What is claimed is:

1. A method of identifying a diploid *Pichia pastoris* host cell that produces a desired antibody with a greater purity than another diploid *Pichia pastoris* host cell, said method comprising:

(a) providing a panel of diploid *Pichia pastoris* host cells, said panel comprising at least two diploid *Pichia pastoris* host cells that each comprise differing numbers of copies of one or more of the genes that provide for the expression of the subunits of the desired antibody, wherein said genes that provide for the expression of the subunits of the desired antibody comprise genes encoding the light chain and the heavy chain of the desired antibody;
(b) culturing each of said diploid *Pichia pastoris* host cells to express the desired antibody;
(c) measuring the purity of the desired antibody produced by each of said diploid *Pichia pastoris* host cells; and
(d) identifying a diploid *Pichia pastoris* host cell that produces said desired antibody with a greater purity than another diploid *Pichia pastoris* host cell in said panel of diploid *Pichia pastoris* host cells that produce the desired antibody.

2. The method of claim 1, wherein said panel of *Pichia pastoris* host cells comprises a heterogenous population of diploid *Pichia pastoris* cells, wherein said heterogenous population of diploid *Pichia pastoris* cells comprises cells comprising different copy number combinations of said genes encoding subunits of said desired antibody relative to one another and *Pichia pastoris* cells comprising the same copy number combinations of said genes encoding subunits of said desired antibody relative to one another.

3. The method of claim 1 or 2, wherein the respective number of copies of the gene encoding the heavy chain of said desired antibody and the number of copies of the gene encoding the light chain of said desired antibody in said host cells are; 2 and 1, 3 and 1, 4 and 1, 5 and 1, 6 and 1, 7 and 1, 8 and 1, 9 and 1 , 10 and 1, 1 and 2, 2 and 2, 3 and 2, 4 and 2, 5 and 2, 6 and 2, 7 and 2, 8 and 2, 9 and 2, 10 and 2, 1 and 3, 2 and 3, 3 and 3, 4 and 3, 5 and 3, 6 and 3, 7 and 3, 8 and 3, 9 and 3, 10 and 3, 1 and 4, 2 and 4, 3 and 4, 4 and 4, 5 and 4, 6 and 4, 7 and 4, 8 and 4, 9 and 4, 10 and 4, 1 and 5, 2 and 5, 3 and 5, 4 and 5, 5 and 5, 6 and 5, 7 and 5, 8 and 5, 9 and 5, 10 and 5, 1 and 6, 2 and 6, 3 and 6, 4 and 6, 5 and 6, 6 and 6, 7 and 6, 8 and 6, 9 and 6, 10 and 6, 1 and 7, 2 and 7, 3 and 7, 4 and 7, 5 and 7, 6 and 7, 7 and 7, 8 and 7, 9 and 7, 10 and 7, 1 and 8, 2 and 8, 3 and 8, 4 and 8, 5 and 8, 6 and 8, 7 and 8, 8 and 8, 9 and 8, 10 and 8, 1 and 9, 2 and 9, 3 and 9, 4 and 9, 5 and 9, 6 and 9, 7 and 9, 8 and 9, 9 and 9, 10 and 9, 1 and 10, 2 and 10, 3 and 10, 4 and 10, 5 and 10, 6 and 10, 7 and 10, 8 and 10, 9 and 10, 10 and 10.

4. The method of any one of claims 1-3, wherein:

(i) the panel of diploid *Pichia pastoris* host cells includes cells that express up to 15 copies of each gene that encode the desired antibody, and represent substantially all possible copy number combinations of each subunit relative to the other subunit(s);
(ii) the panel of diploid *Pichia pastoris* host cells includes cells that express up to 12 copies of each gene that encode the desired antibody, and represent substantially all possible copy number combinations of each subunit relative to the other subunit(s);
(iii) the panel of diploid *Pichia pastoris* host cells includes cells that express up to 10 copies of each gene that encode the desired antibody, and represent substantially all possible copy number combinations of each subunit relative to the other subunit(s);
(iv) the panel of diploid *Pichia pastoris* host cells includes cells that express up to 8 copies of each gene that encode the desired antibody, and represent substantially all possible copy number combinations of each subunit relative to the other subunit(s); or
(v) the panel of diploid *Pichia pastoris* host cells includes cells that express up to 6 copies of each gene that encode the desired antibody, and represent substantially all possible copy number combinations of each subunit relative to the other subunit(s).

5. The method of any one of claims 1-4, wherein said purity is determined by measuring the relative proportion of one or more glycosylated antibody chains and optionally wherein one or more of said glycosylated antibody chains include a glycosylated antibody heavy chain variant.

6. The method of any one of claims 1-5, wherein:

(i) said panel of diploid *Pichia pastoris* host cells is produced by a mating or fusion of haploid *Pichia pastoris* cells containing differing numbers of copies of the genes encoding one or more subunits of said desired antibody, whereby said mating produces diploid *Pichia pastoris* cells containing differing numbers of copies of the genes encoding the subunits of said desired antibody; or
(ii) said panel of diploid *Pichia pastoris* host cells is produced by a mating or fusion of haploid *Pichia pastoris* cells containing differing numbers of copies of the genes encoding one or more subunits of said desired antibody, whereby said mating produces diploid *Pichia pastoris* cells containing differing numbers of copies of the genes encoding the subunits of said desired antibody and wherein said genes that provide for the expression of the subunits of the desired antibody are integrated into the genome of said haploid *Pichia pastoris* cells.

7. A method according to any of claims 1-6, wherein said identified diploid *Pichia pastoris* host cell is used to develop a production culture.

8. A method according to any of claims 1-7, wherein said genes that provide for the expression of the subunits of the desired antibody are integrated into the genome of said diploid *Pichia pastoris* host cells.

9. The method of claim 8, wherein the genes that provide for the expression of the subunits of the desired antibody are integrated into one or more genomic loci selected from the group consisting of the pGAP, 3' AOX TT, PpURA5, OCH1, AOX1, HIS4, GAP, ARG, and HIS4 TT loci.

10. A method according to any one of claims 1-9, wherein:

(i) at least one of said genes encoding said subunits of the desired antibody are expressed under the control of an inducible or constitutive promoter;
(ii) at least one of said genes encoding said subunits of the desired antibody are expressed under the control of an inducible or constitutive promoter, wherein said inducible promoter is selected from the group consisting of the GAP, CUP1, AOX1, and FLD1 promoters;
(iii) at least one of said genes encoding said subunits of the desired antibody are expressed under the control of an inducible or constitutive promoter, wherein at least one of said genes encoding said subunits of the desired antibody are expressed under the control of a promoter selected from the group consisting of: the AOX1, ICL1, glyceraldehyde-3-phosphate dehydrogenase (GAP), FLD1 , ADH1, alcohol dehydrogenase II, GAL4, PHO3, PHO5, and Pyk promoters, chimeric promoters derived therefrom, yeast promoters, mammalian promoters, insect promoters, plant promoters, reptile promoters, amphibian promoters, viral promoters, and avian promoters;
(iv) the desired antibody is purified from said diploid *Pichia pastoris* host cells;
(v) the desired antibody is purified from an intracellular component, cytoplasm, nucleoplasm, or a membrane of said diploid *Pichia pastoris* host cells;
(vi) the diploid *Pichia pastoris* host cell secretes said desired antibody into the culture medium;
(vii) the desired antibody is a monospecific or bispecific antibody;
(viii) at least two diploid *Pichia pastoris* host cells comprise differing numbers of copies of a gene encoding a subunit of said desired antibody;
(ix) at least one diploid *Pichia pastoris* host cell in said panel comprises a gene encoding at least one subunit of the desired antibody whose expression is driven by a different promoter than the promoter that drives the expression of the corresponding gene in a different diploid *Pichia pastoris* host cell in said panel;
(x) at least one diploid *Pichia pastoris* host cell in said panel comprises a polycistronic gene comprising more than one sequence encoding a subunit of the desired antibody;
(xi) said desired antibody specifically binds to IL-6, TNF-alpha, CGRP, PCSK9, or NGF;
(xii) said desired antibody comprises a human antibody or a humanized antibody or fragment thereof;
(xiii) said desired antibody comprises a humanized antibody or fragment thereof and said humanized antibody is of mouse, rat, rabbit, goat, sheep, or cow origin, preferably rabbit origin;
(xiv) said desired antibody comprises a monovalent, bivalent, or multivalent antibody;
(xv) at least one of said genes that provide for expression of a subunit of said desired antibody in at least one of said diploid *Pichia pastoris* host cells in said panel is optimized for expression in said diploid *Pichia pastoris* host cell; or

(xvi) said desired antibody is glycosylated and the purity of said desired antibody is assessed by measuring the fraction of the desired antibody produced by said diploid *Pichia pastoris* host cell that is non-glycosylated, is contained in antibody complexes having the expected apparent hydrodynamic radius, and /or specifically binds a target of said desired antibody.

11. The method of any one of claims 1-10, wherein:

(i) the copy number of the genes encoding the desired antibody is stable for 20 generations;
(ii) the copy number of the genes encoding the desired antibody is stable for 50 generations;
(iii) the copy number of the genes encoding the desired antibody is stable for 100 generations;
(iv) the copy number of the genes encoding the desired antibody is stable for 500 generations;
(v) the copy number of the genes encoding the desired antibody is stable for 1000 generations;
(vi) the gene copies encoding at least one of the subunits of said desired antibody are integrated into two or more loci;
(vii) the gene copies encoding at least one of the subunits of said desired antibody are integrated into three or more loci;
(viii) the gene copies encoding at least one of the subunits of said desired antibody are integrated into two, three or more loci wherein each locus contains no more than 5 copies of a given subunit;
(ix) the gene copies encoding at least one of the subunits of said desired antibody are integrated into two, three or more loci wherein each locus contains no more than 4 copies of a given subunit; or
(x) the gene copies encoding at least one of the subunits of said desired antibody are integrated into two, three or more loci wherein each locus contains no more than 3 copies of a given subunit.

12. The method of any one of claims 1-11, further comprising recombinantly producing said desired antibody from said diploid *Pichia pastoris* host cell identified as a diploid *Pichia pastoris* host cell that produces a desired antibody with a greater purity, wherein the diploid *Pichia pastoris* host cell (i) comprises one or more genes encoding each subunit of the desired antibody; or (ii) comprises between two and ten copies of a gene encoding each subunit of said desired antibody,
wherein the method comprises:
(a) providing the diploid *Pichia pastoris* host cell; and
(b) culturing said diploid *Pichia pastoris* host cell to express said desired antibody.

13. The method of claim 12, wherein the diploid *Pichia pastoris* host cell comprises one or more genes encoding each subunit of the desired antibody and is identified by the method of any one of claims 1-11 as a diploid *Pichia pastoris* host cell that produces a desired antibody with a greater purity, and wherein:

(i) the method further comprises the purification of said desired antibody; or
(ii) said diploid *Pichia pastoris* host cell produces an antibody titer of at least 100 mg / L, at least 150 mg / L, at least 200 mg / L, at least 250 mg / L, at least 300 mg / L, between 100 and 300 mg / L, between 100 and 500 mg / L, between 100 and 1000 mg / L, at least 1000 mg / L, at least 1250 mg/liter, at least 1500 mg/liter, 1750 mg/liter, 2000 mg liter, or more.

14. The method of claim 12, wherein said diploid *Pichia pastoris* host cell is produced by mating or fusion of two parental cells, wherein each parental cell comprises one or more copies of at least one gene encoding a subunit of said desired antibody; optionally wherein at least one copy of each of two different genes each encoding a subunit of said desired antibody are integrated into the same locus of two homologous chromosomes of said diploid *Pichia pastoris* host cell.

15. The method of claim 14, wherein:

(i) at least one of the genes that provide for expression of said desired antibody are integrated into genome of said diploid *Pichia pastoris* host cell;

(ii) at least one of the genes that provide for expression of said desired antibody is contained on one or more extrachromosomal elements, plasmids, or artificial chromosomes;
(iii) said diploid *Pichia pastoris* host cell comprises more copies of the gene that provide for the expression of the light chain of said desired antibody than copies of the gene that provide for expression of the heavy chain of said desired antibody;
(iv) said diploid *Pichia pastoris* host cell comprises more copies of the gene that provide for the expression of the heavy chain of said desired antibody than copies of the gene that provide for expression of the light chain of said desired antibody;
(v) said diploid *Pichia pastoris* host cell comprises a number of copies of the gene that provide for the expression of the light chain of said desired antibody that is equal to the number of copies of the gene that provide for expression of the heavy chain of said desired antibody; or
(vi) wherein the respective number of copies of the gene encoding the heavy chain of said desired antibody and the number of copies of the gene encoding the light chain of said desired antibody in said diploid *Pichia pastoris* host cell are: 2 and 2, 2 and 3, 3 and 3, 3 and 4, 3 and 5, 4 and 3, 4 and 4, 4 and 5, 4 and 6, 5 and 4, 5 and 5, 5 and 6, or 5 and 7.

16. The method according to claim 12, wherein the diploid *Pichia pastoris* host cell comprises between two and ten copies of a gene encoding each subunit of said desired antibody, wherein said host cell is produced by mating or fusion of two parental cells, wherein each parental cell comprises one or more copies of genes encoding one or more subunits of said multi-subunit complex and wherein the method of recombinantly producing a desired antibody further optionally includes one or more of the following:

(i) at least one copy of each of two different genes each encoding a subunit of said desired antibody are integrated into the same locus of two homologous chromosomes of said diploid *Pichia pastoris* host cell;
(ii) at least one of said genes that provide for expression of the subunits of said desired antibody are integrated into one or more genomic loci selected from the group consisting of the pGAP locus and the HIS4 TT locus;
(iii) at least one of said genes encoding said desired antibody are expressed under control of an inducible or constitutive promoter;
(iv) at least one of said genes encoding said desired antibody are expressed under control of an inducible or constitutive promoter, wherein said inducible promoter is selected from the group consisting of the GAP, AOX1, CUP1, and FLD1 promoters;
(v) at least one of said genes encoding the desired antibody light chain and / or heavy chain are expressed under control of a promoter selected from the group consisting of: the AOX1, ICL1, glyceraldehyde-3-phosphate dehydrogenase (GAP), FLD1, ADH1, alcohol dehydrogenase II, GAL4, PHO3, PHO5, and Pyk promoters, chimeric promoters derived therefrom, yeast promoters, mammalian promoters, insect promoters, plant pro moters, reptile promoters, amphibian promoters, viral promoters, and avian promoters;
(vi) the diploid *Pichia pastoris* host cell secretes said desired antibody into the culture medium;
(vii) the desired antibody produced by the diploid *Pichia pastoris* host cell is a monospecific or bispecific antibody;
(viii) the desired antibody produced by the diploid *Pichia pastoris* host cell specifically binds to IL-6, TNF-alpha, CGRP, PCSK9, or NGF;
(ix) the desired antibody produced by the diploid *Pichia pastoris* host cell is a humanized antibody or fragment thereof which optionally specifically binds to IL-6, TNF-alpha, CGRP, PCSK9, or NGF;
(x) the desired antibody produced by the diploid *Pichia pastoris* host cell is a humanized antibody of rabbit origin;
(xi) the desired antibody produced by the diploid *Pichia pastoris* host cell is a monovalent, bivalent, or multivalent antibody;
(xii) at least one of said copies of a gene encoding a subunit of said desired antibody is optimized for expression in said diploid *Pichia pastoris* host cell;
(xiii) the number of copies of a gene encoding the light chain of said desired antibody is greater than or equal to said number of copies of a gene encoding the heavy chain of said desired antibody;
(xiv) the method produces a greater purity of said desired antibody than a method using a strain containing a single copy of each gene encoding a subunit of said desired antibody;
(xv) the method produces a greater purity of said desired antibody than a method using a strain containing a single copy of each gene encoding a subunit of said desired antibody, wherein said purity is determined by measuring the mass of glycosylated heavy and/or light chain polypeptides as a percentage of total mass of heavy and/or light chain polypeptides; or

(xvi) at least one subunit of said desired antibody comprises a secretion signal, optionally wherein the secretion signal comprises a polypeptide selected from the group consisting of: chicken lysozyme (CLY) signal peptide; CLY-L8; S. cerevisiae invertase (SUC2) signal peptide; MF-alpha (Prepro); MF-alpha (Pre)-apv; MF-alpha (Pre)-apv-SLEKR; MF-alpha (Prepro)-(EA)3; aF signal peptide; KILM1 signal peptide; repressible acid phosphatase (PHOI) signal peptide; A. niger GOX signal peptide; Schwanniomyces occidentalis glucoamylase gene (GAM1) signal peptide; human serum albumin (HSA) signal peptide with pro-sequence; human serum albumin (HSA) signal peptide without pro-sequence; ISN signal peptide; IFN signal peptide; HGH signal peptide; phytohemagglutinin (PHA); Silkworm lysozyme; Human lysozyme (LYZI); activin receptor type-1; activin type II receptor; P. pastoris immunoglobulin binding protein (PpBiP); human antibody 3D6 light chain leader; and any combination thereof.