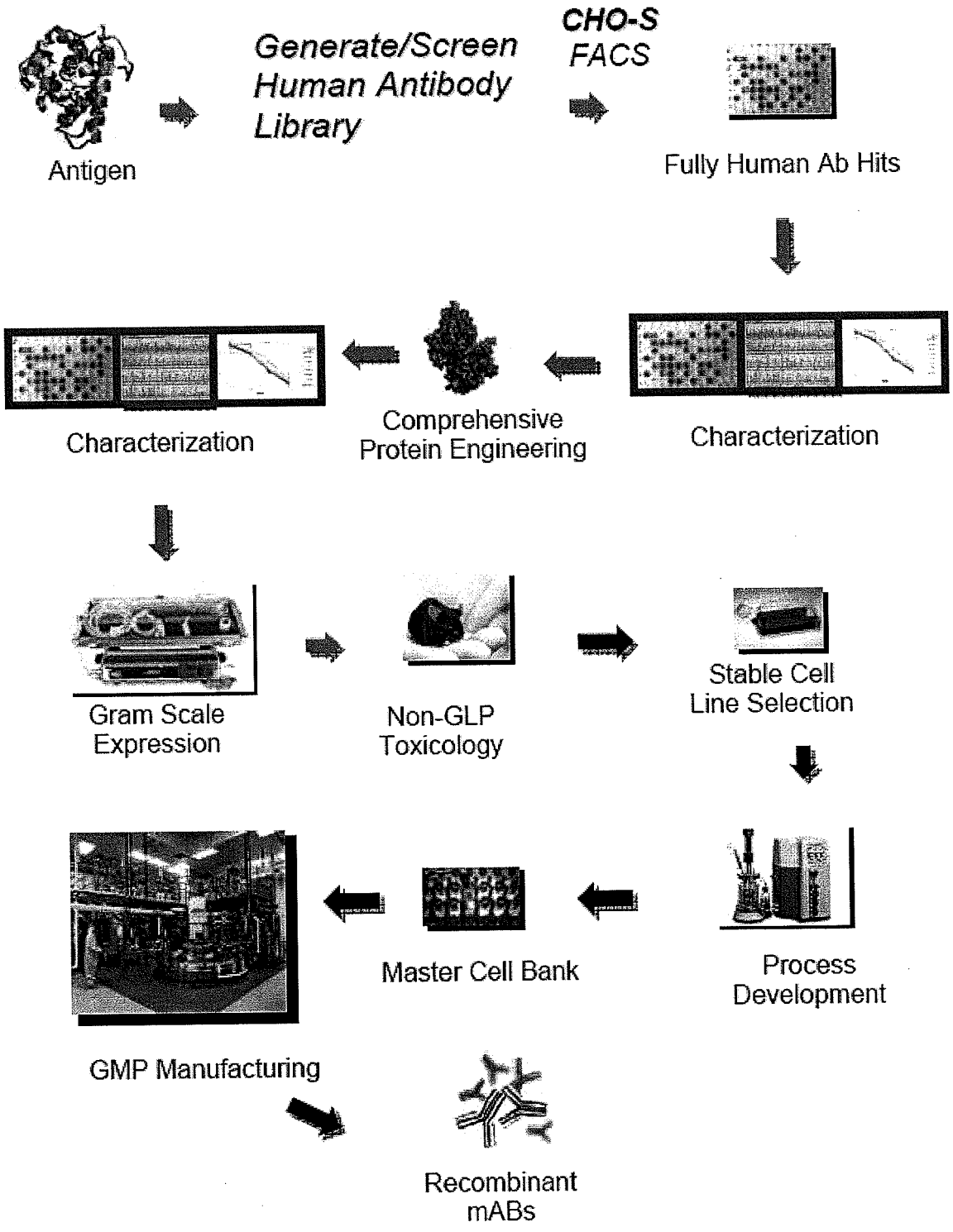

Antigen
Generate/Screen Human Antibody Library
CHO-S FACS
Fully Human Ab Hits
Characterization
Comprehensive Protein Engineering
Characterization
Gram Scale Expression
Non-GLP Toxicology
Stable Cell Line Selection
Process Development
Master Cell Bank
GMP Manufacturing
Recombinant mABs

FIGURE 1

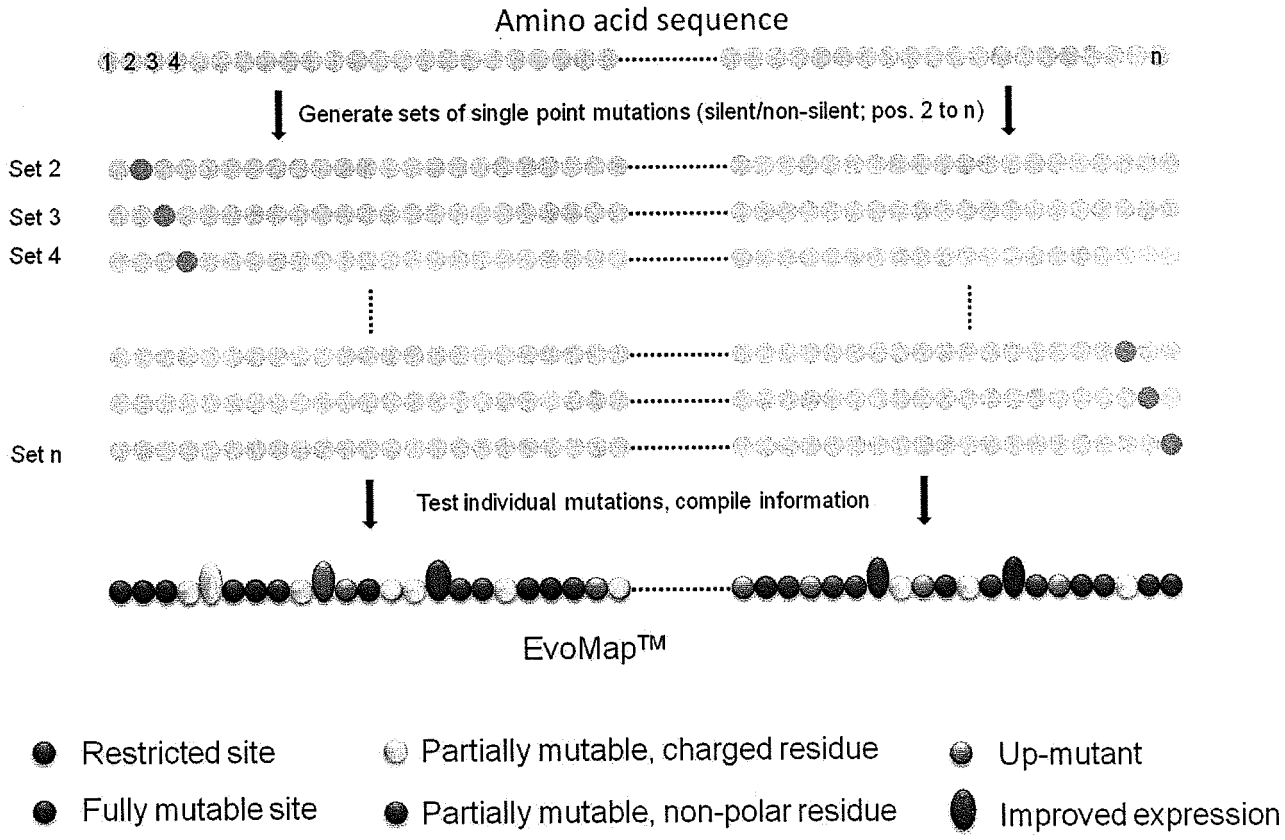

Amino acid sequence
1 2 3 4
n
Generate sets of single point mutations (silent/non-silent; pos. 2 to n)
Set 2
Set 3
Set 4
Set n
Test individual mutations, compile information
EvoMap™
Restricted site
Fully mutable site
Partially mutable, charged residue
Partially mutable, non-polar residue
Up-mutant
Improved expression

FIGURE 2

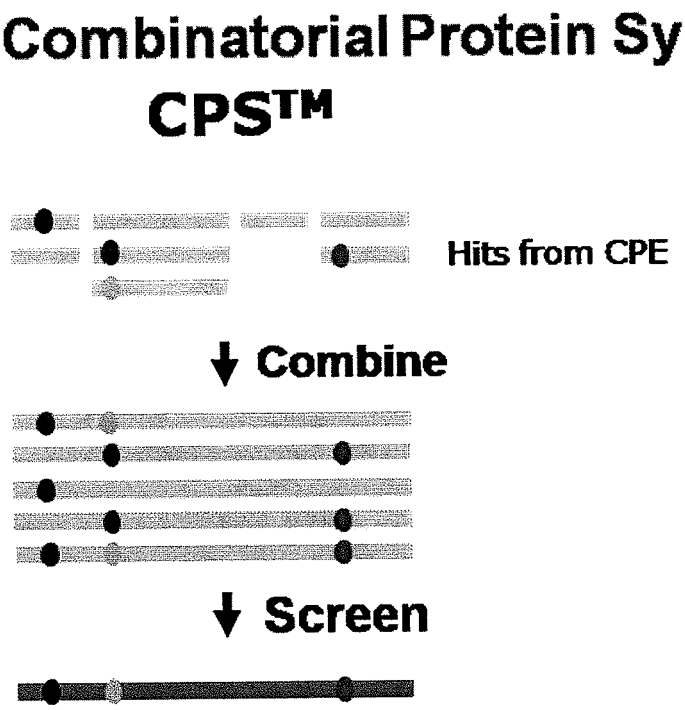

Combinatorial Protein Synthesis
CPS™
Hits from CPE
Combine
Screen
Optimized Gene/Protein

FIGURE 3

CPI™- Comprehensive Positional Insertion Evolution
Inserts up to 20 individual amino acids at every single amino position throughout the protein

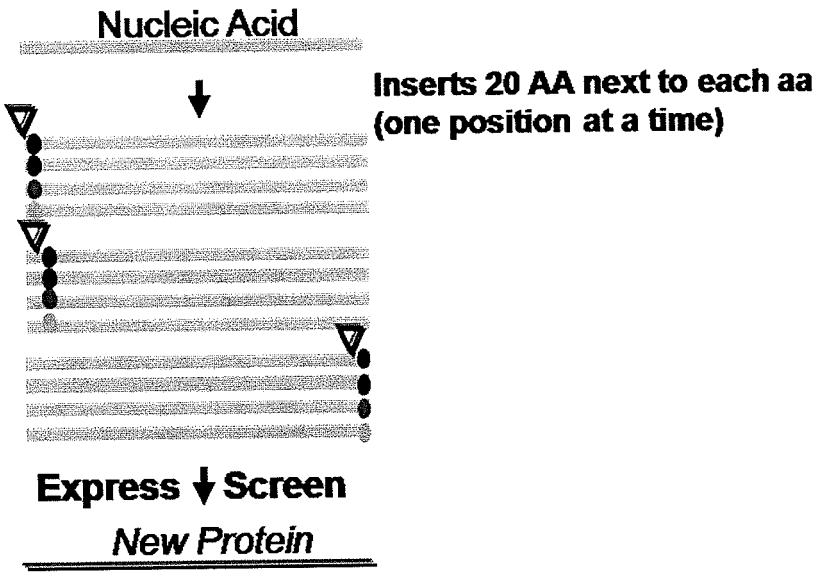


FIGURE 4

Comprehensive Positional Evolution (CPE™)

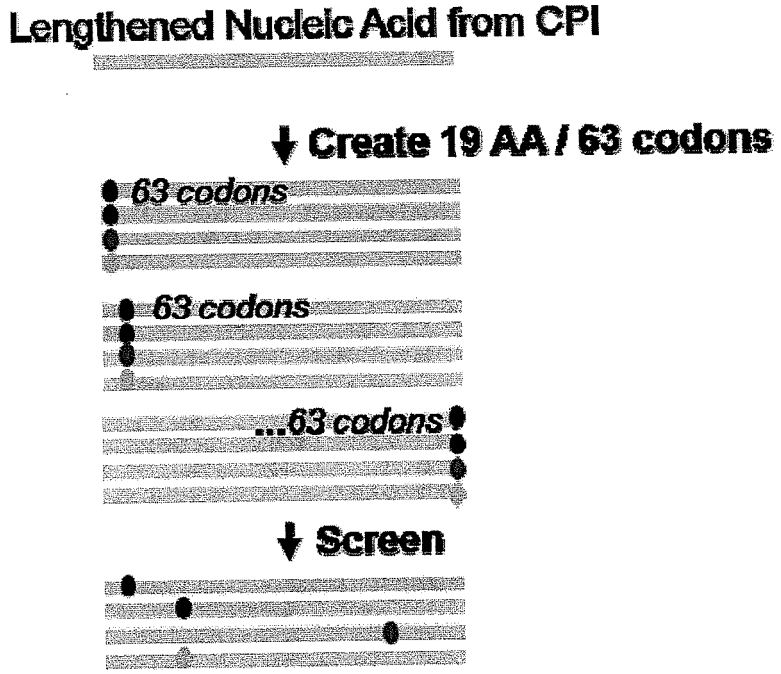


FIGURE 5

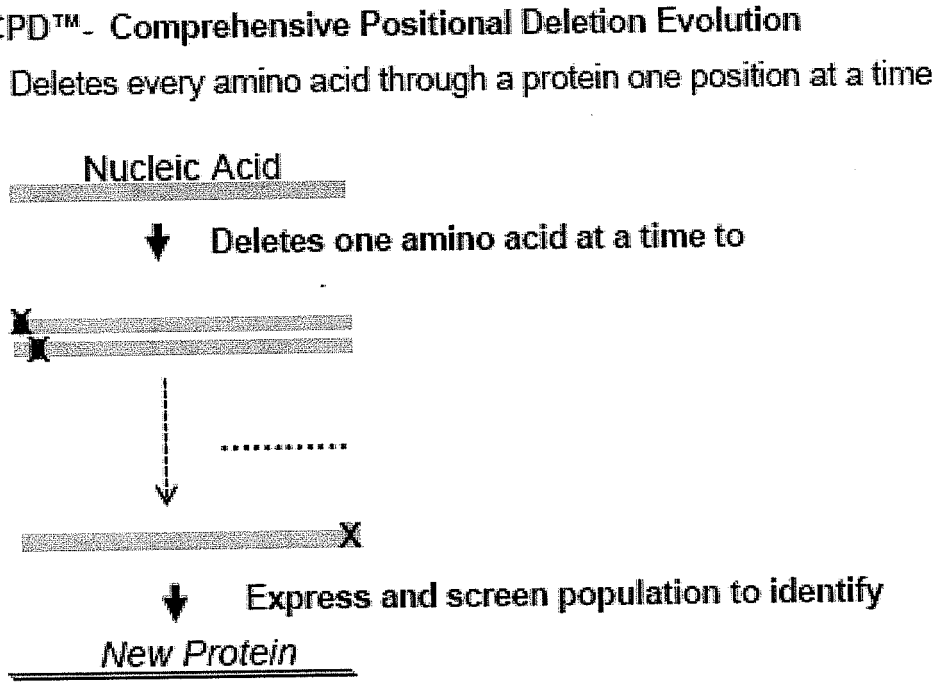

CPD™- Comprehensive Positional Deletion Evolution
Deletes every amino acid through a protein one position at a time
Nucleic Acid
Deletes one amino acid at a time to
X
Express and screen population to identify
New Protein

FIGURE 6

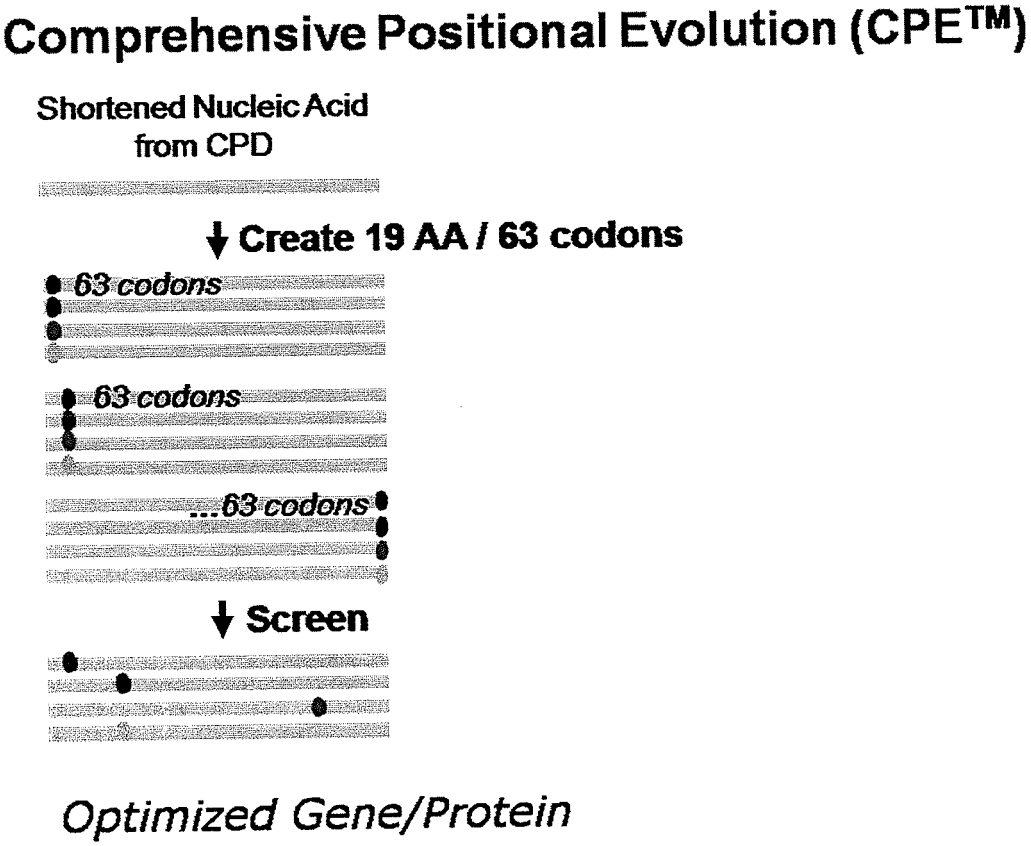

Comprehensive Positional Evolution (CPE™)
Shortened Nucleic Acid from CPD
Create 19 AA / 63 codons
63 codons
63 codons
...63 codons
Screen
Optimized Gene/Protein

FIGURE 7