21 328  
ASP 20 400  
ASN 20 465  
GLU 19 311  
GLN 19 475  
CYS 10 400

Fragment:612

LEU 19 213  
VAL 16 253  
ILE 14 264  
PHE 12 285  
THR 8 142  
PRO 6 115  
TYR 6 181  
ALA 5 68  
MET 5 217  
TRP 5 384  
ASN 3 69  
CYS 2 80  
GLU 2 32  
LYS 2 31  
SER 2 27  
GLN 1 25  
GLY 1 13  
HIS 1 43

Fragment:618

LEU 36 404  
TYR 28 848  
ARG 26 499  
ASP 21 420  
GLU 21 344  
ASN 18 418  
PHE 18 428  
SER 18 246  
GLY 17 236  
ILE 17 320  
VAL 17 269  
HIS 15 652  
THR 14 250  
ALA 12 164

PRO 11 211  
LYS 10 156  
TRP 10 769  
MET 8 347  
CYS 5 200  
GLN 2 50

Fragment:626

PHE 28 666  
LEU 24 269  
ILE 19 358  
TYR 19 575  
VAL 16 253  
HIS 15 652  
LYS 15 234  
ARG 12 230  
MET 12 521  
SER 12 164  
THR 10 178  
GLY 9 125  
ASP 8 160  
CYS 8 320  
ALA 7 95  
GLN 7 175  
ASN 6 139  
PRO 6 115  
TRP 6 461  
GLU 3 49

Fragment:629

LEU 11 123  
ILE 9 169  
ALA 6 82  
ASP 6 120  
GLU 6 98  
VAL 6 95  
LYS 5 78  
PHE 5 119  
GLY 4 55  
MET 2 86  
TYR 2 60  
ARG 1 19  
GLN 1 25  
PRO 1 19  
SER 1 13

Fragment:645

LEU 10 112  
ILE 9 169  
TYR 7 212  
VAL 6 95  
GLY 5 69  
HIS 5 217  
PHE 5 119  
GLU 4 65



PRO 4 76  
ALA 3 41  
SER 3 41  
LYS 1 15  
MET 1 43  
THR 1 17

Fragment:646

VAL 10 158  
LEU 9 101  
TYR 9 272  
PHE 8 190  
ALA 6 82  
THR 5 89  
GLU 3 49  
GLY 3 41  
HIS 3 130  
ILE 3 56  
SER 3 41  
ARG 2 38  
ASP 2 40  
CYS 2 80  
GLN 2 50  
MET 2 86  
ASN 1 23  
LYS 1 15  
TRP 1 76

Fragment:658

TYR 15 454  
PHE 10 238  
SER 10 136  
LEU 9 101  
HIS 8 347  
THR 8 142  
TRP 8 615  
ASN 6 139  
GLY 6 83  
ARG 5 96  
GLN 5 125  
ASP 4 80  
GLU 4 65  
MET 4 173  
ILE 3 56  
VAL 3 47  
ALA 2 27

Fragment:663

LEU 22 247  
PHE 14 333  
TYR 13 393  
VAL 12 190  
ILE 11 207  
ALA 6 82  
GLN 6 150

GLY 6 83  
CYS 5 200  
HIS 5 217  
MET 5 217  
SER 4 54  
ASP 3 60  
GLU 3 49  
PRO 3 57  
THR 3 53  
TRP 3 230  
ASN 2 46  
LYS 2 31  
ARG 1 19

Fragment:671

ARG 33 634  
GLU 22 360  
PHE 19 452  
SER 19 260  
THR 14 250  
TRP 14 1076  
ASN 10 232  
GLN 10 250  
VAL 10 158  
ALA 9 123  
HIS 8 347  
LEU 8 89  
CYS 7 280  
ILE 7 132  
PRO 6 115  
LYS 5 78  
MET 5 217  
TYR 5 151  
ASP 1 20  
GLY 1 13

Fragment:701

ASP 26 520  
GLY 23 319  
ILE 23 433  
SER 23 315  
LYS 22 343  
PHE 20 476  
THR 18 321  
TRP 17 1307  
TYR 17 515  
GLU 16 262  
LEU 16 179  
ARG 15 288  
GLN 14 350  
PRO 14 269  
ASN 11 255  
HIS 11 478  
MET 10 434  
ALA 8 109

CYS 7 280  
VAL 5 79

Fragment:711

PHE 15 357  
ILE 11 207  
LEU 11 123  
VAL 11 174  
THR 10 178  
ALA 9 123  
ARG 8 153  
GLY 7 97  
TYR 7 212  
ASP 6 120  
MET 6 260  
GLU 5 81  
SER 5 68  
CYS 4 160  
HIS 3 130  
ASN 2 46  
GLN 2 50  
LYS 2 31  
TRP 1 76

Fragment:714

ASP 21 420  
LYS 10 156  
ARG 5 96  
GLN 5 125  
LEU 5 56  
ASN 1 23  
GLU 1 16  
THR 1 17  
TYR 1 30

Fragment:743

LEU 13 146  
ILE 12 226  
SER 11 150  
PHE 8 190  
THR 6 107  
ASN 5 116  
GLU 4 65  
TRP 4 307  
TYR 4 121  
PRO 3 57  
VAL 3 47  
ARG 2 38  
GLY 2 27  
MET 2 86  
ALA 1 13  
CYS 1 40  
HIS 1 43  
LYS 1 15

Fragment:745

LEU 23 258  
TYR 20 606  
ILE 18 339  
ALA 16 219  
PHE 16 380  
VAL 14 222  
ARG 10 192  
ASP 10 200  
SER 10 136  
GLU 7 114  
GLY 7 97  
TRP 7 538  
ASN 6 139  
MET 5 217  
LYS 3 46  
PRO 3 57  
CYS 1 40  
GLN 1 25  
THR 1 17

Fragment:776

SER 18 246  
HIS 15 652  
GLY 13 180  
PHE 10 238  
ALA 7 95  
LEU 6 67  
TYR 6 181  
ASN 5 116  
ILE 5 94  
THR 5 89  
VAL 4 63  
PRO 3 57  
GLU 2 32  
GLN 2 50  
LYS 2 31  
TRP 2 153  
ASP 1 20  
CYS 1 40

Fragment:784

TYR 13 393  
LEU 11 123  
MET 10 434  
ASN 8 186  
PHE 8 190  
THR 8 142  
ALA 6 82  
PRO 6 115  
VAL 6 95  
GLU 5 81  
SER 5 68  
GLN 4 100  
HIS 3 130

LYS 3 46  
TRP 3 230  
ARG 2 38  
CYS 1 40  
GLY 1 13  
ILE 1 18

Fragment:788

ARG 13 249  
GLY 12 166  
HIS 11 478  
PHE 8 190  
SER 8 109  
CYS 7 280  
LEU 7 78  
MET 7 304  
TYR 6 181  
ALA 5 68  
ASP 5 100  
ILE 5 94  
ASN 3 69  
GLN 3 75  
LYS 3 46  
PRO 3 57  
GLU 2 32  
THR 2 35  
VAL 1 15

Fragment:799

PHE 103 2452  
TYR 92 2787  
TRP 86 6615  
LEU 79 887  
ARG 76 1461  
ASP 72 1440  
ALA 71 972  
VAL 62 984  
GLY 61 847  
ILE 51 962  
GLU 46 754  
HIS 46 2000  
THR 46 821  
SER 45 616  
MET 33 1434  
GLN 25 625  
LYS 24 375  
ASN 22 511  
PRO 18 346  
CYS 12 480

Fragment:813

LEU 14 157  
PHE 10 238  
GLU 8 131  
ALA 7 95

GLY 6 83  
ASP 5 100  
HIS 5 217  
VAL 5 79  
GLN 4 100  
MET 4 173  
ASN 3 69  
CYS 3 120  
LYS 3 46  
SER 2 27  
THR 2 35  
TRP 2 153  
TYR 2 60  
ARG 1 19  
ILE 1 18  
PRO 1 19

Fragment:847

GLY 11 152  
LEU 8 89  
HIS 7 304  
TRP 7 538  
TYR 6 181  
ALA 5 68  
PHE 5 119  
THR 5 89  
CYS 4 160  
SER 4 54  
ASN 3 69  
GLN 3 75  
ILE 3 56  
PRO 3 57  
VAL 3 47  
ASP 2 40  
GLU 2 32  
LYS 2 31  
ARG 1 19  
MET 1 43

Fragment:870

ARG 66 1269  
GLU 34 557  
TYR 32 969  
ASP 25 500  
ASN 18 418  
ILE 17 320  
TRP 16 1230  
LYS 11 171  
HIS 9 391  
LEU 7 78  
PHE 7 166  
THR 7 125  
GLN 5 125  
SER 5 68  
VAL 5 79

ALA 3 41  
MET 3 130  
GLY 2 27  
PRO 2 38

Fragment:898

LEU 17 191  
PHE 14 333  
VAL 11 174  
GLY 10 138  
THR 9 160  
ALA 8 109  
HIS 7 304  
GLU 6 98  
GLN 6 150  
ILE 5 94  
CYS 4 160  
TYR 4 121  
MET 3 130  
SER 3 41  
TRP 3 230  
ASP 2 40  
LYS 2 31  
ARG 1 19  
ASN 1 23

Fragment:911

LYS 11 171  
ARG 10 192  
PHE 10 238  
PRO 10 192  
GLN 7 175  
SER 7 95  
LEU 6 67  
ASN 5 116  
TYR 5 151  
VAL 5 79  
ALA 4 54  
ASP 4 80  
GLU 4 65  
TRP 4 307  
GLY 3 41  
HIS 3 130  
MET 3 130  
THR 3 53  
ILE 1 18

Fragment:912

ARG 15 288  
PHE 15 357  
HIS 11 478  
THR 9 160  
ASN 8 186  
PRO 8 153  
SER 8 109

GLY 7 97  
MET 7 304  
ALA 5 68  
GLN 5 125  
ILE 5 94  
LYS 5 78  
ASP 4 80  
TRP 2 153  
TYR 2 60  
VAL 2 31  
LEU 1 11

Fragment:927

ARG 19 365  
GLY 16 222  
LYS 6 93  
SER 5 68  
THR 5 89  
ASP 4 80  
GLU 4 65  
MET 4 173  
HIS 3 130  
LEU 3 33  
PRO 3 57  
TYR 3 90  
ILE 2 37  
VAL 2 31  
ALA 1 13  
ASN 1 23  
GLN 1 25  
PHE 1 23  
TRP 1 76

Fragment:957

PHE 18 428  
VAL 16 253  
LEU 13 146  
ALA 10 136  
ILE 10 188  
ARG 9 173  
LYS 7 109  
MET 7 304  
GLN 5 125  
ASN 4 93  
SER 4 54  
CYS 3 120  
GLU 3 49  
GLY 3 41  
PRO 3 57  
TYR 3 90  
THR 2 35  
TRP 2 153  
HIS 1 43

Fragment:979



PHE 25 595  
LEU 20 224  
VAL 19 301  
ALA 18 246  
ILE 18 339  
GLU 14 229  
ASP 12 240  
GLY 12 166  
HIS 10 434  
TYR 10 303  
SER 9 123  
THR 9 160  
GLN 8 200  
LYS 8 125  
MET 8 347  
ARG 7 134  
PRO 7 134  
TRP 4 307  
ASN 3 69  
CYS 1 40

Fragment:984

PHE 15 357  
TYR 8 242  
VAL 6 95  
TRP 5 384  
ASP 4 80  
ILE 4 75  
GLU 3 49  
ARG 2 38  
LEU 2 22  
ASN 1 23  
CYS 1 40  
GLN 1 25  
GLY 1 13  
HIS 1 43  
LYS 1 15  
MET 1 43

Fragment:990

SER 16 219  
THR 10 178  
ARG 9 173  
GLY 7 97  
GLN 5 125  
HIS 5 217  
ILE 5 94  
PHE 5 119  
TYR 5 151  
VAL 5 79  
ASN 4 93  
ALA 3 41  
LYS 3 46  
MET 3 130  
PRO 3 57

LEU 2 22  
ASP 1 20  
TRP 1 76

Fragment:997

VAL 16 253  
LEU 12 134  
ALA 9 123  
GLU 9 147  
PHE 8 190  
TYR 6 181  
GLY 5 69  
LYS 5 78  
PRO 5 96  
TRP 5 384  
SER 4 54  
ASP 3 60  
HIS 3 130  
ILE 3 56  
MET 3 130  
THR 3 53  
ARG 1 19

Fragment:1014

GLY 25 347  
ARG 16 307  
ASN 16 372  
LYS 15 234  
SER 15 205  
ASP 14 280  
GLN 12 300  
ALA 11 150  
HIS 11 478  
MET 11 478  
PHE 9 214  
VAL 9 142  
GLU 7 114  
TYR 5 151  
THR 4 71  
LEU 3 33  
ILE 2 37  
PRO 2 38  
CYS 1 40  
TRP 1 76

Fragment:1017

ASP 12 240  
GLU 11 180  
GLY 11 152  
LEU 11 123  
ILE 9 169  
MET 8 347  
SER 8 109  
ALA 7 95  
PHE 7 166

VAL 7 111  
CYS 5 200  
THR 5 89  
ASN 4 93  
ARG 2 38  
GLN 1 25  
LYS 1 15

Fragment:1022  
GLY 212 2944  
ALA 86 1178  
ASP 81 1620  
SER 81 1109  
TYR 68 2060  
PHE 66 1571  
THR 62 1107  
LEU 61 685  
ARG 59 1134  
PRO 57 1096  
GLU 49 803  
ASN 46 1069  
VAL 40 634  
HIS 38 1652  
ILE 36 679  
CYS 34 1360  
LYS 33 515  
TRP 30 2307  
GLN 27 675  
MET 18 782

Fragment:1032  
ALA 13 178  
GLY 13 180  
GLU 11 180  
PHE 11 261  
TRP 11 846  
ILE 10 188  
PRO 9 173  
SER 8 109  
VAL 8 126  
HIS 6 260  
TYR 5 151  
LEU 4 44  
LYS 4 62  
ASN 2 46  
THR 2 35  
CYS 1 40

Fragment:1074  
LEU 12 134  
PHE 12 285  
VAL 12 190  
GLY 10 138  
ILE 10 188  
ALA 8 109

THR 8 142  
HIS 4 173  
SER 4 54  
TYR 3 90  
ARG 2 38  
CYS 2 80  
GLU 2 32  
MET 2 86  
ASP 1 20  
ASN 1 23  
PRO 1 19  
TRP 1 76

Fragment:1081

GLU 14 229  
ILE 14 264  
ARG 12 230  
GLY 12 166  
THR 11 196  
PHE 9 214  
SER 9 123  
LYS 8 125  
TRP 8 615  
TYR 8 242  
ALA 7 95  
ASN 7 162  
LEU 7 78  
VAL 6 95  
ASP 5 100  
CYS 5 200  
HIS 4 173  
PRO 3 57  
GLN 1 25

Fragment:1110

GLY 14 194  
TYR 14 424  
TRP 9 692  
GLU 7 114  
LEU 5 56  
PHE 5 119  
SER 5 68  
HIS 4 173  
ILE 4 75  
MET 2 86  
VAL 2 31  
ALA 1 13  
GLN 1 25  
THR 1 17

Fragment:1135

TYR 14 424  
LEU 11 123  
GLU 8 131  
TRP 7 538

VAL 7 111  
SER 6 82  
GLY 5 69  
PHE 4 95  
ASP 3 60  
ASN 3 69  
HIS 3 130  
ALA 2 27  
CYS 2 80  
ILE 2 37  
LYS 2 31  
MET 2 86  
PRO 2 38  
ARG 1 19  
GLN 1 25

Fragment:1140

ARG 26 499  
LYS 24 375  
SER 22 301  
GLY 20 277  
ASP 19 380  
GLU 11 180  
THR 10 178  
VAL 10 158  
LEU 8 89  
TYR 8 242  
ALA 7 95  
ASN 4 93  
HIS 3 130  
PRO 3 57  
ILE 2 37  
MET 2 86  
CYS 1 40  
GLN 1 25  
PHE 1 23

Fragment:1179

ASP 11 220  
GLY 8 111  
THR 5 89  
ALA 4 54  
LEU 4 44  
TYR 4 121  
ILE 3 56  
LYS 3 46  
SER 3 41  
ARG 2 38  
HIS 2 86  
MET 2 86  
PRO 2 38  
ASN 1 23  
GLU 1 16  
GLN 1 25  
TRP 1 76

Fragment:1218

LEU 17 191  
PHE 13 309  
ALA 9 123  
GLY 7 97  
TYR 7 212  
VAL 7 111  
ILE 6 113  
ASN 5 116  
GLU 5 81  
SER 5 68  
TRP 5 384  
ARG 4 76  
ASP 4 80  
HIS 4 173  
MET 3 130  
THR 3 53  
GLN 2 50  
LYS 2 31  
PRO 2 38  
CYS 1 40

Fragment:1233

ASP 11 220  
ARG 10 192  
GLU 9 147  
LYS 9 140  
GLY 7 97  
HIS 7 304  
SER 5 68  
GLN 4 100  
ASN 3 69  
LEU 3 33  
PHE 3 71  
ILE 2 37  
MET 2 86  
VAL 2 31  
ALA 1 13  
CYS 1 40  
THR 1 17  
TRP 1 76  
TYR 1 30

Fragment:1242

GLY 11 152  
SER 8 109  
TYR 7 212  
VAL 7 111  
TRP 6 461  
ALA 5 68  
ARG 5 96  
MET 5 217  
LEU 4 44  
PRO 4 76

THR 4 71  
GLU 3 49  
HIS 3 130  
ILE 3 56  
LYS 3 46  
ASP 2 40  
ASN 2 46  
PHE 2 47  
CYS 1 40

Fragment:1246

LEU 32 359  
PHE 27 642  
MET 19 826  
TYR 18 545  
VAL 13 206  
HIS 11 478  
ILE 11 207  
ALA 10 136  
GLY 10 138  
ASN 9 209  
SER 9 123  
ARG 8 153  
ASP 8 160  
TRP 8 615  
GLN 7 175  
GLU 5 81  
LYS 5 78  
PRO 5 96  
THR 5 89  
CYS 2 80

Fragment:1247

LEU 14 157  
TYR 8 242  
MET 6 260  
PHE 6 142  
GLN 5 125  
LYS 5 78  
ILE 4 75  
THR 3 53  
VAL 3 47  
HIS 2 86  
TRP 2 153  
GLU 1 16  
GLY 1 13

Fragment:1263

LEU 20 224  
PHE 16 380  
VAL 15 238  
ILE 13 245  
ALA 12 164  
HIS 10 434  
TRP 10 769

GLY 9 125  
MET 7 304  
ARG 6 115  
ASN 6 139  
THR 6 107  
TYR 5 151  
SER 4 54  
CYS 3 120  
GLN 3 75  
ASP 2 40  
GLU 2 32  
LYS 2 31  
PRO 2 38

Fragment:1287

TRP 11 846  
GLN 10 250  
TYR 9 272  
ARG 5 96  
ASN 5 116  
GLU 5 81  
GLY 4 55  
HIS 3 130  
ILE 3 56  
LEU 3 33  
SER 3 41  
LYS 2 31  
PHE 2 47  
PRO 2 38  
ASP 1 20  
VAL 1 15

Fragment:1295

HIS 13 565  
ASN 10 232  
LEU 10 112  
ASP 7 140  
CYS 7 280  
GLY 7 97  
ILE 7 132  
ALA 6 82  
ARG 5 96  
GLU 5 81  
PRO 5 96  
SER 5 68  
VAL 4 63  
TRP 3 230  
MET 2 86  
PHE 2 47  
LYS 1 15  
THR 1 17  
TYR 1 30

Fragment:1308

LEU 154 1730



GLY 147 2041  
ALA 117 1602  
VAL 108 1714  
TYR 96 2909  
ILE 80 1509  
PHE 75 1785  
ARG 74 1423  
SER 68 931  
THR 51 910  
ASN 47 1093  
GLN 47 1175  
LYS 43 671  
ASP 40 800  
GLU 40 655  
PRO 37 711  
HIS 32 1391  
TRP 32 2461  
MET 27 1173  
CYS 15 600

Fragment:1318

GLY 23 319  
PHE 18 428  
VAL 17 269  
ASP 11 220  
MET 10 434  
HIS 9 391  
ILE 9 169  
LEU 9 101  
ALA 8 109  
THR 7 125  
SER 6 82  
ASN 5 116  
GLU 4 65  
GLN 4 100  
TYR 4 121  
ARG 3 57  
PRO 3 57  
CYS 2 80  
TRP 2 153

Fragment:1321

ARG 14 269  
GLY 10 138  
HIS 8 347  
ASP 5 100  
ASN 5 116  
GLU 5 81  
ILE 4 75  
ALA 3 41  
LYS 3 46  
SER 3 41  
TYR 3 90  
GLN 2 50  
PHE 2 47

THR 2 35

Fragment:1330

LEU 13 146

TRP 6 461

GLU 5 81

ILE 5 94

SER 5 68

VAL 5 79

ALA 3 41

ARG 3 57

HIS 3 130

PHE 3 71

PRO 3 57

ASP 2 40

GLY 2 27

TYR 2 60

CYS 1 40

MET 1 43

THR 1 17

Fragment:1335

GLU 19 311

ILE 13 245

SER 13 178

ARG 12 230

ASP 11 220

MET 11 478

VAL 11 174

GLY 10 138

PHE 9 214

TYR 8 242

ALA 7 95

THR 7 125

ASN 5 116

CYS 5 200

TRP 3 230

LEU 2 22

LYS 2 31

GLN 1 25

HIS 1 43

Fragment:1338

VAL 15 238

PHE 13 309

TYR 13 393

LEU 10 112

ALA 8 109

GLY 8 111

MET 8 347

ILE 7 132

ARG 6 115

TRP 6 461

ASN 4 93

GLU 4 65

PRO 4 76  
HIS 3 130  
LYS 3 46  
THR 3 53  
ASP 2 40  
GLN 2 50  
SER 1 13

Fragment:1356

LEU 24 269  
ASP 22 440  
PHE 20 476  
TYR 19 575  
GLU 16 262  
ILE 13 245  
ARG 12 230  
GLY 12 166  
THR 12 214  
VAL 12 190  
ALA 11 150  
ASN 10 232  
PRO 9 173  
SER 8 109  
LYS 7 109  
MET 6 260  
CYS 3 120  
TRP 3 230  
GLN 2 50  
HIS 1 43

Fragment:1374

GLY 11 152  
SER 4 54  
ALA 3 41  
ILE 3 56  
LEU 3 33  
PRO 2 38  
TYR 2 60  
VAL 2 31  
ARG 1 19  
ASP 1 20  
CYS 1 40  
GLU 1 16  
GLN 1 25  
THR 1 17

Fragment:1380

GLY 14 194  
GLU 13 213  
ARG 9 173  
SER 7 95  
ALA 4 54  
PHE 4 95  
TYR 4 121  
GLN 3 75

LEU 3 33  
VAL 3 47  
ASP 2 40  
ASN 2 46  
LYS 2 31  
THR 2 35  
TRP 2 153  
CYS 1 40  
HIS 1 43  
ILE 1 18  
MET 1 43

Fragment:1424

LEU 18 202  
ALA 15 205  
VAL 14 222  
PHE 10 238  
GLU 9 147  
GLY 9 125  
MET 8 347  
THR 7 125  
TYR 7 212  
CYS 3 120  
ILE 3 56  
ASP 2 40  
LYS 2 31  
SER 2 27  
ASN 1 23  
TRP 1 76

Fragment:1425

PHE 15 357  
LEU 7 78  
TRP 6 461  
GLY 4 55  
ILE 3 56  
MET 3 130  
SER 3 41  
THR 3 53  
TYR 3 90  
VAL 3 47  
ALA 2 27  
ARG 2 38  
ASN 2 46  
GLU 2 32  
HIS 2 86  
ASP 1 20  
GLN 1 25

Fragment:1444

TRP 13 999  
ASP 12 240  
TYR 10 303  
GLY 9 125  
GLU 7 114

PHE 7 166  
MET 6 260  
ASN 1 23  
GLN 1 25

Fragment:1448

ASN 14 325  
LEU 8 89  
GLN 7 175  
MET 7 304  
ALA 6 82  
THR 6 107  
GLY 5 69  
ARG 4 76  
GLU 3 49  
HIS 3 130  
ILE 3 56  
PHE 3 71  
TYR 3 90  
VAL 3 47  
ASP 2 40  
LYS 2 31  
SER 2 27  
TRP 2 153  
PRO 1 19

Fragment:1469

GLY 15 208  
VAL 12 190  
LYS 11 171  
ASN 5 116  
SER 5 68  
THR 5 89  
ALA 4 54  
ASP 4 80  
ARG 3 57  
CYS 2 80  
GLU 2 32  
GLN 2 50  
HIS 2 86  
LEU 2 22  
PHE 2 47  
MET 1 43  
TRP 1 76  
TYR 1 30

Fragment:1472

LEU 18 202  
MET 17 739  
TYR 11 333  
ARG 8 153  
ILE 6 113  
PHE 6 142  
GLN 5 125  
ASN 4 93

TRP 4 307  
ALA 3 41  
CYS 3 120  
GLY 3 41  
HIS 3 130  
SER 3 41  
PRO 2 38  
THR 2 35  
VAL 2 31  
GLU 1 16

Fragment:1492

ARG 74 1423  
GLY 51 708  
ASP 21 420  
THR 20 357  
LYS 18 281  
PRO 17 326  
SER 17 232  
ALA 11 150  
LEU 11 123  
GLU 9 147  
ILE 6 113  
MET 5 217  
VAL 5 79  
HIS 4 173  
TYR 4 121  
GLN 3 75  
PHE 2 47  
TRP 2 153  
ASN 1 23

Fragment:1497

LEU 11 123  
GLY 8 111  
ILE 7 132  
ASP 6 120  
VAL 5 79  
GLN 4 100  
SER 4 54  
ASN 3 69  
GLU 3 49  
CYS 1 40

Fragment:1515

ARG 18 346  
TRP 18 1384  
CYS 12 480  
GLY 11 152  
GLU 10 163  
ASN 9 209  
THR 8 142  
GLN 5 125  
HIS 5 217  
LYS 5 78

SER 5 68  
TYR 5 151  
ALA 4 54  
ASP 3 60  
LEU 3 33  
PHE 2 47  
VAL 2 31  
ILE 1 18

Fragment:1530

LEU 14 157  
PHE 14 333  
ILE 12 226  
VAL 8 126  
MET 7 304  
ALA 6 82  
SER 5 68  
TYR 3 90  
ARG 2 38  
ASP 2 40  
GLU 2 32  
GLN 2 50  
GLY 2 27  
LYS 2 31  
TRP 2 153  
ASN 1 23  
HIS 1 43

Fragment:1531

PHE 24 571  
LYS 11 171  
ILE 9 169  
LEU 8 89  
MET 8 347  
ARG 7 134  
ASN 6 139  
GLN 5 125  
THR 5 89  
TYR 5 151  
VAL 5 79  
HIS 4 173  
PRO 4 76  
TRP 4 307  
ASP 3 60  
GLU 3 49  
ALA 2 27  
CYS 1 40  
SER 1 13

Fragment:1537

GLN 13 325  
ARG 11 211  
PRO 11 211  
LEU 9 101  
TYR 9 272

LYS 8 125  
SER 8 109  
ASN 6 139  
TRP 6 461  
ASP 5 100  
PHE 5 119  
MET 4 173  
THR 4 71  
VAL 4 63  
GLY 3 41  
GLU 2 32  
ALA 1 13  
HIS 1 43  
ILE 1 18

Fragment:1569

PHE 30 714  
ILE 21 396  
ALA 16 219  
GLY 14 194  
LEU 11 123  
TRP 10 769  
VAL 8 126  
TYR 7 212  
SER 6 82  
THR 5 89  
CYS 3 120  
HIS 3 130  
MET 3 130

Fragment:1570

ALA 19 260  
LEU 13 146  
PHE 12 285  
TRP 10 769  
ILE 5 94  
MET 5 217  
SER 5 68  
TYR 5 151  
VAL 5 79  
GLU 3 49  
THR 2 35  
ASN 1 23  
CYS 1 40  
GLY 1 13  
PRO 1 19

Fragment:1571

PHE 22 523  
LEU 16 179  
ILE 12 226  
ALA 9 123  
VAL 7 111  
THR 6 107  
TRP 6 461



MET 5 217  
SER 5 68  
GLY 4 55  
TYR 4 121  
ASN 2 46  
ARG 1 19  
HIS 1 43  
PRO 1 19

Fragment:1592

LEU 62 696  
PHE 55 1309  
ILE 41 773  
ALA 33 452  
VAL 26 412  
GLY 23 319  
TRP 17 1307  
MET 13 565  
SER 12 164  
PRO 11 211  
TYR 10 303  
THR 8 142  
HIS 6 260  
CYS 5 200  
ASN 3 69  
ARG 2 38  
ASP 1 20  
GLU 1 16

Fragment:1601

THR 20 357  
TRP 20 1538  
MET 16 695  
TYR 16 484  
LYS 12 187  
PHE 12 285  
PRO 11 211  
ALA 10 136  
ILE 10 188  
ASP 9 180  
VAL 8 126  
LEU 7 78  
GLY 5 69  
SER 5 68  
GLU 3 49  
ASN 2 46  
CYS 2 80  
GLN 2 50  
ARG 1 19

Fragment:1610

ASP 18 360  
ARG 13 249  
LYS 10 156  
LEU 8 89

GLN 5 125  
ALA 4 54  
ASN 4 93  
HIS 4 173  
SER 4 54  
TYR 4 121  
GLU 3 49  
GLY 3 41  
VAL 2 31  
MET 1 43  
PHE 1 23  
PRO 1 19

Fragment:1616

LEU 64 719  
GLY 52 722  
GLU 51 836  
VAL 49 777  
ALA 39 534  
ASP 38 760  
LYS 34 531  
MET 26 1130  
SER 21 287  
ILE 18 339  
PHE 16 380  
TYR 14 424  
THR 13 232  
ARG 11 211  
CYS 10 400  
ASN 6 139  
GLN 5 125  
PRO 5 96  
HIS 4 173  
TRP 2 153

Fragment:1637

LEU 29 325  
PHE 20 476  
VAL 12 190  
ILE 11 207  
ALA 9 123  
TRP 7 538  
TYR 6 181  
GLY 5 69  
PRO 5 96  
THR 5 89  
MET 4 173  
ARG 3 57  
ASP 3 60  
LYS 3 46  
ASN 1 23  
HIS 1 43  
SER 1 13

Fragment:1643

ARG 18 346  
SER 16 219  
LYS 11 171  
GLY 8 111  
PHE 5 119  
TYR 5 151  
ASN 4 93  
PRO 4 76  
GLU 3 49  
GLN 3 75  
ASP 2 40  
HIS 2 86  
ILE 2 37  
TRP 2 153  
MET 1 43  
THR 1 17  
VAL 1 15

Fragment:1651

HIS 19 826  
LEU 7 78  
TYR 7 212  
GLY 6 83  
ALA 5 68  
THR 5 89  
GLU 4 65  
ILE 4 75  
PHE 4 95  
PRO 4 76  
VAL 3 47  
ARG 1 19  
ASP 1 20  
ASN 1 23  
MET 1 43

Fragment:1655

GLY 30 416  
LEU 24 269  
GLU 22 360  
HIS 18 782  
GLN 12 300  
ILE 12 226  
VAL 12 190  
CYS 11 440  
ARG 8 153  
TYR 6 181  
ALA 5 68  
PRO 4 76  
ASP 1 20  
PHE 1 23  
SER 1 13  
THR 1 17  
TRP 1 76

Fragment:1664

TRP 14 1076  
GLU 12 196  
ASP 9 180  
HIS 9 391  
PHE 7 166  
TYR 7 212  
ARG 4 76  
ASN 4 93  
ILE 3 56  
GLN 2 50  
THR 2 35  
ALA 1 13  
GLY 1 13  
LEU 1 11  
LYS 1 15  
PRO 1 19  
SER 1 13  
VAL 1 15

Fragment:1665

TYR 16 484  
ASP 14 280  
TRP 14 1076  
ARG 10 192  
HIS 10 434  
PHE 8 190  
ASN 7 162  
LEU 6 67  
LYS 6 93  
MET 6 260  
PRO 4 76  
ALA 3 41  
GLU 3 49  
THR 3 53  
GLN 2 50  
GLY 2 27  
SER 2 27  
CYS 1 40  
ILE 1 18  
VAL 1 15

Fragment:1666

LEU 18 202  
VAL 11 174  
ALA 5 68  
ILE 4 75  
MET 4 173  
PHE 4 95  
SER 3 41  
TYR 3 90  
LYS 2 31  
TRP 2 153  
ASN 1 23  
HIS 1 43  
PRO 1 19

THR 1 17

Fragment:1674

LEU 24 269  
PHE 18 428  
VAL 14 222  
ALA 12 164  
ILE 12 226  
TYR 8 242  
TRP 7 538  
MET 6 260  
PRO 6 115  
SER 6 82  
THR 5 89  
GLY 4 55  
ASN 3 69  
GLN 3 75  
HIS 3 130  
CYS 1 40

Fragment:1677

LEU 10 112  
ILE 9 169  
PHE 8 190  
THR 7 125  
VAL 7 111  
TRP 6 461  
MET 5 217  
CYS 4 160  
SER 3 41  
ALA 2 27  
GLU 2 32  
GLY 2 27  
TYR 2 60  
PRO 1 19

Fragment:1681

LEU 18 202  
PHE 17 404  
ILE 11 207  
VAL 10 158  
ALA 8 109  
TRP 7 538  
GLY 5 69  
MET 4 173  
THR 3 53  
TYR 3 90  
ASN 2 46  
ARG 1 19  
ASP 1 20  
PRO 1 19  
SER 1 13

Fragment:1686

PHE 21 500

LEU 19 213  
TRP 9 692  
VAL 8 126  
ILE 6 113  
ALA 4 54  
SER 4 54  
TYR 4 121  
ASN 2 46  
GLY 2 27  
PRO 2 38  
THR 2 35  
ASP 1 20  
CYS 1 40  
LYS 1 15  
MET 1 43

Fragment:1689

PHE 10 238  
LEU 9 101  
ILE 6 113  
ALA 4 54  
GLY 3 41  
MET 3 130  
VAL 3 47  
THR 2 35  
TRP 2 153  
HIS 1 43

Fragment:1690

LEU 10 112  
PHE 10 238  
TRP 6 461  
GLY 2 27  
SER 2 27  
THR 2 35  
TYR 2 60  
VAL 2 31  
ALA 1 13  
ASN 1 23  
ILE 1 18  
PRO 1 19

Fragment:1728

ILE 12 226  
LEU 12 134  
PHE 12 285  
THR 8 142  
VAL 7 111  
GLY 5 69  
HIS 5 217  
SER 5 68  
ASN 4 93  
GLU 4 65  
LYS 4 62  
MET 4 173

ASP 3 60  
GLN 3 75  
PRO 3 57  
TYR 3 90  
ARG 2 38  
CYS 2 80  
ALA 1 13  
TRP 1 76

Fragment:1753

SER 13 178  
GLY 7 97  
LYS 6 93  
THR 6 107  
ASN 4 93  
TRP 4 307  
ALA 3 41  
GLU 3 49  
HIS 3 130  
TYR 2 60  
ARG 1 19  
ASP 1 20  
CYS 1 40  
GLN 1 25  
LEU 1 11  
MET 1 43  
PHE 1 23  
VAL 1 15

Fragment:1766

VAL 15 238  
GLU 14 229  
LEU 13 146  
ALA 12 164  
ASP 8 160  
GLY 8 111  
LYS 7 109  
TYR 6 181  
ILE 5 94  
MET 5 217  
PHE 5 119  
THR 5 89  
ARG 1 19  
ASN 1 23  
SER 1 13

Fragment:1778

ARG 12 230  
GLU 12 196  
ASP 9 180  
SER 6 82  
TRP 6 461  
LEU 4 44  
GLY 3 41  
ASN 2 46

CYS 2 80  
ILE 2 37  
PHE 2 47  
TYR 2 60  
GLN 1 25  
HIS 1 43  
LYS 1 15  
MET 1 43  
PRO 1 19  
THR 1 17  
VAL 1 15

Fragment:1788

TYR 37 1121  
LEU 36 404  
ASP 33 660  
ARG 24 461  
PHE 21 500  
ASN 20 465  
CYS 20 800  
MET 20 869  
VAL 19 301  
ILE 17 320  
PRO 17 326  
HIS 16 695  
THR 15 267  
GLN 13 325  
ALA 12 164  
SER 12 164  
GLU 10 163  
GLY 9 125  
TRP 8 615  
LYS 7 109

Fragment:1789

ASP 28 560  
ARG 19 365  
TYR 18 545  
LEU 15 168  
PHE 15 357  
HIS 11 478  
ILE 11 207  
LYS 11 171  
ASN 10 232  
CYS 10 400  
THR 9 160  
ALA 7 95  
PRO 7 134  
GLN 6 150  
GLY 6 83  
MET 6 260  
VAL 4 63  
GLU 3 49  
SER 3 41  
TRP 3 230



Fragment:1812

TRP 14 1076  
GLU 11 180  
ASN 8 186  
HIS 6 260  
PHE 5 119  
TYR 5 151  
GLN 4 100  
ASP 3 60  
GLY 2 27  
MET 2 86  
THR 2 35  
ALA 1 13  
ARG 1 19  
ILE 1 18  
LEU 1 11  
SER 1 13

Fragment:1818

GLY 12 166  
SER 9 123  
PHE 8 190  
GLU 5 81  
LEU 5 56  
TYR 5 151  
ASN 4 93  
HIS 4 173  
ASP 3 60  
MET 3 130  
THR 3 53  
ALA 2 27  
ARG 2 38  
CYS 2 80  
GLN 2 50  
ILE 2 37  
LYS 1 15  
TRP 1 76  
VAL 1 15

Fragment:1819

LEU 25 280  
ILE 23 433  
PHE 17 404  
VAL 16 253  
TRP 14 1076  
ALA 10 136  
THR 8 142  
GLY 5 69  
MET 5 217  
PRO 5 96  
TYR 5 151  
ARG 4 76  
HIS 3 130  
SER 2 27

CYS 1 40  
GLU 1 16

Fragment:1824

TRP 11 846  
GLU 8 131  
TYR 6 181  
ASP 5 100  
ARG 4 76  
HIS 4 173  
ASN 3 69  
LYS 2 31  
MET 2 86  
ALA 1 13  
GLN 1 25  
GLY 1 13  
LEU 1 11  
PHE 1 23

Fragment:1828

HIS 16 695  
LEU 8 89  
GLU 7 114  
GLY 7 97  
ALA 6 82  
TYR 6 181  
ILE 4 75  
PRO 4 76  
SER 4 54  
VAL 4 63  
LYS 3 46  
ARG 2 38  
ASN 2 46  
THR 2 35  
CYS 1 40

Fragment:1830

TRP 16 1230  
TYR 11 333  
ASP 8 160  
GLU 8 131  
PHE 7 166  
ASN 5 116  
ARG 4 76  
HIS 4 173  
VAL 3 47  
GLY 1 13  
ILE 1 18  
LEU 1 11  
LYS 1 15  
THR 1 17

Fragment:1850

SER 17 232  
GLY 10 138

ASN 9 209  
ALA 6 82  
LYS 6 93  
THR 6 107  
CYS 3 120  
GLU 3 49  
TYR 3 90  
GLN 2 50  
ILE 2 37  
LEU 2 22  
PHE 2 47  
TRP 2 153  
ASP 1 20  
MET 1 43

Fragment:1865

TYR 13 393  
LYS 10 156  
PHE 9 214  
MET 6 260  
ALA 5 68  
ASP 5 100  
GLN 4 100  
ILE 4 75  
LEU 4 44  
PRO 4 76  
VAL 4 63  
ARG 3 57  
GLU 3 49  
ASN 2 46  
SER 2 27  
THR 2 35  
HIS 1 43

Fragment:1876

ARG 13 249  
HIS 5 217  
GLU 4 65  
LYS 4 62  
ALA 3 41  
GLY 3 41  
PHE 3 71  
SER 3 41  
ASP 2 40  
LEU 2 22  
TYR 2 60  
VAL 2 31  
ASN 1 23  
CYS 1 40  
GLN 1 25  
THR 1 17

Fragment:1895

LEU 14 157  
ILE 12 226

PHE 11 261  
HIS 8 347  
TRP 7 538  
ALA 6 82  
PRO 6 115  
MET 4 173  
TYR 4 121  
CYS 3 120  
ARG 2 38  
GLN 1 25  
LYS 1 15  
SER 1 13  
THR 1 17

Fragment:1920

PHE 13 309  
GLY 12 166  
TYR 12 363  
HIS 7 304  
LEU 7 78  
CYS 5 200  
LYS 5 78  
VAL 5 79  
ILE 4 75  
ALA 3 41  
ASP 3 60  
ASN 3 69  
MET 3 130  
SER 3 41  
ARG 1 19  
GLU 1 16  
TRP 1 76

Fragment:1925

VAL 15 238  
ALA 12 164  
ASP 11 220  
LEU 11 123  
GLU 9 147  
PHE 9 214  
LYS 7 109  
ILE 4 75  
GLN 3 75  
GLY 3 41  
HIS 3 130  
ARG 2 38  
ASN 2 46  
CYS 2 80  
THR 2 35  
TYR 2 60  
MET 1 43  
PRO 1 19

Fragment:1971

ARG 12 230

LEU 10 112  
ASP 8 160  
GLU 7 114  
GLY 7 97  
ILE 7 132  
SER 7 95  
ASN 6 139  
GLN 6 150  
VAL 4 63  
CYS 3 120  
PHE 3 71  
ALA 2 27  
LYS 2 31  
PRO 2 38  
THR 2 35

Fragment:1974

LEU 14 157  
PHE 7 166  
VAL 7 111  
ILE 6 113  
ALA 5 68  
HIS 4 173  
PRO 4 76  
THR 4 71  
TYR 4 121  
ASN 2 46  
CYS 2 80  
GLU 2 32  
GLY 2 27  
LYS 2 31  
GLN 1 25  
MET 1 43

Fragment:2010

GLY 33 458  
LEU 18 202  
PHE 18 428  
ALA 15 205  
ILE 13 245  
VAL 13 206  
MET 12 521  
THR 11 196  
TYR 11 333  
PRO 9 173  
ARG 8 153  
SER 8 109  
ASN 7 162  
ASP 6 120  
LYS 6 93  
HIS 5 217  
GLU 4 65  
CYS 3 120  
GLN 2 50  
TRP 2 153

Fragment:2016

SER 10 136  
THR 6 107  
ASN 5 116  
LYS 5 78  
GLY 4 55  
TYR 3 90  
TRP 2 153  
ASP 1 20  
GLU 1 16  
LEU 1 11  
PHE 1 23

Fragment:2038

SER 16 219  
THR 7 125  
ASN 6 139  
GLY 6 83  
LYS 6 93  
TYR 6 181  
ARG 2 38  
LEU 2 22  
TRP 2 153  
ALA 1 13  
GLN 1 25  
HIS 1 43  
PHE 1 23

Fragment:2040

SER 18 246  
ASN 11 255  
GLY 11 152  
ALA 8 109  
LYS 8 125  
THR 7 125  
TYR 5 151  
GLN 3 75  
ILE 3 56  
LEU 3 33  
MET 3 130  
ARG 1 19  
ASP 1 20  
CYS 1 40  
GLU 1 16  
PHE 1 23  
PRO 1 19  
TRP 1 76  
VAL 1 15

Fragment:2045

SER 10 136  
GLY 8 111  
THR 7 125  
ASN 6 139

LYS 6 93  
TYR 6 181  
ALA 4 54  
HIS 4 173  
PHE 4 95  
ARG 3 57  
LEU 3 33  
VAL 3 47  
ASP 2 40  
ILE 2 37  
CYS 1 40  
GLU 1 16  
GLN 1 25

Fragment:2066

LEU 13 146  
TYR 10 303  
HIS 6 260  
TRP 6 461  
PHE 5 119  
THR 5 89  
GLY 4 55  
ILE 4 75  
LYS 4 62  
MET 4 173  
PRO 4 76  
SER 4 54  
ARG 3 57  
GLU 3 49  
ALA 2 27  
ASN 2 46  
CYS 2 80  
VAL 2 31  
ASP 1 20  
GLN 1 25

Fragment:2109

ILE 37 698  
ALA 31 424  
ARG 31 596  
LEU 30 337  
VAL 28 444  
PHE 27 642  
GLY 22 305  
THR 22 392  
GLU 18 295  
SER 16 219  
TYR 13 393  
GLN 12 300  
MET 12 521  
ASP 10 200  
ASN 7 162  
CYS 7 280  
HIS 7 304  
LYS 5 78

TRP 4 307

Fragment:2180

LEU 11 123  
VAL 10 158  
MET 9 391  
ALA 7 95  
GLU 6 98  
GLY 5 69  
ILE 5 94  
PHE 3 71  
TYR 3 90  
THR 2 35  
LYS 1 15

Fragment:2189

GLN 13 325  
GLU 10 163  
LEU 8 89  
PHE 8 190  
SER 8 109  
HIS 5 217  
THR 5 89  
CYS 4 160  
PRO 4 76  
ALA 3 41  
ASN 3 69  
TYR 3 90  
VAL 3 47  
ILE 2 37  
MET 2 86  
ARG 1 19  
GLY 1 13

Fragment:2478

LEU 12 134  
ASP 9 180  
ILE 7 132  
THR 7 125  
GLY 6 83  
VAL 6 95  
ARG 5 96  
HIS 5 217  
ASN 4 93  
CYS 4 160  
GLU 4 65  
LYS 3 46  
MET 3 130  
PHE 3 71  
SER 3 41  
ALA 2 27  
PRO 2 38  
TRP 2 153  
TYR 1 30



Fragment:2486

GLY 12 166  
PHE 9 214  
GLN 8 200  
ARG 7 134  
TYR 6 181  
GLU 4 65  
HIS 4 173  
ALA 3 41  
THR 3 53  
ASN 2 46  
LEU 2 22  
SER 2 27  
ASP 1 20  
ILE 1 18  
LYS 1 15  
TRP 1 76

Fragment:2496

GLY 13 180  
GLN 10 250  
SER 4 54  
ARG 3 57  
CYS 3 120  
GLU 3 49  
PHE 3 71  
ILE 1 18  
THR 1 17

Fragment:2625

ILE 17 320  
TYR 11 333  
MET 6 260  
ALA 5 68  
ASN 5 116  
LEU 5 56  
PHE 5 119  
SER 5 68  
VAL 4 63  
PRO 3 57  
ARG 2 38  
ASP 2 40  
GLY 2 27  
THR 2 35  
TRP 2 153  
GLU 1 16

Fragment:2709

TRP 17 1307  
ASP 11 220  
TYR 9 272  
GLU 8 131  
ASN 7 162  
HIS 5 217  
PHE 4 95

GLY 3 41  
ARG 2 38  
GLN 2 50  
LYS 2 31  
VAL 2 31  
ILE 1 18

Fragment:2763

GLY 30 416  
ALA 12 164  
PHE 10 238  
PRO 10 192  
ASN 9 209  
ASP 8 160  
TYR 8 242  
LYS 7 109  
SER 7 95  
GLU 6 98  
LEU 6 67  
ARG 5 96  
ILE 4 75  
THR 4 71  
VAL 4 63  
CYS 3 120  
GLN 3 75  
HIS 3 130  
TRP 2 153  
MET 1 43

Fragment:2933

GLU 15 245  
ASP 14 280  
VAL 14 222  
PHE 10 238  
SER 10 136  
ALA 9 123  
ILE 8 150  
MET 8 347  
GLY 7 97  
ARG 6 115  
THR 5 89  
TYR 5 151  
LEU 4 44  
ASN 2 46  
CYS 2 80  
HIS 2 86  
LYS 2 31  
TRP 2 153  
PRO 1 19

Fragment:3202

HIS 20 869  
TYR 5 151  
GLU 4 65  
ASP 3 60

ALA 2 27  
ASN 2 46  
PHE 2 47  
SER 2 27  
TRP 2 153  
CYS 1 40  
GLY 1 13  
ILE 1 18  
LEU 1 11  
LYS 1 15  
MET 1 43  
PRO 1 19  
THR 1 17  
VAL 1 15

Fragment:3508

TYR 24 727  
ARG 14 269  
GLY 14 194  
LYS 11 171  
ASN 10 232  
PHE 7 166  
LEU 6 67  
ILE 5 94  
TRP 5 384  
THR 4 71  
ALA 3 41  
HIS 3 130  
SER 3 41  
GLU 2 32  
GLN 2 50  
VAL 2 31

Fragment:3742

GLY 15 208  
ALA 7 95  
LEU 6 67  
VAL 6 95  
HIS 5 217  
SER 5 68  
CYS 4 160  
ARG 3 57  
ASP 3 60  
THR 3 53  
TYR 3 90  
ASN 2 46  
GLN 2 50  
MET 2 86  
ILE 1 18  
PRO 1 19  
TRP 1 76

Fragment:3792

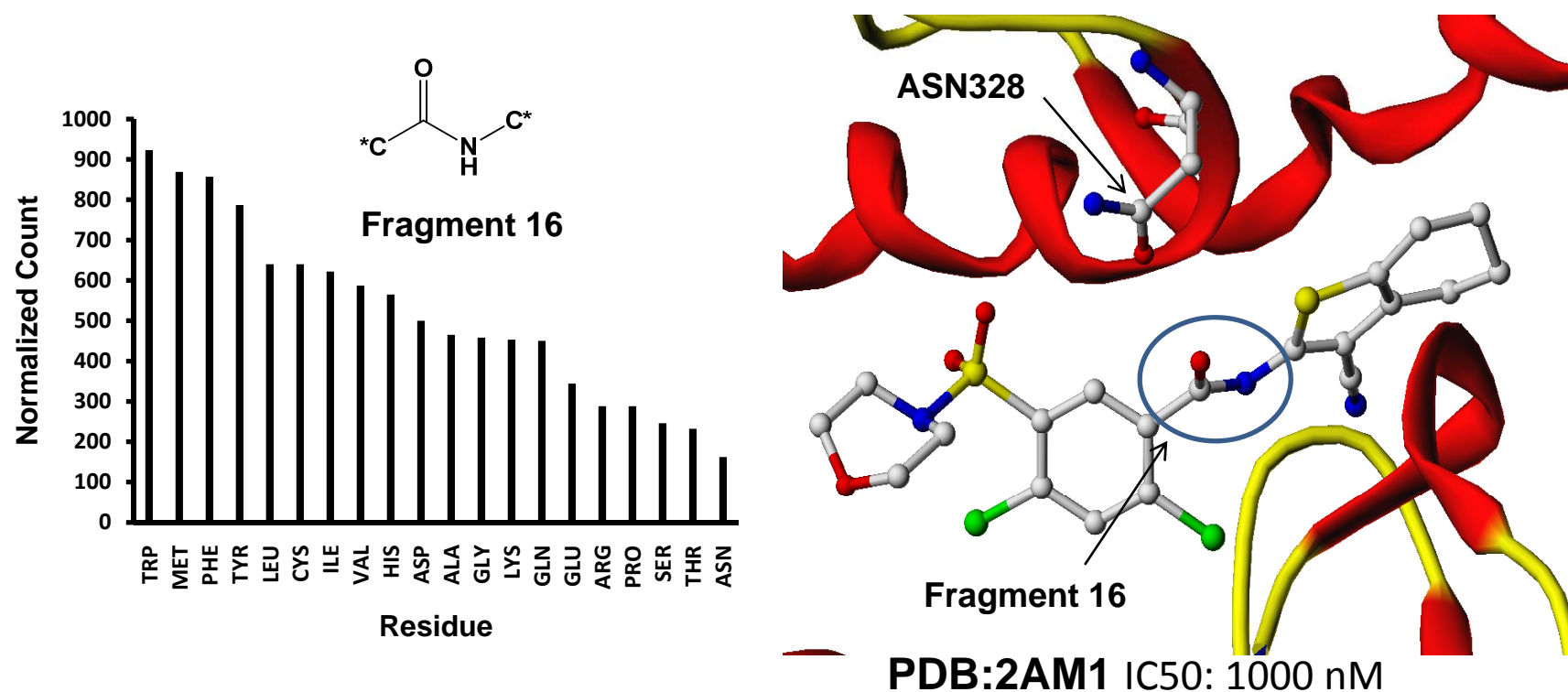
GLU 11 180  
SER 6 82

ALA 5 68  
ARG 5 96  
ASN 5 116  
THR 5 89  
LYS 4 62  
CYS 3 120  
GLY 3 41  
HIS 3 130  
ASP 1 20  
GLN 1 25  
ILE 1 18  
LEU 1 11  
MET 1 43  
PRO 1 19  
TRP 1 76  
TYR 1 30

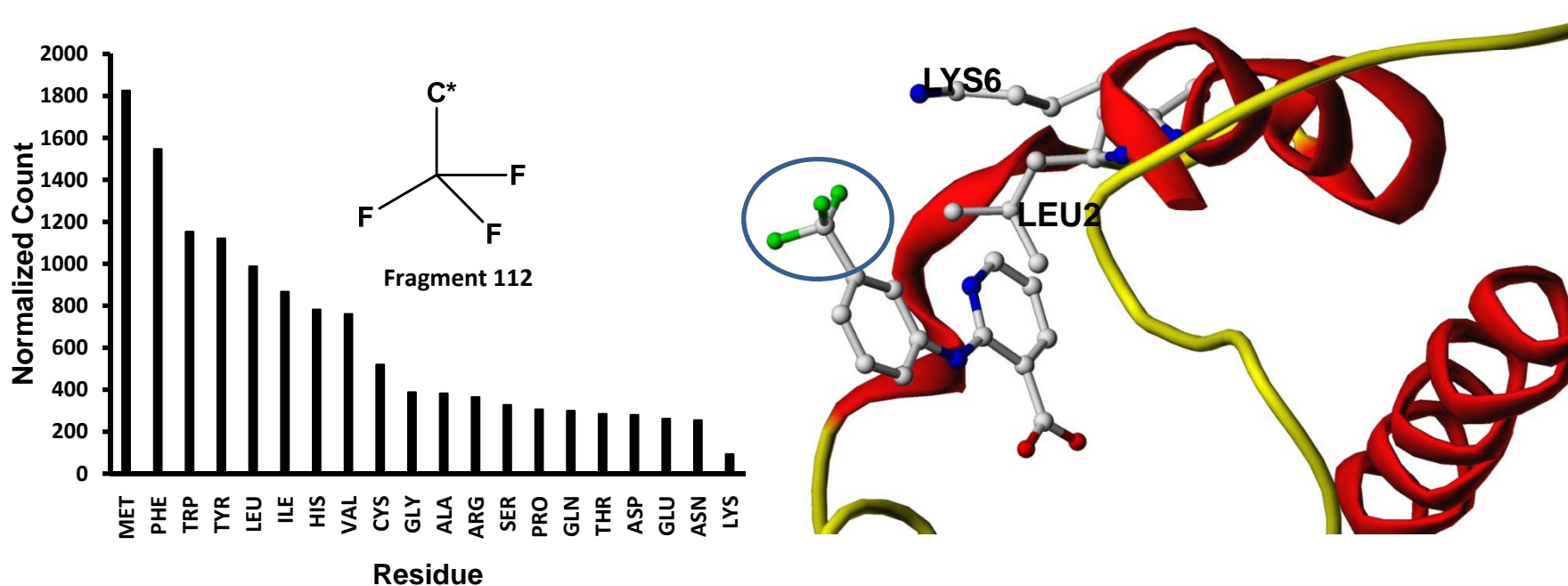
Fragment:3882

ARG 13 249  
VAL 9 142  
GLU 8 131  
ILE 8 150  
ASN 4 93  
LEU 4 44  
LYS 4 62  
THR 4 71  
ASP 2 40  
GLN 2 50  
PHE 2 47  
SER 2 27  
ALA 1 13  
CYS 1 40  
GLY 1 13  
HIS 1 43  
TYR 1 30

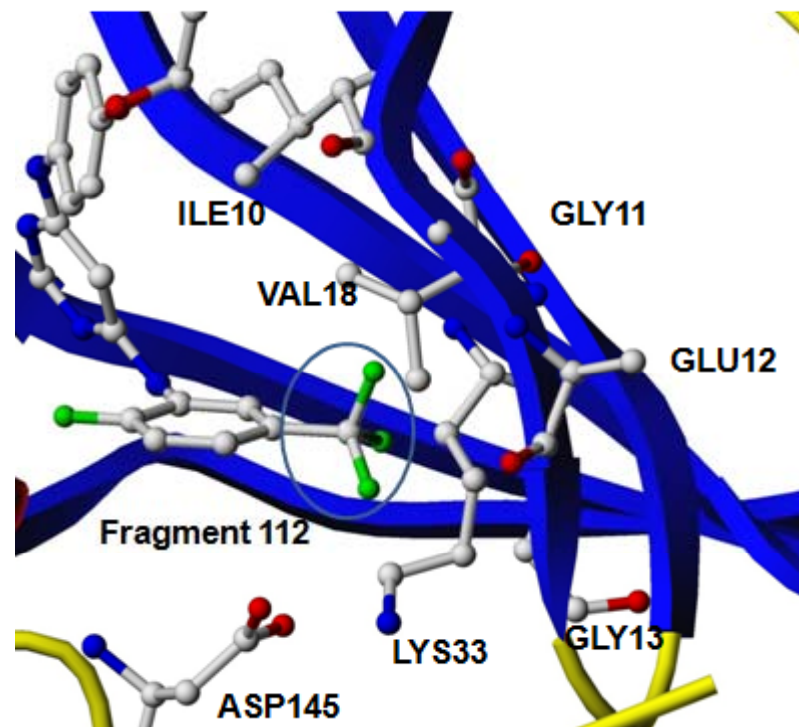
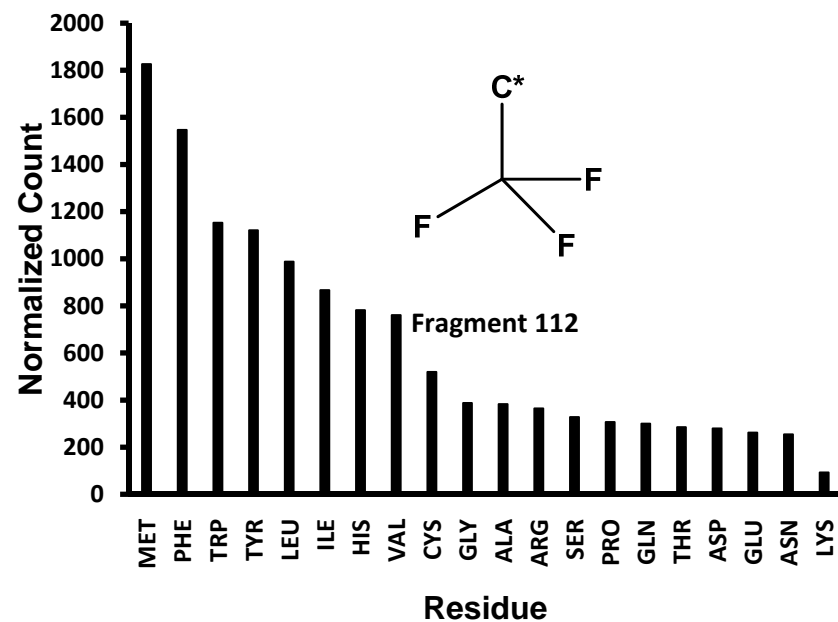
### Part 3. Four Additional Examples of PDB Fragment-Residues Interaction Analysis



**Figure S1.** The fragment-residues interaction profile of fragment 16 (left) and the interaction of fragment 16 with ASN in PDB 2AM1(right). The profile indicates that ASN is a unfavored residue of fragment 16. As shown in PDB structure 2AM1, the side chain of ASN is almost parallel with fragment 16. The binding affinity, IC50, is 1000nM.

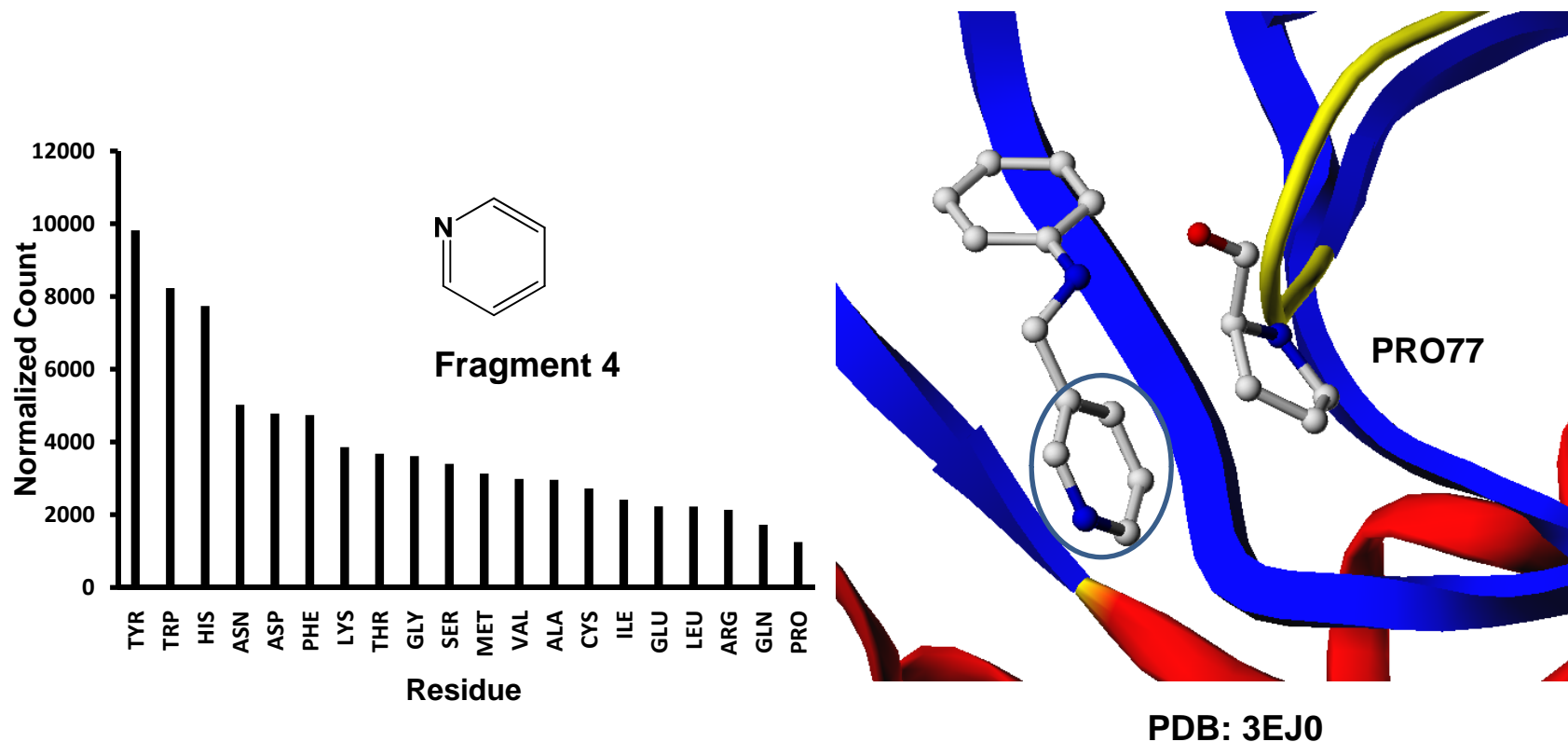


**Figure S2. The fragment-residues interaction profile of fragment 112 (left) and the interaction of fragment 112 with LYS and LEU in PDB 1TD7(right).** The profile indicates that LYS is a unfavored residue and LEU is a relatively favored residues for fragment 112. As shown in PDB structure 1TD7, the fragment 112 is surrounded by LEU2 and LYS6. it is anticipated that the unfavored residue LYS6 may influence the binding (Ki is 12600nM).



PDB:1V1K IC50: 35000 nM

**Figure S3.** The fragment-residues interaction profile of fragment 112 (left) and the interaction of fragment 112 with residues in PDB 1V1K (right). As shown above, the fragment 112 is surrounded by ILE10, GLY11, GLU12, GLY13, VAL18, LYS33 and ASP145. ASP, GLU and LYS are not the favored residues of the fragment 112. The binding affinity is low (IC50 is 35000nM.).



**Figure S4.** The fragment-residues interaction profile of fragment 4 (left) and the interaction of fragment 4 with PRO in PDB 3EJ0 (right). The profile indicates that PRO is a disfavored residue for the fragment 4. As shown in the PDB structure 3EJ0, the side chain of PRO77 is in a parallel position, an unfavorable interaction position with fragment 4.