FORM 10-K/A

Annual report pursuant to section 13 and 15(d) [amend]

Filing Date: **1996-10-01** | Period of Report: **1995-12-31**
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FILER

HUMAN GENOME SCIENCES INC

CIK:**901219**| IRS No.: **223178468** | State of Incorp.:**DE** | Fiscal Year End: **1231**
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SIC: **2835** In vitro & in vivo diagnostic substances

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SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K/A
Amendment No. 1

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 1995 Commission File Number 0-22962

HUMAN GENOME SCIENCES, INC.
(Exact name of registrant)

Delaware	22-3178468
(State of organization)	(I.R.S. Employer Identification Number)

9410 Key West Avenue, Rockville, Maryland 20850-3338
(Address of principal executive offices and zip code)

(301) 309-8504
(Registrant's telephone Number)

Securities registered pursuant to Section 12(b) of the Act: NONE

Securities registered pursuant to Section 12(g) of the Act:

Common stock, par value $.01 per share

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes X No
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Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of the registrants's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. [ ]

The number of shares of the registrant's common stock outstanding on March 18, 1996 was 18,624,535

As of March 18, 1996, the aggregate market value of the common stock held by non-affiliates of the registrant based on the closing price reported on the National Association of Securities Dealers Automated Quotations System was

approximately $316,000,000.*

DOCUMENTS INCORPORATED BY REFERENCE

Portions of Human Genome Sciences, Inc.'s Notice of Annual Stockholder's Meeting and Proxy Statement, to be filed within 120 days after the end of the registrant's fiscal year, are incorporated into Part III of this Annual Report.

* Excludes 10,719,644 shares of common stock deemed to be held by officers and directors, and stockholders whose ownership exceeds five percent of the shares outstanding at March 18, 1996. Exclusion of shares held by any person should not be construed to indicate that such person possesses the power, direct or indirect, to direct or cause the direction of the management or policies of the registrant, or that such person is controlled by or under common control with the registrant.

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SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

HUMAN GENOME SCIENCES, INC.

BY: /s/ William A. Haseltine, Ph.D.

William A. Haseltine, Ph.D.
Chairman and Chief Executive Officer

Dated: October 1, 1996

EXHIBIT INDEX

Exhibit No.

10.15++# Research Collaboration Agreement, dated January 19, 1996, between Registrant and Pioneer Hi- Bred International, Inc. ("Pioneer").

10.16++# License Agreement between Registrant and F. Hoffman-La Roche, Ltd. ("Roche").

++ Confidential treatment has been requested. The copy filed as an exhibit omits the information subject to the confidentiality request.

The attached Exhibit supersedes the previously filed Exhibit.

"Portions of this Exhibit have been omitted pursuant to a request for confidential treatment. The omitted portions, marked by [****], have been separately filed with the Commission."

RESEARCH COLLABORATION AGREEMENT

This Agreement, effective January 19, 1996 (" EFFECTIVE DATE"), by and between Pioneer Hi-Bred International, Inc. ("PIONEER"), a corporation having an address at 700 Capital Square, 400 Locust Street, Des Moines, IA 50309 and Human Genome Science, Inc., a Delaware Corporation having offices at 94 1 0 Key West Avenue, Rockville, MD 20850 ("HGS").

WHEREAS, PIONEER, a breeder and producer of proprietary planting seed, in particular MAIZE, desires to have more information about MAIZE nucleic acid sequences; and

WHEREAS, HGS has the capability to conduct research to provide such information and desires to perform such research for PIONEER, and;

WHEREAS, PIONEER and HGS are interested in a research collaboration to determine nucleic acid sequences of MAIZE.

NOW THEREFORE, in consideration of the mutual promises and other good and valuable consideration, the parties agree as follows:

SECTION 1 - DEFINITIONS.

The terms used in this Agreement have the following meaning:

1.1 "AFFILIATE" means any company or other legal entity other than a party, in whatever country organized, controlling or controlled by PIONEER OR HGS. "Control" means having the power to direct or cause the direction of the management and policies, whether through the ownership of voting securities, by contract, or otherwise.

1.2 "EST" means expressed sequence tags that are partial cDNA sequences.

1.3 "FIRST COMMERCIAL SALE" means, in each country, the first sale of any HGS PRODUCT in the HGS FIELD by HGS, its AFFILIATES or SUBLICENSEES, following approval of its sales by the appropriate governmental agency for the

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country in which the sale is to be made, and when governmental approval is not required, the first sale in that country.

1.4 "HGS FIELD" [****].

1.5 "HGS INFORMATION" means any information know-how, informatics and software (including the source code therefor) owned by HGS and/or to which HGS has a transferable interest in each case during the TRANSFER PERIOD and that is necessary for PIONEER to evaluate MAIZE ESTs provided by HGS.This also includes any information, informatics and software that is protected by issued US or foreign patents owned by HGS.Informatics are further defined in attached Schedule A.

1.6. "HGS PATENT RIGHTS" means any US patent application owned by HGS, including any provisional, division, continuation, or continuation-in-part thereof owned by HGS or as to which HGS has a transferable interest, and any foreign patent application or equivalent corresponding thereto owned by HGS or as to which HGS has a transferable interest, and any Letters Patents or the equivalent thereof issuing thereon owned by HGS or as to which HGS has a transferable interest, or reissue, reexamination or extension thereof, insofar as it contains one or more VALID CLAIMS to a nucleic acid sequence or to an expression product thereof or to the use of a nucleic acid or its expression product.

1.7 "HGS PRODUCT(S)" means any article, composition, apparatus, substance, chemical, material, method, process or service that is covered by one or more claims of PIONEER PATENT RIGHTS and/or RESEARCH PATENT RIGHTS and/or which incorporates RESEARCH TECHNOLOGY and/or PIONEER TECHNOLOGY.

1.8 "LICENSED TERRITORY" means all countries of the world.

"The information below marked [****] has been omitted pursuant to a request for

confidential treatment. The omitted portions have been separately filed with the Commission."

1.9 "MAIZE" means corn (Zea mays) and any portion of the corn plant, including cells,

1.10 "MAIZE EST" means an EST obtained from a MAIZE LIBRARY(IES) provided to HGS by PIONEER which meets the specifications of Schedule D.

1.11 "MAIZE LIBRARY(IES)" means a cDNA library produced from MAIZE that has the specifications set forth in attached Schedule B.

1.12 "NET SALES PRICE" means the total amount received by HGS, its AFFILIATES or SUBLICENSEES from sale of HGS PRODUCT in the HGS FIELD, less transportation charges and insurance, sales taxes, use taxes, excise taxes, value added taxes, customs duties or other imposts, normal and customary quantity and cash discounts, rebates granted and disallowed reimbursements and allowances and credit on account of rejection or return of HGS PRODUCT in the HGS FIELD.

HGS PRODUCT shall be considered "sold" when billed out or invoiced.

1.13 "PIONEER FIELD" [****].

1.14 "PIONEER TECHNOLOGY" means any process, use, article of manufacture, composition of matter, information, data and materials, whether patentable or not, which results or is derived from RESEARCH TECHNOLOGY and that is owned by PIONEER or as to which PIONEER has a transferable interest.

1.15 "PIONEER PATENT RIGHT(s)" mean any United States patent application, including any provisional, division, continuation, or continuation-in-part thereof, and any foreign patent application or equivalent corresponding thereto, and any Letters Patent or the equivalent thereof issuing thereon, or reissue, re-examination or extension thereof, insofar as it contains one or more claims to PIONEER TECHNOLOGY.

1.16 "RESEARCH PROJECT" means the program of research agreed to by PIONEER and HGS under this Agreement and conducted according to this Agreement and its Schedules.

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1.17 "RESEARCH TECHNOLOGY" means MAIZE ESTs, a gene that includes a MAIZE EST, a polypeptide expressed thereby and a clone that contains a MAIZE EST that results from research performed by or on behalf of HGS pursuant to the RESEARCH PROJECT and any and all information, data and materials relating to the foregoing that results from research performed by or on behalf of HGS pursuant to the RESEARCH PROJECT.

1.18 "RESEARCH PATENT RIGHT(S)" means any United States patent application, including any provisional, division, continuation, or continuation-in-part thereof and any foreign patent application or equivalent corresponding thereto and any Letters Patent or the equivalent thereof issuing thereon or reissue or extension thereof, insofar as it claims a RESEARCH TECHNOLOGY.

1.19 "SUBLICENSEE" means any non-AFFILIATE third party licensed by HGS to make, have made, import, use or sell any HGS PRODUCT.

1.20 "TRANSFER PERIOD" means for a period beginning on the EFFECTIVE DATE and ending September 1, 2000.

1.21 "VALID CLAIM" means a claim of an issued US or foreign patent that has not lapsed, become abandoned, or been declared invalid or unenforceable by a court of competent jurisdiction or an administrative agency from which no appeal can be or is taken.

SECTION 2 - HGS OBLIGATIONS

2.1 (a) During the TRANSFER PERIOD, HGS will transfer to PIONEER HGS INFORMATION, in particular the informatics system and will assist PIONEER with the installation of HGS INFORMATION into computer hardware provided by PIONEER and located at PIONEER. PIONEER will purchase all computer hardware located at PIONEER that is needed. The timetable for the initial installation is given in Schedule C. Until completion of the RESEARCH PROJECT as set forth in Schedule E. HGS shall install and maintain [****] a direct, secure link between HGS and

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PIONEER for the purpose of transferring and maintaining RESEARCH TECHNOLOGY.

(b) During the TRANSFER PERIOD, HGS will provide PIONEER with all upgrades and improvements to HGS INFORMATION on a timely basis [****].

(c) If, during the TRANSFER PERIOD, HGS develops a version of the MACINTOSH(R) computer-based user client software as defined in Schedule A which operates in the WINDOWS(R) operating environment, it shall provide such user interface to PIONEER [****].

(d) HGS shall provide training and support to PIONEER with respect to the use of HGS INFORMATION, as specified in Schedule C. From time to time during the TRANSFER PERIOD, if required and upon request by PIONEER, HGS shall provide reasonable additional training and support to PIONEER personnel with respect to the use of HGS INFORMATION. The location and frequency of such training will be determined jointly by the PROJECT COMMITTEE.

2.2 HGS shall perform RESEARCH PROJECT according to the workplan specified 'in Schedule E. HGS' performance of RESEARCH PROJECT under Schedule E is subject to Pioneer providing HGS with a sufficient number of MAIZE LIBRARIES and at a time which permits HGS to perform its obligations hereunder.

2.3 For a period beginning on the EFFECTIVE DATE and ending two (2) years from the date on which HGS successfully completes Phase III of the RESEARCH PROJECT as set forth in Schedule E, HGS agrees not to undertake any activity involving MAIZE to the benefit of any third party, including sequencing of MAIZE, sequence analysis of MAIZE or the transfer of HGS INFORMATION for use with MAIZE, except as HGS is licensed hereunder.

2.4 Beginning on the EFFECTIVE DATE and ending on June 30, 1997, PIONEER shall have the right, exercisable by written notice to HGS, to extend RESEARCH PROJECT for one year after the successful completion of Phase III, as set forth in Schedule E, to undertake additional work similar to that outlined in Schedule E. The

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parties shall attempt to reach agreement on the terms and conditions thereof within six (6) months of PIONEER's written notification to HGS.

2.5 In the event that PIONEER provides to HGS plant nucleotide sequences, HGS agrees to[****] sequences provided by PIONEER to the PIONEER MAIZE EST database maintained at HGS [****]. These added sequences will be identified as PIONEER CONFIDENTIAL INFORMATION and are not subject to the license granted to HGS hereunder.

SECTION 3 - PIONEER OBLIGATIONS

3.1 PIONEER shall fund RESEARCH PROJECT as follows:

(a) PIONEER shall pay to HGS [****] within thirty (30) days of the EFFECTIVE DATE for the conduct of Phase I of the RESEARCH PROJECT as set forth in Schedule E.

(b) PIONEER shall pay to HGS [****] once HGS INFORMATION is operating as per Schedule C, designated "GO LIVE". "GO LIVE" is defined as the delivery to PIONEER of useable functional capabilities of HGS INFORMATION as listed in Schedule G. This payment covers all deliverables representing HGS INFORMATION to be provided by HGS according to Schedules A, C & G.

(c) Within thirty (30) days of the completion of Phase I of the RESEARCH PROJECT, as set forth in Schedule E, which includes the conveyance to PIONEER of MAIZE ESTs discovered in the RESEARCH PROJECT that meet the specifications in Schedule D, but in no case prior to [****], PIONEER shall pay to HGS [****] for the conduct of Phase II of RESEARCH PROJECT, as set forth in Schedule E.

(d) Within thirty (30) days of the completion of Phase 11 of the RESEARCH PROJECT, as set forth in Schedule E which includes the conveyance to PIONEER of MAIZE ESTs discovered in the RESEARCH PROJECT that

meet the specifications in Schedule D, but in no case prior to [****], PIONEER shall pay to HGS [****] for the conduct of Phase III of RESEARCH PROJECT, as set forth in Schedule E.

(e) PIONEER shall pay to HGS a payment of [****] for the completion of the RESEARCH PROJECT as set forth in Schedule E. Said payment shall be made within thirty (30) days of said completion but in no case prior to [****].

3.2 The payments in Section 3.1 are non-refundable except as follows:

(a) Solely in the event of a breach of this Agreement by HGS, PIONEER shall be entitled to a refund equal to [****] multiplied by a fraction the numerator of which is the difference between [****] and [****] under Phase I and the denominator of which is [****] and further multiplied by [****].

(b) Solely in the event of a breach of this Agreement by HGS, PIONEER shall be entitled to a refund equal to [****] multiplied by a fraction the numerator of which is the difference between [****] and [****] under Phase II and the denominator of which is [****].

(c) Solely in the event of a breach of this Agreement by HGS, PIONEER shall be entitled to a refund equal to [****] multiplied by a fraction the numerator of which is the difference between [****] and [****] under Phase III and the denominator of which is [****].

3.3 PIONEER agrees to meet all of its obligations under Schedule C and perform and to permit HGS to perform the work required to enable transfer of HGS INFORMATION to PIONEER and to permit installation of such HGS INFORMATION into computer hardware provided by PIONEER and located at PIONEER.

SECTION 4 - CONFIDENTIALITY.

4.1 During the term of this Agreement, it is contemplated that each party will disclose to the other proprietary and confidential technology, inventions, technical information, biological materials and the like which are owned or controlled by the disclosing party or which that party is obligated to maintain in confidence and that is designated by the disclosing party as confidential ("Confidential Information"). Each party agrees to retain the other party's Confidential Information in confidence and not to disclose any such Confidential Information to a third party without the prior written consent of the disclosing party and to use the other party's Confidential Information only for the purposes of this Agreement.

4.2 The obligations of confidentiality will not apply to Confidential Information that:

(a) was known to the receiving party or generally known to the public prior to its disclosure hereunder; or

(b) subsequently becomes known to the public by some means other than a breach of this Agreement;

(c) is subsequently disclosed to the receiving party by a third party having a lawful right to make such disclosure;

(d) is required by law or bona fide legal process to be disclosed, provided that the party required to make the disclosure takes all reasonable steps to restrict and maintain confidentiality of such disclosure and provides reasonable notice to the party providing the Confidential Information; or

(e) is approved for release by the parties, or

(f) is independently developed by the employees or agents of either party without any knowledge of the Confidential Information provided by the other party.

4.3 Notwithstanding the foregoing, information relating to the RESEARCH

LIBRARIES, shall be Confidential Information and shall not be used or disclosed by HGS other than as provided herein.

4.4 HGS shall use MAIZE LIBRARIES only for obtaining MAIZE ESTs for PIONEER under this Agreement and HGS shall not transfer MAIZE LIBRARIES, PIONEER TECHNOLOGY or RESEARCH TECHNOLOGY to a third party or use MAIZE LIBRARIES, PIONEER TECHNOLOGY or RESEARCH TECHNOLOGY for the benefit of a third party. Notwithstanding the foregoing, HGS may use MAIZE LIBRARIES, PIONEER TECHNOLOGY or RESEARCH TECHNOLOGY pursuant to the licenses granted under Section 6.2.

4.5 PIONEER agrees to use HGS INFORMATION only as licensed under Section 6. 1. PIONEER agrees not to disclose or transfer HGS INFORMATION to a third party provided, however, that with the prior approval of HGS, which will not be unreasonably withheld, PIONEER may permit a third party to remotely access a database of PIONEER which operates in accordance with HGS INFORMATION.

SECTION 5 - PATENTS.

5.1 (a) HGS shall promptly assign to PIONEER all of its rights, title and interest in and to RESEARCH TECHNOLOGY as it is developed and RESEARCH PATENT RIGHTS. In addition, HGS shall cooperate with and assist PIONEER in obtaining appropriate patent protection and shall execute all documents required for such purpose.

(b) HGS agrees that all HGS employees who work on the RESEARCH PROJECT will be obligated to assign inventions to HGS.

(c) As part of the assignment of Section 5.1(a), PIONEER will grant to HGS a security interest in and to RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS to secure PIONEER's payment obligations under Section 3. 1. The security interest will include an agreement by PIONEER to reassign RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS to HGS in the event that PIONEER fails to make payments under Section 3.1 when due.

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SECTION 6 - GRANTS AND ROYALTIES.

6.1 (a) HGS grants to PIONEER and AFFILIATES a [****] license in the LICENCED TERRITORY to use HGS INFORMATION to analyze: (i) RESEARCH TECHNOLOGY and PIONEER TECHNOLOGY, and (ii) nucleic acid sequences from plants and plant pests.

Notwithstanding anything to the contrary, it is expressly understood that no license is granted to use the HGS INFORMATION with respect to (i) DNA prepared from human cells and/or (ii) a human gene and/or (iii) a family of human genes or (iv) any portion of the foregoing or (v) any expression product of the foregoing.

(b) HGS grants to PIONEER and AFFILIATES a [****] license under HGS PATENT RIGHTS to make, have made, use, import, sell, or have sold on its behalf, in all fields except non-human animal healthcare and/or diagnostics and/or the HGS FIELD in the LICENSED TERRITORY, product(s) which is a nucleic acid that is or includes a MAIZE EST provided to PIONEER by HGS or an expression product thereof that without such license would infringe a VALID CLAIM of HGS PATENT RIGHTS.

6.2 (a) PIONEER grants to HGS and AFFILIATES a [****] right and license for the LICENSED TERRITORY under PIONEER PATENT RIGHTS, RESEARCH PATENT RIGHTS owned by PIONEER, PIONEER TECHNOLOGY and RESEARCH TECHNOLOGY owned by PIONEER to make, have made, use, import, sell or have sold on its behalf HGS PRODUCTS in the HGS FIELD, including the right to sublicense third parties.

(b) For the rights set forth in Section 6.2(a), HGS shall pay to PIONEER a royalty to be negotiated by the parties in good faith, which royalty shall not exceed [****] of NET SALES of HGS PRODUCTS in the

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HGS FIELD sold by HGS or its AFFILIATES or [****] the royalty received by HGS for sale of HGS PRODUCT in HGS FIELD from its SUBLICENSEES.

(c) To the extent HGS PRODUCT in the HGS FIELD is covered by a VALID CLAIM of PIONEER PATENT RIGHTS and/or RESEARCH PATENT RIGHTS in a country where sold, such royalty shall be payable for the life of such PIONEER PATENT RIGHTS and/or RESEARCH PATENT RIGHTS in such country.

(d) To the extent an HGS PRODUCT in the HGS FIELD is not covered by a VALID CLAIM of PIONEER PATENT RIGHTS and/or RESEARCH PATENT RIGHTS in a country where sold, such royalty shall be payable for five (5) years from FIRST COMMERCIAL SALE in such country.

(e) In the event that an HGS PRODUCT in the HGS FIELD includes a component(s) covered by royalty obligations hereunder ("COVERED COMPONENT(S)") and a component which is diagnostically useable or therapeutically active alone or in a combination that does not require the COVERED COMPONENT("COMBINED, PRODUCT"), then NET SALES shall be the amount that is normally received by HGS or its AFFILIATES from a sale of the COVERED COMPONENT(S) in an arm's length transaction with an unaffiliated third party. If the COVERED COMPONENT(S) is not sold separately, then NET SALES upon which a royalty is paid shall be the NET SALES of the COMBINED PRODUCT multiplied by a fraction, the numerator of which is the cost for producing the COVERED COMPONENT and the denominator of which is the cost for producing the COMBINED PRODUCT.

(f) In the event that royalties are to be paid by HGS to a party who is not an AFFILIATE of HGS for an HGS PRODUCT in the HGS FIELD for which royalties are also due to PIONEER pursuant to Paragraph 6.2 (such royalties to such party are hereinafter

"Other Royalties"), then the royalties to be paid to PIONEER by HGS pursuant to Paragraph 6.2 shall be reduced by one-half of the amount of such Other Royalties. but in no event shall any royalties

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payable under Paragraph 6.2 be reduced by more than [****].

(g) Only one royalty shall be due and payable for the manufacture, use and sale of an HGS PRODUCT in the HGS FIELD irrespective of the number of patents or claims thereof licensed hereunder which cover the manufacture, use and sale of such HGS PRODUCT in the HGS FIELD.

6.3 The term of the licenses described in Sections 6.1 and 6.2 shall be for the pendency of any issued patents and forever under any know-how rights.

6.4 HGS shall keep, and shall cause each of its AFFILIATES and SUBLICENSEES to keep, full and accurate accounts containing all particulars that may be necessary for the purpose of calculating all royalties payable to PIONEER. Such accounts shall be kept at their principal place of business and, with all necessary supporting data shall, for the three (3) years next following the end of the calendar year to which each shall pertain, be open for inspection by an independent certified accountant reasonably acceptable to HGS upon reasonable notice during normal business hours, at PIONEER's expense, for the sole purpose of verifying royalty statements or compliance with this Agreement, but in no event more than once in each calendar year. All information and data offered shall be used only for the purpose of verifying royalties and shall be treated as HGS Confidential Information subject to the obligations of this Agreement. In the event that such inspection shall indicate that in any calendar year that the royalties which should have been paid by HGS are at least [****] greater than those which were actually paid by HGS, then HGS shall pay the cost of such inspection.

6.5 With each semi-annual payment, HGS shall deliver to PIONEER a full and accurate accounting to include at least the following information:

(a) Quantity of each HGS PRODUCT in the HGS FIELD subject to royalty sold (by country) by HGS, and its AFFILIATES;

(b) Total receipts for each HGS PRODUCT sold in HGS FIELD subject to royalty (by country);

(c) Total royalties payable to PIONEER; and

(d) Royalties received from SUBLICENSEES for HGS PRODUCT sold in HGS FIELD.

6.6 In each year the amount of royalty due shall be calculated semi-annually as of June 30 and December 31 (each as being the last day of an "ACCOUNTING PERIOD") and shall be paid semi-annually within the following sixty days, every such payment shall be supported by the accounting prescribed in Paragraph 6.4 and shall be made in United States dollars. For the purpose of calculating royalties conversion from any foreign currency, such conversion shall be at the Exchange Rate published in the Wall Street Journal, under "Currency Trading", for the last business day of the applicable ACCOUNTING PERIOD.

6.7 If the transfer of or the conversion into United States Dollar Equivalent of any remittance due hereunder is not lawful or possible in any country, such remittance shall be made by the deposit thereof in the currency of the country to the credit and account of PIONEER or its nominee in any commercial bank or trust company located in that country, prompt notice of which shall be given to PIONEER. PIONEER shall be advised in writing in advance by HGS and provide to HGS a nominee, if so desired.

6.8 Any tax required to be withheld by HGS under the laws of any foreign country for the account of PIONEER, shall be promptly paid by HGS for and on behalf of PIONEER to the appropriate governmental authority, and HGS shall furnish PIONEER with proof of payment of such tax. Any such tax actually paid on PIONEER's behalf shall be deducted from royalty payments due PIONEER.

SECTION 7 - WARRANTIES.

7.1 Each of HGS and PIONEER warrants and represents to the other that it has the full right and authority to enter into this Agreement, and that it is not aware of any impediment which would inhibit its ability to perform the terms and conditions imposed on it by this Agreement.

SECTION 8 -INDEMNIFICATION.

8.1 (a) PIONEER agrees to indemnify and hold harmless HGS, its shareholders, officers, directors, employees, and agents, against any and all actions, claims (specifically including, but not limited to, any damages based on product liability claims), suits, losses, demands, judgments, and other liabilities (including attorney's fees until PIONEER assumes the defense as described below) asserted by third parties, government and non-government, resulting from or arising out of (i) any use of RESEARCH TECHNOLOGY and/or PIONEER TECHNOLOGY by or on behalf of PIONEER or by any person or entity (other than HGS) who derives rights thereto from PIONEER, and (ii) any manufacture, use or sale of any product or process which is based on and/or incorporates RESEARCH TECHNOLOGY and/or PIONEER TECHNOLOGY, which product or process is manufactured, sold or used by or on behalf of PIONEER or any person or entity (other than HGS) who obtains or claims rights thereto from PIONEER.

If any such claims or actions are made, HGS shall be defended at PIONEER's sole expense by counsel selected by PIONEER and reasonably acceptable to HGS provided that HGS may, at its own expense, also be represented by counsel of its own choosing. PIONEER will not settle or compromise any claims without the consent of HGS, which consent will not unreasonably be withheld. PIONEER's indemnification hereunder shall not apply to any liability, damage, loss or expense of an indemnitee to the extent that it is directly attributable to the negligent activities or intentional misconduct of such indemnitee.

(b) HGS agrees to indemnify and hold harmless PIONEER, its shareholders, officers, directors, employees and agents,

against any and all actions, claims, suits, demands, judgments and other liabilities (including attorney's fees until HGS assumes the defense as described below) asserted by third parties, government and non-government or arising out of the manufacture, use or sale by HGS of HGS PRODUCTS in the HGS FIELD.

If any such claims or actions are made, PIONEER shall be defended at HGS' sole expense by counsel selected by HGS and reasonably acceptable to PIONEER, provided that PIONEER may, at its own expense, also be represented by counsel of its own choosing. HGS will not settle or compromise any claims without the consent of PIONEER, which consent will not unreasonably be withheld. HGS indemnification hereunder shall not apply to any liability, damage, loss or expense of an indemnitee to the extent it is directly attributable to the negligent activities or intentional misconduct of such indemnitee.

(c) Each party hereto shall notify the other party promptly of any claim or threatened claim under this Section 8 and shall fully cooperate with all reasonable requests with respect thereto.

SECTION 9 - ASSIGNMENT; SUCCESSORS.

9.1 This Agreement shall not be assignable by either of the parties without the prior written consent of the other party (which consent shall not be unreasonably withheld), except that either party may assign this Agreement to an AFFILIATE or to a successor in interest or transferee of all or substantially all of the portion of the business to which this Agreement relates.

9.2 Subject to the limitations on assignment herein, this Agreement shall be binding upon and inure to the benefit of said successors in interest and assigns of HGS and PIONEER. Any such successor or assignee of a party's interest shall expressly assume in writing the performance of all the terms and conditions of this Agreement to be performed by said party and such Assignment shall not relieve the Assignor of any of its obligations under this Agreement.

SECTION 10 - TERM AND TERMINATION.

10.1 Termination or Cancellation of Licenses

(a) Upon material breach of any material provisions of this Agreement by either party to this Agreement, in the event the breach is not cured within sixty (60) days after written notice to the breaching party by the other party, in addition to any other remedy it may have, the other party at its sole option may terminate this Agreement, provided that such other party is not then in breach of this Agreement.

(b) Termination of this Agreement for breach of any of its provisions shall be without prejudice to any other rights or remedies the non-breaching party may have hereunder, whether or not such rights or remedies arise from such breach.

(c) Either party may terminate this Agreement upon notice to the other party in the event of the filing by the other party of a petition in bankruptcy or for liquidation; the request for or appointment of a receiver; execution upon any portion of the other party's business or assets; the other party's arrangement with or assignment for the benefit of creditors; or the other party's becoming unable to meet its obligations as they become due.

10.2 (a) In the event that this Agreement is terminated by HGS pursuant to Section 10.1, then any portion of the sixteen million dollars which has not been paid to HGS under Section 3.1, including the payment specified in Section 3.1 (e), shall be immediately due and payable to HGS by PIONEER and upon full payment PIONEER shall have a fully paid-up non-terminable license under Section 6.1, PIONEER shall retain ownership of RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS assigned to PIONEER under Section 5.1, the security interest assigned therein to HGS shall be released, and the rights and obligations of Sections 6.2 through 6.8 shall remain in full force and effect.

(b) In the event that PIONEER fails to make any payment under Section 3.1 when due, HGS shall have the right to provide PIONEER written notice of such failure, and if such payment is not made within thirty (30) days after such written notice, then all amounts to be paid by PIONEER under Section 3.1, including the payment specified in Section 3.1(e), shall become immediately due and payable to HGS by PIONEER and upon full payment

PIONEER shall have a fully paid-up non-terminable license under Section 6.1, PIONEER shall retain ownership of RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS assigned to PIONEER under Section 5. 1, the security interest assigned therein to HGS shall be released, and the rights and obligations of Sections 6.2 through 6.8 shall remain in full force and effect.

10.3 In the event that this Agreement is terminated by PIONEER pursuant to Section 10.1, then:

(a) If terminated prior to payment of eight million dollars under Section 3. 1 (a) and (b), all licenses granted to PIONEER shall be terminated, HGS shall own RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS and PIONEER shall not use RESEARCH TECHNOLOGY or HGS INFORMATION.

(b) If terminated subsequent to payment of eight million dollars under Section 3.1(a) and (b), then PIONEER shall retain ownership of RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS assigned to PIONEER under Section 5. 1, the security interest assigned therein to HGS shall be released, and PIONEER shall retain its licenses under Section 6. 1.

10.4 Upon termination of this Agreement by PIONEER under Section 10. 1, the licenses granted to HGS under Section 6.2 shall terminate.

10.5 In the event that HGS' license hereunder is terminated, HGS agrees not to use PIONEER TECHNOLOGY or RESEARCH TECHNOLOGY and HGS shall either destroy or return MAIZE LIBRARIES, RESEARCH TECHNOLOGY and PIONEER TECHNOLOGY to PIONEER.

10.6 Upon termination of this Agreement by either party, neither party shall be required to perform the RESEARCH PROJECT or any obligation under Section 2, but HGS shall deliver to PIONEER all MAIZE ESTs and RESEARCH TECHNOLOGY in its possession and not yet conveyed to PIONEER.

10.7 The obligations of Sections 4, 7, 8 and 10 and of Paragraph 1 1.3 of this Agreement shall survive any termination of this Agreement, the licenses of Section 6 shall survive termination to the extent such licenses are non-terminable under Sections 10.2 and 10.3, and the provisions of Paragraph 5. 1 (a) shall survive to the extent that PIONEER retains ownership in RESEARCH TECHNOLOGY and RESEARCH PATENT RIGHTS.

10.8 Upon termination of this Agreement for any reason, nothing herein shall be construed to release either party from any obligation that matured prior to the date of such termination.

SECTION 11 - GENERAL PROVISIONS.

11.1 The relationship between HGS and PIONEER is that of independent contractors. HGS and PIONEER are not joint venturers, partners, principal and agent, master and servant, employer or employee, and have no relationship other than as independent contracting parties. HGS shall have no power to bind or obligate PIONEER in any manner. Likewise, PIONEER shall have no power to bind or obligate HGS in any manner.

11.2 This Agreement and its attached Schedules A - G sets forth the entire agreement and understanding between the parties as to the subject matter thereof and supersedes all prior agreements in this respect. There shall be no amendments or modifications to this Agreement, except by a written document which is signed by both parties.

11.3 This Agreement shall be construed and enforced in accordance with the laws of the State of Maryland without reference to its choice of law principles.

11.4 The headings in this Agreement have been inserted for the convenience of reference only and are not intended to limit or expand on the

meaning of the language contained in the particular article or section.

11.5 Any delay in enforcing a party's rights under this Agreement or any waiver as to a particular default or other matter shall not constitute a waiver of a party's right to the future enforcement of its rights under this Agreement, excepting only as to an

expressed written and signed waiver as to a particular matter for a particular period of time.

11.6 No public announcement concerning the existence of or terms of this Agreement shall be made, either directly or indirectly, by any party to this Agreement without prior written notice to the other party and, except as may be legally required, or as may be required for a public offering of securities, or as may be required for recording purposes, without first obtaining the approval of the other party and agreement upon the nature and text of such announcement, which approval and agreement shall not be unreasonably withheld or delayed. The party desiring to make any such public announcement shall inform the other party of the proposed announcement or disclosure in reasonably sufficient time prior to public release, and shall provide the other party with a written copy thereof, in order to allow such other party to comment upon such announcement or disclosure.

11.7 Notices. Any notices given pursuant to this Agreement shall be in writing and shall be deemed to have been given and delivered upon the earlier of (i) when received at the address set forth below, or (ii) three (3) business days after mailed by certified or registered mail postage prepaid and properly addressed, with return receipt requested, or (iii) on the day when sent by facsimile as confirmed by certified or registered mail. Notices shall be delivered to the respective parties as indicated:

To HGS: Human Genome Sciences, Inc.
941 0 Key West Avenue
Rockville, NO 20850
ATTN: CEO

Copy to: Carella, Byrne, Bain, Gilfillan,
Cecchi, Stewart & Olstein

6 Becker Farm Road
Roseland, N.J. 07068
Fax no.(201)994-1744
ATTN: Elliot M. Olstein, Esq.

HGS/PHI
Research Collaboration Agreement
1/12/96

To PIONEER:	PIONEER HI-BRED INTERNATIONAL, INC. 700 Capital Square 400 Locust Street Des Moines, Iowa 50309-2340 ATTN: Legal Department
Copy to:	PIONEER HI-BRED INTERNATIONAL, INC. Research Technology Services P.O. Box 1004 Johnston, IA 50131-1004 Fax no. (515) 253-2478 ATTN: John Duesing

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date set forth above.

For HUMAN GENOME SCIENCES, INC.	For PIONEER HI-BRED INTERNATIONAL, INC.
By: /s/William A. Haseltine	By: /s/Anthony J. Cavalieri
William A. Haseltine	Anthony J. Cavalieri
(Printed Name)	(Printed Name)
Chairman and Chief Executive Officer	Vice-President-Research
(Title)	(Title)
1-19-96	1-15-96

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(Date) (Date)

SCHEDULE A

Specifications for Informatics System ("HGS INFORMATION")
to be installed at Pioneer:

I. Database and analysis server supplied by PIONEER:

1. Multi-processor Unix Host (DEC Alpha server or equivalent)

2. Unix system software

   2.1. Sybase SQL Server
   2.2. Sybase Open Client Libraries
   2.3. Sybase Replication Server
   2.4. C compiler
   2.5. TCP/IP networking services
   2.6. Electronic mail facilities
   2.7. Backup/recovery equipment and software

II. Macintosh client machines supplied by PIONEER:

1. Quadra or PowerMac models
2. Minimum 8MB of RAM; 16MB recommended
3. Minimum 14-inch color monitor; 17-inch recommended for active users
4. MB of available disk space
5. TCP/IP network connection

III. Network connectivity supplied by HGS:

1. Installation and maintenance of dedicated circuit (at least 56Kbps)
2. Encryption equipment
3. CSU/DSU line terminating equipment
4. Network router interface

IV. Macintosh client software supplied by HGS:

1. IRIS bioinformatics application
2. HGS BLAST Client
3. HGS HyperEntrez
4. Unix command client
5. PSEM (Protein structure evaluation module)

V. Server software supplied by HGS:

1. Components derived from the public domain are indicated; HGS will install and configure the public domain software, but cannot provide a warrany for its performance.
2. Database schema, stored procedures, triggers:
   a) Unix command client
   b) Data management utilities
   c) BLAST sequence searching software (public domain)
   d) FASTA sequence searching software (public domain)
   e) BLOCKS motif searching software (public domain)

VI. Services provided by HGS:

1. Setup of PIONEER database schema
2. Testing of network and system components on PIONEER equipment
3. Development of on-going data transfer mechanism
4. Training for end users of the Iris application
5. Training for technical people in system administration and troubleshooting
6. Assistance developing customer analyses and reports
7. Telephone and e-mail support for the database and related applications
8. Customization of sequence classification method to adapt it to plant DNA

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

SCHEDULE B

Maize Library Specifications

Libraries must be constructed in vectors which contain either the[****]

binding sites. The vectors must be capable of being propagated as a [****]. Appropriate vectors include: [****]. Libraries must be [****]. cDNA generated by [****] will not sequence efficiently. Therefore, all [****] will need to be evaluated on a case-by-case basis before sequencing will commence. If these libraries are important and Pioneer elects to have them sequenced, the specifications for the number of good sequences, as stated in the body of this agreement, will have to be adjusted accordingly [****] .

Libraries should be generated in [****] and [****] should be used for sequencing.

Other information about each library will need to be provided by PIONEER. This includes:

* tissue source
* method of construction
* vector type
* restriction sites used in cloning
* library complexity
* sample titer
* percent of clones containing insert
* average insert size
* bacterial strain

All libraries transferred for sequencing will be evaluated initially by HGS for quality control purposes. [****] sequence reactions will initially be performed for each library and successful reactions will be analyzed for content.

In the event HGS determines that any MAIZE library submitted by PIONEER to HGS hereunder does not meet the specifications required for HGS to meet its obligations under this agreement, HGS shall immediately notify PIONEER. In the event PIONEER and HGS do not agree upon whether any given library meets the required specifications, this matter shall be resolved by the Project Committee.

SCHEDULE C

Timeline for Delivery of HGS INFORMATION

Month		Task	Who	Where
[****]	o	Order Power Macs	Pioneer	Pioneer
	o	Order System Hardware	Pioneer	Pioneer
	o	M. Fannon to Pioneer to meet with Pioneer IM Group	HGS	Pioneer
	o	Prepare/Send existing sequences to use as test set	Pioneer	HGS-Pioneer
[****]	o	Set up Wide area link	HGS	HGS-Pioneer
	o	Set up Mack Network	Pioneer	Pioneer
	o	Configure System machine/Sybase	Pioneer	Pioneer
	o	Obtain a copy of IRIS	Pioneer	HGS-Pioneer
	o	Demo the software to Pioneer user community (and IM)	HGS	Pioneer
	o	Train 2-3 users (2 days)	Pioneer	HGS
[****]	o	3-5 MACS connected to HGS	Pioneer	Pioneer
	o	Set up Blast Server	HGS	Pioneer
	o	Test System	Pioneer/HGS	Pioneer/HGS
	o	Connect entire Mac Network	Pioneer	Pioneer
[****]	o	GO LIVE*	Pioneer	Pioneer/HGS
	o	Replacement update of DB	HGS	HGS-Pioneer
[****]	o	Fine tune database replication method	HGS/Pioneer	HGS-Pioneer
[****]	o	Have replication update in place	HGS	HGS-Pioneer

* "GO LIVE" is defined as the delivery to PIONEER of useable functional capabilities of HGS INFORMATION as listed in schedule G.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

SCHEDULE D

Specifications for MAIZE ESTs

1.

In order to complete successfully the workplan for the RESEARCH PROJECT as specified in Schedule E, the MAIZE ESTs shall have the following characteristics

(a) be a minimum of [****] in length,

(b) contain [****] percent or less ambiguities, and

(c) [****] of the total number of MAIZE ESTs generated will be at least [****] nucleotides in length.

2. HGS will classify the ESTs as follows.

Class 1: Identical to a known maize gene.

The MAIZE EST sequence overlaps with a nucleotide sequence from the maize subset of Genbank.

[****] is used as the search method.

Class 2: Significant match to a maize protein.

The MAIZE EST sequence has a significant match with a maize protein sequence from the non-redundant protein database.

[****] is used as the search method.

Class 3: Significant match to any non-maize protein in the non-redundant database.

The MAIZE EST sequence has a significant match with a non-maize protein sequence in the non-redundant database.

[****] is used as the search method.

Class 4: Mitochondria, chloroplast and vector.

The MAIZE EST sequence is determined to be mitochondria, chloroplast or vector.

[****] search of mitochondrial and vector sequences.

Class 5: Unknown.

The MAIZE EST sequence has no significant match in the databases of published nucleotide sequences or corresponding protein sequences.

OVERLAP is determined by a segment of at least [****] with at least [****] identical matches. Ambiguities are counted as matches. The [****] search method is used for overlap determination.

A SIGNIFICANT MATCH is determined by a [****] probability value of [****] or less.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

SCHEDULE E

Work plan for RESEARCH PROJECT

1. Beginning upon the receipt of the MAIZE LIBRARIES from PIONEER, HGS shall conduct RESEARCH PROJECT as follows:

Phase I Research using MAIZE LIBRARIES provided by PIONEER for purposes of generating [****] MAIZE ESTs by [****];

Phase II Research using MAIZE LIBRARIES provided by PIONEER for purposes of generating an additional [****] MAIZE ESTs, cumulatively [****], by [****];

Phase III Research using MAIZE LIBRARIES provided by PIONEER for purposes of generating an additional [****] MAIZE ESTs, cumulatively [****], by [****], which shall be considered completion of the RESEARCH PROJECT.

2. During the course of RESEARCH PROJECT, PIONEER shall provide HGS with, and approve for sequencing, [****] for HGS to carry out RESEARCH PROJECT. MAIZE LIBRARIES will be provided sufficiently in advance so that HGS is able to prepare them and to schedule them for RESEARCH

PROJECT to meet HGS' obligations under this Schedule E.

3. HGS will perform [****] initial sequencing reactions from each MAIZE LIBRARY for quality control within [****] of their submission by PIONEER. The sequencing reactions will be provided to PIONEER for review. In consultation with HGS scientists, PIONEER will then decide as to which MAIZE LIBRARIES to proceed sequencing and the number of MAIZE ESTs to be provided from each MAIZE LIBRARY before the next review. HGS shall begin in-depth sequencing in these certain MAIZE LIBRARIES within [****] of providing PIONEER the initial [****]sequencing reactions, provided PIONEER has authorized such sequencing reactions.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

4. At certain times during the RESEARCH PROJECT, PIONEER

[****]

5. During the course of RESEARCH PROJECT, HGS scientists shall, to the best of their ability, instruct and provide training to PIONEER scientists in preparing cDNA libraries to enable PIONEER to prepare MAIZE LIBRARIES that meet the technical specifications in Schedule B. PIONEER will send up to [****] to HGS between the EFFECTIVE DATE and [****], to prepare cDNA libraries in conjunction with HGS scientists and to be trained by HGS in their methods of cDNA library preparation. During the course of RESEARCH PROJECT, HGS scientists shall be available to consult with PIONEER scientists on strategies to use MAIZE ESTs and the HGS INFORMATION to determine/investigate gene function and utility, via telephone, E-mail, fax or personal visits to HGS facilities, including seminars.

6. Upon initiation of the RESEARCH PROJECT and no later than [****], PIONEER will provide to HGS up to [****] MAIZE LIBRARIES.

7. Paragraphs 3-6 of this workplan are prepared to reflect the intention of the parties in the conduct of the RESEARCH PROJECT. The parties understand that changes in certain aspects of said paragraphs may need to be changed based on experience gained during the RESEARCH PROJECT. The PROJECT COMMITTEE shall have authority to modify the protocol as required.

SCHEDULE F

Specifications for the PROJECT COMMITTEE

1. Each of PIONEER and HGS shall designate two (2) full time employees to be members of the PROJECT COMMITTEE (hereinafter "MEMBERS").

2. The PROJECT COMMITTEE shall meet at least once every 6 (six) months during the term of this agreement. The PROJECT COMMITTEE may elect to meet more frequently as required. Meetings will be held at PIONEER and HGS -in alternate succession.

3. MEMBERS shall be develop and finalize an agenda for each PROJECT COMMITTEE meeting not later than two (2) weeks prior to each meeting.

4. MEMBERS shall be responsible for keeping minutes of each meeting which shall be circulated for comment and review by PIONEER and HGS within two (2) weeks of each meeting. A final draft of each meetings minutes will then be created, agreed upon by both parties and kept on record.

5. Each of PIONEER and HGS may propose additional personnel or consultants as invited guests to each PROJECT COMMITTEE meeting and the parties shall mutually inform and agree on the participation of said guests prior to said meeting.

6. MEMBERS of the PROJECT COMMITTEE may change over time as the nature of the relationship evolves.

7. The MEMBERS of the PROJECT COMMITTEE shall be responsible for the ongoing operational management and communication between HGS and PIONEER pertaining to the RESEARCH PROJECT.

8. The PROJECT COMMITTEE may form subcommittees as required to address and resolve issues pertaining to the RESEARCH PROJECT.

SCHEDULE G

Definition of requirement to achieve GO LIVE status of HGS INFORMATION

(To be completed by [****]).

This list identifies the software and services to be provided to PIONEER by HGS that will enable users of the HGS INFORMATION at PIONEER to evaluate MAIZE ESTs.

The GO LIVE informatics milestone shall be considered met upon delivery of such software and services to PIONEER and the Iris software running successfully at PIONEER facilities.

Services to be available to PIONEER users from Macintosh workstations at GO LIVE milestone:

1. Sign on with user identification and password authentication
2. Retrieve sequences by identification code, gene name and library
3. Export sequences in popular formats for sequence analysis programs
4. Retrieve library information and sequencing statistics
5. Retrieve sequence assemblies; display assembly alignments
6. Customize tabular displays
7. Customize user dashboard
8. Prepare and save custom queries
9. Perform interactive BLAST searches
10. Perform Genbank and Medline lookups using the HGS Entrez client
11. Perform interactive sequence assemblies
12. Perform simple modeling of putative proteins
13. Identify library distribution of related sequences
14. Perform library expression analyses

In addition to the establishment of the above-listed features and operational capabilities of the HGS INFORMATION, HGS will complete an initial user training session for PIONEER users and will provide the following additional services to fulfill the requirements of the GO LIVE milestone:

Services provided to PIONEER Information Management staff:

1. Install dedicated, encrypted data circuit

2. Configure and test the database

3. Develop data transfer mechanism

4. Customize sequence classification methods for analysis of Maize ESTs

5. Train technical staff on system administration functions:
    a. Configuring Macintosh workstations
    b. Setting up new users, modifying user parameters
    c. Configuring local BLAST databases
    d. Understanding the database schema
    e. Understanding how data is processed and interpreted
    f. Troubleshooting problems
    g. Monitoring the HGS/PIONEER data connection
    h. Developing custom queries and reports

"Portions of this Exhibit have been omitted pursuant to a request for confidential treatment. The omitted portions, marked by [****], have been separately filed with the Commission."

LICENSE AGREEMENT

between

F.HOFFMANN-LA ROCHE LTD, Grenzacherstrasse 124, CH-4070 Basel, Switzerland, and

HOFFMANN-LA ROCHE INC., 340 Kingsland Street, Nutley, New Jersey 07110-1199, U.S.A.
(hereinafter both jointly called "ROCHE")

and

HUMAN GENOME SCIENCES, INC., 9410 Key West Avenue, Rockville, Maryland 20850, USA (hereinafter called "HGS")

****

WITNESSETH

WHEREAS, HGS professes to ROCHE to have substantial knowledge and expertise in and owns or has rights to certain technology relating to genes and gene sequencing, and

WHEREAS, ROCHE desires to utilize HGS Know-How (as hereinafter defined) to research and develop Target Products and Products (other than Vaccines and Immunotherapeutic Products against infectious agents).

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants herein contained, the parties hereby agree as follows:

1. DEFINITIONS

For purposes of this Agreement, the terms defined in this Article 1 shall have the respective meanings set forth below:

1.1 "Affiliate" shall mean, with respect to either party hereto, any corporation, partnership or other business entity controlled by, controlling or under common control with either such party, with "control" meaning direct or indirect beneficial ownership of at least fifty percent (50 %) of the voting interest of such corporation or other business entity. The term Affiliate of ROCHE shall not include Genentech Inc, 460 Point San Bruno Bid, South San Francisco, California, U.S.A unless ROCHE opts for such inclusion by giving a written notice to HGS.

1.2 "Assembled Genome" shall mean the final results of the genome assembly of a Streptococcus pneumoniae strain whose accuracy, quality, strategy and time lines are set forth in Appendix 1, attached hereto and made a part hereof.

1.3 "FDA" shall mean the United States Food and Drug Administration or the equivalent regulatory agency in a Major Market Country.

1.4 "Field" shall mean the prevention, diagnosis or treatment of infectious diseases in humans excluding Vaccines and Immunotherapeutics.

1.5 The term "First Commercial Sale" shall mean in each country the first sale of any Product as part of a nationwide launch of Product by ROCHE, its Affiliates or sublicensees following approval of its marketing (including pricing) by the appropriate governmental agency for the country in which the sale is to be made and when governmental approval is not required, the first such sale in that country.

1.6 "HGS" shall mean and include Human Genome Sciences, Inc. and its Affiliates.

1.7 "HGS Know-How" shall mean all information and data with respect to the Assembled Genome which is owned by HGS or as to which HGS has a transferable interest and which is in the possession of HGS prior to providing the Assembled Genome to ROCHE as set forth herein.

1.8 "HGS Patents" shall mean any and all patents and patent applications anywhere in the world which are or will be owned by HGS or as to which HGS has a transferable interest which is based on an invention conceived or reduced to practice prior to delivery of the Assembled Genome to ROCHE as set forth herein and which invention is directed to a polynucleotide contained in the Assembled Genome or to an expression product thereof or to an antibiotic produced by S. pneumoniae.

1.9 "Immunotherapeutics" shall mean products incorporating antibodies

and/or fragments thereof and/or derivatives thereof derived from Technology, which have a protective or therapeutic effect against infectious agents.

1.10 "Licensee" means any person or entity granted a right or license by ROCHE to manufacture and/or use and/or sell a Product and/or Target Product.

1.11 "Major Market Country" shall mean any one of the following countries: the United States of America, France, Italy, Germany, United Kingdom or Japan.

1.12 "NDA" shall mean a New Drug Application or Product License Application by which approval is sought to sell a Product in the United States of America pursuant to the regulations of the FDA or an equivalent application in a Major Market Country.

1.13 "Net Sales" shall mean the gross sales of the Product to third parties less deductions of returns (including withdrawals and recalls), rebates (price reductions, including Medicaid and similar types of rebates e.g. chargebacks), volume (quantity) discounts, discounts granted at the time of invoicing, sales taxes and other taxes directly linked to and included in the gross sales amount as computed in the central ROCHE's Swiss Francs Sales Statistics for the countries concerned, whereby the amount of such sales in foreign currencies is converted into Swiss Francs at the average monthly rate of exchange at the time.

From the so adjusted gross sales there shall be a lump sum deduction of [****] for those sales related deductions which are not accounted for on a product-by-product basis (e.g. outward freights, transportation insurance, packaging materials for dispatch of goods, custom duties, discounts granted later than at the time of invoicing, cash discounts and other direct sales expenses).

1.14 "Product(s)" shall mean a pharmaceutical preparation or composition containing the Substance as its active ingredient(s).

1.15 "Research" shall mean the activities conducted directly or indirectly by ROCHE to discover and develop Products and Target Products in the Field.

1.16 "S. Aureus Data" shall mean the DNA sequencing data set forth in

Appendix II, attached hereto and made a part hereof.

1.17 "Substance" shall mean a polypeptide expressed by a polynucleotide from an Assembled Genome or an antibiotic produced by S. pneumoniae which is identified by or on behalf of ROCHE prior to the Assembled Genome being generally available to the public and which was not known to the general public prior to such identification by or on behalf of ROCHE.

1.18 "Target" shall mean a polynucleotide (or expression product thereof) present in the Assembled Genome, which polynucleotide (or expression product thereof) is selected as a target for screening by ROCHE.

1.19 "Target Product" shall mean any product, material, substance or composition which results directly or indirectly from screening against a Target. For the avoidance of doubt a product, substance or material or composition which is based on or derived from a product, material, substance or composition which is identified by screening against a Target is a Target Product, however, a product, substance or material or composition which is based on or derived from a product, material, substance or composition for which the screening test has been started only after the Target or its genomic sequence has become known to the public or to ROCHE independently from the collaboration hereunder, shall not be considered as a Target Product.

1.20 "Technology" means the Assembled Genome or any portion thereof and/or HGS Know-How and/or S. Aureus Data.

1.21 "Vaccine" shall mean products incorporating genes and/or gene products and/or fragments thereof and/or derivatives thereof derived from Technology, utilized for active immunization against infectious agents.

1.22 "Valid Claim" shall mean any claim in an unexpired patent included within the HGS Patents which claim has not been disclaimed of held invalid by a decision beyond the right of review.

1.23 The use herein of the plural shall include the singular and the use of the masculine shall include the feminine.

2. OBLIGATION OF HGS

2.1 ROCHE hereby acknowledges that HGS has provided ROCHE with S. Aureus Data.

2.2 HGS agrees to use its reasonable efforts to provide to ROCHE the Assembled Genome in accordance with Appendix I and until March 31, 1997

at the latest.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

2.3 HGS agrees to provide HGS Know-How to ROCHE as it becomes available to HGS.

3. LICENSES

3.1 For the term of this Agreement, HGS hereby grants to ROCHE a worldwide non-exclusive, royalty bearing license in the Field, under HGS Patent Rights and HGS Know-How, without the right to grant sublicenses for the purpose of performing preclinical research under this Agreement and with the right to grant such sublicenses to develop, make, have made, use and sell Products and Target Products in the Field, in each case in accordance with the terms and conditions of this Agreement.

3.2 HGS grants to ROCHE and its Affiliates the non-exclusive right to use the S. Aureus Data for Research in the Field.

3.3 HGS agrees that for a period of [****] from the date that the Assembled Genome is provided to ROCHE, HGS will not grant access to the Assembled Genome to any third party for use by such third party in the Field.

4. CONFIDENTIALITY AND PUBLICATION

4.1 ROCHE agrees to retain Technology in confidence and not to disclose any such Technology to a third party without the prior written consent of HGS and to use Technology only for the purposes of this Agreement. ROCHE's obligation hereunder shall terminate five (5) years after the expiration or termination of this Agreement.

4.2 The obligations of confidentiality will not apply to Technology which:

(i) was known to ROCHE or generally known to the public prior to its disclosure hereunder; or

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

(ii) subsequently becomes known to the public by some means other

than a breach of this Agreement;

(iii) is subsequently disclosed to ROCHE by a third party having a lawful right to make such disclosure;

(iv) is required by law or bona fide legal process to be disclosed, provided that ROCHE takes all reasonable steps to restrict and maintain confidentiality of such disclosure and provides reasonable notice to HGS; or

(v) is approved for release by mutual written agreement of the parties.

4.3 HGS shall not publish or allow publication of or otherwise publicly disclose Technology for[****] following the delivery of the Assembled Genome to ROCHE.

4.4 Subject to Art. 4.3 and except as required by law (including applicable federal or state securities laws), neither ROCHE nor HGS shall disclose the terms and conditions of this Agreement to any third party or issue press releases relating to this Agreement for any purpose whatsoever without the other party's prior written consent, which consent shall not be unreasonably withheld.

4.5 The term "ROCHE" as used in Articles 4.1, 4.2 and 4.4 above shall mean and include F.Hoffmann-La Roche Ltd and its Affiliates and consultants who have agreed to be bound by the confidentiality and non-use obligations of this Article 4.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

5. ROYALTIES

5.1 ROCHE shall pay HGS a royalty of two and one half percent (2 1/2%) of the Net Sales of Products sold or distributed by ROCHE, or a Licensee in a country where such Product would infringe a Valid Claim. The Initial Royalty Payment shall be due in accordance with Art.7.1.

In the case of Product being sold as a combination of Substance and one or more other therapeutically active principle(s), the parties shall negotiate in good faith and agree on such adjusted royalty rate reflecting the significance of the Substance in relation to the other active principle(s).

5.2 Royalties shall be payable on a country by country, Product by Product

basis, for ten (10) years from First Commercial Sale of a Product in a country where such Product would infringe a Valid Claim or until the expiration of the last to expire HGS Patent containing such Valid Claim in such country whichever is later.

5.3 [****]

6. RESEARCH PAYMENTS

6.1 ROCHE has paid to HGS, a non-refundable and non-creditable research payment of [****] and HGS hereby acknowledges the receipt thereof.

6.2 Within thirty (30) days after delivery of the Assembled Genome by HGS to ROCHE, ROCHE shall pay to HGS an additional research payment of [****] provided that in the event the Assembled Genome data has on or before that date [****], the payment set forth herein shall not be payable.

7. INITIAL ROYALTY PAYMENTS

7.1 For each Product, ROCHE shall pay HGS an initial royalty payment of [****] within thirty (30) days after [****].

7.2 For each Target Product, ROCHE shall pay to HGS an initial royalty payment of [****] within thirty (30) days after [****].

8. AUDIT, ACCOUNTING AND PAYMENT

8.1 ROCHE shall keep full and accurate books of account containing all particulars that may be necessary for the purpose of calculating all royalties payable to HGS. Such books of account shall be kept at their principal place of business and, abstracts thereof shall be made independently by ROCHE's public accountants and shall be made available for audit not more frequently than once per calendar year and upon at least thirty (30) working days' prior written notice. Any such audit shall be made at the request and expenses of HGS and conducted during regular business hours in such a manner as to not unnecessarily interfere with ROCHE's normal business activities. All information, data documents and abstracts herein referred to shall be used only for the purpose of verifying royalty statements or compliance with this agreement, shall be treated as ROCHE Confidential Information subject

to the obligations of this Agreement and need neither be retained more than one (1) year after completion of an audit hereof, if an audit has been requested; nor more than two (2) years from the end of the calendar year to which each shall pertain; nor more than one (1) year after the date of termination of this Agreement, whichever period is shorter. In the event that such audits shall indicate that in any calendar year that the royalties which should have been paid by ROCHE are at least five percent (5 %) greater than those which were actually paid by ROCHE, then ROCHE shall pay the cost of such inspection.

8.2 In each year the amount of royalty due shall be calculated half yearly as of June 30 and December 31 (each as being the last day of an "ACCOUNTING PERIOD") and shall be paid half yearly within the ninety (90) days next following such date, every such payment shall be supported by the accounting prescribed in Paragraph 8.3 and shall be made in United States currency. For countries other than the United States, when calculating the adjusted gross sales, the amount of such sales in foreign currencies shall be converted into Swiss Francs as computed in the central ROCHE's Swiss Francs Sales Statistics for the countries concerned, using the average monthly rate of exchange at the time for such currencies calculated on the basis of the average daily rate of exchange as retrieved from the Reuters System during such month.

When calculating the royalties on Net Sales, such conversion shall be at the average rate of the Swiss Franc to the United States currency calculated on the basis of the average daily rate of exchange as retrieved from the Reuters System for the applicable ACCOUNTING PERIOD.

8.3 With each half yearly payment, ROCHE shall deliver to HGS a full and accurate accounting to include at least the following information:

(a) Quantity of each Product subject to royalty sold (by country) by ROCHE, and its Affiliates and sublicensees;

(b) Total adjusted gross sales for each Product subject to royalty sold (by country) by ROCHE, its Affiliates and sublicensees;

(c) Total royalties payable to HGS.

8.4 Any tax required to be withheld by ROCHE under the laws of any foreign country for the account of HGS, shall be promptly paid by ROCHE for and on behalf of HGS to the appropriate governmental authority, and ROCHE shall furnish HGS with proof of payment of such tax. Any such tax actually paid on HGS's behalf shall be deducted from royalty payments due HGS.

8.5 Only one royalty shall be due and payable for the manufacture, use and sale of a Product irrespective of the number of patents or claims thereof which cover the manufacture, use and sale of such Product.

8.6

(a) If at any time a Product is sold in a country in which conditions or legal restrictions exist which prohibit remittance of United States dollars or other currency ("Blocked Country"), the following provisions shall apply to the payment of the corresponding royalty, depending on where the Product is made:

(i) If such Product is made in the same or another Blocked Country, ROCHE shall have the right and option to make such royalty payment by depositing the amount thereof in the currency of the country of sale or manufacture, at HGS's election, to HGS's account in a bank designated by HGS in such country.

(ii) If such Product is made in a country which is not a Blocked Country, then a "number' shall be obtained by multiplying the applicable royalty rate by the price at which the Product is sold to the entity selling in the Blocked Country. ROCHE or its Affiliates (A) shall pay that "number' to HGS and (B) shall deposit the excess of the applicable royalty over the "number', in the currency of the country of sale of the Product, to HGS's account in a bank designated by HGS in such Blocked Country.

(b) If in any country where the Product is sold, rates of royalties provided for herein are prohibited by law or regulation, ROCHE shall pay royalties to HGS at the highest rate permitted in that country for license of the type herein granted, provided that such rate is less than the rate applicable under this Agreement.

9. INDEMNIFICATION AND WARRANTY

9.1 (a) ROCHE agrees to indemnify and hold harmless HGS, its directors, officers, employees, shareholders and agents (each

an "Indemnitee"), against any and all actions, claims (specifically including, but not limited to, any damages based on product liability claims), suits, losses, demands, judgments, and other liabilities (including attorney's fees until ROCHE assumes the defense as described below) asserted by third parties, government and non-government, resulting from or arising out of ROCHE's activities under this Agreement, and/or Research conducted by ROCHE and/or any Product or Target Product which is manufactured, used or sold by or on behalf of ROCHE or a Licensee. If any such claims or actions are made, HGS shall be defended at ROCHE's sole expense by counsel selected by ROCHE and reasonably acceptable to HGS provided that HGS may, at its own expense, also be represented by counsel of its own choosing.

(b) ROCHE's indemnification hereunder shall not apply to any liability, damage, loss or expense of an Indemnitee to the extent that it is attributable to the negligence or intentional misconduct (including breach of warranty) by the Indemnitee, in which case HGS shall indemnify and hold harmless ROCHE under the same terms and conditions as required of ROCHE hereunder.

(c) ROCHE shall have the right to control the defense, settlement or compromise of any such action; however, no settlement or compromise shall be made without the consent of HGS which consent shall not be unreasonably withheld.

9.2 HGS and ROCHE warrant to each other that it has the full right and authority to enter into this Agreement and that it is not aware of any impediment which would inhibit its ability to perform any of its obligations.

10. ASSIGNMENT, SUCCESSORS

10.1 This Agreement shall not be assignable by either of the parties without the prior written consent of the other party (which consent shall not be unreasonably withheld), except that either party may assign this Agreement to an Affiliate or to a successor in interest or transferee of all or substantially all of the portion of the business to which this Agreement relates.

10.2 Subject to the limitations on assignment herein, this Agreement shall be binding upon and inure to the benefit of said successors in interest and assigns of ROCHE and HGS. Any such successor or assignee of a

party's interest shall expressly assume in writing the performance of all the terms and conditions of this Agreement to be performed by said party and such Assignment shall not relieve the Assignor of any of its obligations under this Agreement.

11. TERMINATION

11.1 Except as otherwise specifically provided herein and unless sooner terminated pursuant to Paragraph 1 1.2 of this Agreement, this Agreement and the licenses and rights granted thereunder shall on a country-by-country basis remain in full force and effect until ROCHE's obligations to pay royalties hereunder has expired. After such expiry in such country, ROCHE shall have the right to use or have used the rights and licenses granted to ROCHE hereunder in such country without further payment to HGS. In addition, after receipt of the Assembled Genome and payment of the license fee set forth in Article 6.2, ROCHE shall have the right to terminate this Agreement at any time within sixty (60) days prior written notice; provided that upon such termination all rights and licenses granted to ROCHE hereunder shall terminate and ROCHE shall be bound by the covenant set forth in Article 12.1

11.2 Upon material breach of any material provisions of this Agreement by either party to this Agreement, in the event the breach is not curred within thirty (30) days after written notice to the breaching party by the other party, in addition to any other remedy it may have, the other party at its sole option may terminate this Agreement, provided that such other party is not then in breach of this Agreement.

11.3 The termination of this Agreement means that all rights and obligations of this Agreement shall terminate except those of Articles 4, 9 and 12 and of Paragraphs 3.2, 7.1, 7.2, 11.1, 11.3 and 11.4 of this Agreement.

11.4 Upon termination of this Agreement for any reason, nothing herein shall be construed to release either party from any obligation that matured prior to the effective date of such termination.

12. COVENANTS OF ROCHE

12.1 ROCHE hereby covenants that, so long as the Technology is not publicly known, it will use the Technology solely in the Field and only to the extent ROCHE retains a license hereunder with respect thereto.

12.2 ROCHE hereby guarantees and shall be responsible for compliance by its

Affiliates with all terms and conditions of this Agreement.

13. GENERAL PROVISIONS

13.1 The relationship between HGS and ROCHE is that of independent contractors. HGS and ROCHE are not joint venturers, partners, principal and agent, master and servant, employer or employee, and have no relationship other than as independent contracting parties. HGS shall have no power to bind or obligate ROCHE in any manner. Likewise, ROCHE shall have no power to bind or obligates HGS in any manner.

13.2 This Agreement sets forth the entire agreement and understanding between the parties as to the subject matter thereof and supersedes all prior agreements in this respect. There shall be no amendments or modifications to this Agreement, except by a written document which is signed by both parties.

13.3 This Agreement shall be construed and enforced in accordance with the laws of the State of Delaware.

In the event of any controversy or claim arising out of or relating to any provision of this Agreement or the breach thereof, the parties shall try to settle those conflicts amicably between themselves.

Should the parties fail to agree, any controversy, dispute or claim which may arise out of or in connection with this Agreement, or the breach, termination or validity thereof other than with respect to patent validity shall be settled by final and binding arbitration pursuant to the Rules of the American Arbitration Association ("AAA") as herein provided.

(a) The Arbitration Tribunal shall consist of three arbitrators. Each party shall nominate in the request for arbitration and the answer thereto one arbitrator and the two arbitrators so named will then jointly appoint the third arbitrator as chairman of the Arbitration Tribunal. If one party fails to nominate its arbitrator or, if the parties' arbitrators cannot agree on the person to be named as chairman within sixty (60) days, the necessary appointments shall be made under the rules of the AAA.

(b) The place of arbitration shall be in Wilmington, Delaware and the arbitration proceedings shall be held in English. The procedural law of the place of arbitration shall apply where the AAA Rules are silent.

(c) The award of the Arbitration Tribunal shall be final and judgement upon such an award may be entered in any competent court or application may be made to any competent court for judicial acceptance of such an award and order of enforcement.

13.4 The headings in this Agreement have been inserted for the convenience of reference only and are not intended to limit or expand on the meaning of the language contained in the particular article or section.

13.5 Any delay in enforcing a party's rights under this Agreement or any waiver as to a particular default or other matter shall not constitute a waiver of a party's right to the future enforcement of its rights under this Agreement, excepting only as to an expressed written and signed waiver as to a particular matter for a particular period of time.

13.6 Notices. Any notices given pursuant to this Agreement shall be in writing and shall be deemed to have been given and delivered upon the earlier of (i) when received at the address set forth below, or (ii) three (3) business days after mailed by certified or registered mail postage prepaid and properly addressed, with return receipt requested, or (iii) on the day when sent by facsimile as confirmed by certified or registered mail. Notices shall be delivered to the respective parties as indicated:

To HGS: Human Genome Sciences, Inc.
9410 Key West Avenue
Rockville, MD 20850
Attn: CEO

Copy to: Carella, Byrne, Bain, Gilfillan,
Cecchi, Stewart & Olstein
6 Becker Farm Road
Roseland, New Jersey 07068
Fax No. (201) 994-1744
Attn: Elliot M. Olstein, Esq.

To ROCHE: F.Hoffmann-La Roche Ltd
Grenzacherstrasse 124
CH-4070 Basel

Switzerland
Attn: Corporate Law

and

Hoffmann-La Roche Inc.

340 Kingsland Street
Nutley, New Jersey 07110-1199

U.S.A.

Att: Corporate Secretary

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date set forth above.

Basel, this March 12, 1996

F.HOFFMANN-LA ROCHE LTD

/s/

Apprv'd As To Form
LAW DEPT.

Nutley, this March 12, 1996

HOFFMANN-LA ROCHE INC.
By /s/

/s/

Rockville, this March 20, 1996

HUMAN GENOME SCIENCES, INC.

/s/ William A. Haseltine

William A. Haseltine

[LOGO]
"The information below marked [****] has been omitted pursuant to a request for

confidential treatment. The omitted portions have been separately filed with the Commission."

APPENDIX I: STREPTOCOCCUS PNEUMONIAE

1. Sequencing and Genome Assembly

Our plan is to sequence and assemble the [****] of Streptococcus pneumoniae. This strain is a Type IV pathogenic clinical isolate. Sequencing will be performed in both a sheared genomic library (present in the plasmid pUC18) containing inserts of approximately [****] and a lambda genome library containing inserts of approximately [****]. The majority of our sequencing efforts will be from 2-3 libraries prepared in pUC18. Sequencing will be performed from both the 5' and 3' ends of each clone picked. Clones will be stored as glycerol stocks in 96-well microtiter dishes and will be made available to Roche as well as the host E. coli strain SURE2 (Stratagene) in which the libraries have been established and the S. pneumoniae strain [****].

Based on preliminary sequencing efforts, approximately [****] nucleotides from each genomic insert will be obtained from both the 5' and 3' end on first-pass sequencing. Assuming a genomic size of 2.3-2.5 MB, approximately [****] high quality sequencing reactions will be required to obtain a 3-5X coverage of the genome. As only [****] of sequencing reactions result in high quality sequence information, we estimate that the number of sequencing reactions will be significantly higher than the [****] predictedrequired to provide [****] coverage of the genome. After adequate coverage [****] of the genome is complete, further sequencing on selected clones from both the pUC18 and lambda libraries will be required to obtain closure of the genome. In addition, other methods, including PCR, will be used to order and complete the genome sequence map. The final accuracy of the assembled genome will be equivalent to the [****]. As sequence ambiguities in important genes may not be acceptable, HGS will undertake additional in-depth sequencing of clones selected by Roche (see #2 below)

2. Individual Gene Sequencing

For those sequences of most importance to Roche (limited to [****]), further in-depth sequencing will be performed if after a threefold coverage there still exists sequence ambiguities in the individual clones. We estimate that a [****] coverage of individual genes in question will be more than sufficient to resolve all sequencing ambiguities. Sequencing of these chosen clones will continue through the time perod in which Roche has exclusive access.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

3. Data Transmittal

Our plan is to submit edited sequence information weekly to Hoffmann-La Roche. Potential homologies of Streptococcus pneumoniae genes to known genes obtained by Blast analysis will also be provided. Once an appropriate [****] coverage is obtained, preliminary assembly data can also be provided. Both raw data and a chromatogram representing the actual sequence run can be provided if needed.

We look forward to working with your informatics people to implement a responsive and reliable method for transmitting sequence information and annotation throughout the project. An effective transmission scheme should:

* Deliver information in a usable electronic form

* Maintain key relationships among the various data elements

* Transmit additions and changes to the information as they occur

* Ensure transmission integrity; enable simple recovery from network or equipment failures

* Ensure the data is secure from unauthorized disclosure

The details of the transmission technique should be worked out jointly between Roche and HGS technical experts. Several schemes are possible to meet these objectives.

Our recommendation is to use a transaction-based "store and forward" system to transmit sequence information, sequence annotation, preliminary assemblies and the genome as it is being completed. Under this architecture, a database server at Roche facilities will be connected with the HGS network via an encrypted wide-area network link. As changes are posted to the HGS database, they will be transmitted automatically to a database machine at Roche where the transactions will executed on the Roche copy of the database.

This architecture has the advantage of delivering the information directly in database format without requiring the development of export/import procedures. Delivering information in database format ensures that key relationships among database entities and database integrity constraints are maintained across the wide-area link. HGS currently uses the Sybase database management system, so the Sybase Replication Server product is the natural candidate for performing the wide-area database synchronization functions.

Obviously, there are other scenarios we can follow. Please feel free to have your informatics group contact us regarding additional possibilities and suggestions for data transmittal if they believe that

the above does not adequately address the needs of Hoffmann-La Roche.

"The information below marked [****] has been omitted pursuant to a request for confidential treatment. The omitted portions have been separately filed with the Commission."

4. Timeline

* Preparation of [****] insert libraries in [****] - one is completed, others are ongoing

* Preparation of lambda genomic library - [****]

	Estimated Completion
Sequencing to obtain [****] coverage - [****] weeks	[*
[****] Coverage - 20 weeks	*
[****] Coverage (if needed) - [****] weeks	*]

Further sequencing, gap filling and genome assembly is estimated to take an additional [****], suggesting a final completion date of between [****] . Patent submission on the assembled genome will likely take place within this time frame.

Assuming a genome size of 2.5 MB, sequence runs of [****] base pairs, and [****] of sequencing reactions resulting in high quality sequence.

APPENDIX II: STAPHYLOCOCCUS AUREUS

1. Sequencing Data Set

HGS will provide sequence information and frozen bacterial glycerol stocks for [****] GSTs (Genome-Specific Tags). This library was prepared with sheared genomic DNA from Staphylococcus strain [****], a strain cured of the prophages present in the NCTC8325 strain of S. aureus. The genomic library is present in plasmid pBluescript (Stratagene). The average sequence read on these GSTs is [****] nucleotides and the fragment sizes range from [****] bp. Plasmids are present in E. coli strain XL-1 Blue (Stratagene).