



## BETTER IMMUNOLOGY TOOLS FOR BETTER HEALTHCARE

### PURE PROTEIN IS A BIOPHARMA- CEUTICAL COMPANY SPECIALIZING IN IMMUNOLOGY TOOLS FOR DIAGNOSTICS, DRUG AND VACCINE DEVELOPMENT, AND HIGH YIELD PROTEIN PRODUCTION.

#### Industry

Life Sciences / Biopharmaceuticals

#### Objective

Pure Protein seeks collaborative partnerships with industry leaders to develop and commercialize technology for biopharmaceutical applications.

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#### Business Description

Pure Protein, a Delaware limited liability company formed in 1999, has developed a unique method to clone and produce soluble HLA protein. This technique generates pure, single species antigens and greatly increases yield while still maintaining correct processing. The Pure Protein platform was originally discovered and patented by Dr. John Hildebrand at the University of Oklahoma.

#### Technology

Pure Protein has patented a groundbreaking method of producing substantial amounts of soluble HLA (sHLA) in various human and animal cell lines. This method generates highly purified material without the need to lyse cells or to do extensive downstream purification. Pure Protein's HLA products facilitate epitope and protein discovery in cancerous and pathogen targeted cell lines.

HLA proteins serve as molecular fingerprints for the immune system to distinguish self from non-self. The enormous diversity of this class of proteins is important to the proper functioning of immunity, but this characteristic also makes studying this system an equally enormous task. Organ transplantation, autoimmune disease, and vaccine development are key areas of interest for HLA screening and research. Providing a source of highly purified individual HLA proteins is critical to each of these important areas of work.

Pure Protein is also developing a method for producing highly purified Class II HLA proteins. In addition to HLA reagents, Pure Protein also provides analytical services to verify peptide binding and loading quality of FACS staining reagents such as dimers and tetramers.

#### Target Markets

Pure Protein is seeking industry-leading partners in the following areas:

*Vaccine Development* - includes major industry pharmaceutical and biotech companies in the \$10 billion vaccine market.

*Immunological Assays* - market opportunities in the application of immune surveillance proteins to predict and test patient response to vaccines and other immune modulating therapies in a market totaling \$100 million.

#### Advantages of sHLA Technology

- Other HLA production methods involve lysis of cells followed by extensive purification, which can be laborious and often still does not yield highly purified protein. Pure Protein's sHLA preparations are comprised of single specificity proteins.
- Our sHLA proteins are produced in mammalian cells so that they are correctly glycosylated and folded for human applications.
- Because we use a recombinant form of HLA that requires minimal downstream purification, we are able to produce the protein in large quantities (tens of milligrams).
- We are able to produce any Class HLA regardless of the genomic DNA.

## Product Offering

Pure Protein's core technology platform allows the production of large quantities of immune surveillance proteins and provides unique insight to the inner workings of diseased cells. The platform enables a unique toolset for evaluating and improving vaccines as well as reducing unwanted allergic reactions from biotherapeutics.

Pure Protein has produced over 50 single-specificity human leukocyte antigens (HLA) for organ transplant diagnostics, transplant therapeutics, and vaccine design. The HLAs we have in inventory represent over two thirds of the HLA types needed to cover 96% of the U.S. population. The remaining third of the HLA are available but have not yet been produced in commercial quantities. In addition to our standard soluble HLA (sHLA) with truncated tails, Pure Protein has several proteins with histidine and biotinylated tails. These options can be added to any peptide binding and loading quality of FACS staining reagents (e.g., dimers and tetramers). Using this method T-cells can be stained for sorting or in the clinical settings to gauge patient response. In addition to assays designed to elicit the physical properties of various HLA proteins and their epitope cargo, Pure Protein sells reagents to customers to study cellular function. One class of these assays uses tetramers and dimers of HLAs as reagents for functional testing.

## Management Services

Management services for this company are provided by Emergent Technologies, Inc. (ETI). ETI, founded in 1989, is a life sciences venture capital firm that specializes in forming, funding, commercializing, and managing companies for the purpose of converting institutional and university-based technology into high return ventures.