Abstract

The enzyme-linked immunosorbent (ELISpot) assay has been a primary means in immunological researches (such as HIV-specific T cell response). Due to huge amount of data involved in ELISpot assay testing, the database system is needed for efficient data entry, easy retrieval, secure storage, and convenient data process. Besides, the NIH has recently issued a policy to promote the sharing of research data (see http://grants.nih.gov/grants/policy/data_sharing). The Web-based database system will be definitely benefit to data sharing among broad research communities. Here are some considerations for a database system of ELISpot assay (DBSEA).

System Description

**Relational database:** The 96-well plate is widely used in ELISpot assay. The whole plate information will be broken into small pieces according to the normalization of relational database, and saved into different tables. The overall design concept of database tables for DBSEA can be shown below.

**Standardized data entry:** It is challenging to standardize the immunology lab data due to great variability and inconsistency in laboratory process and data management. The DBSEA shall use the standardized data entry for the effort of data standardization in ELISpot assay. Many lab investigators typically use the Excel spreadsheet as a means of data recording for the plate information in a format of 8x12 matrix (96 wells). It will be very useful if we can create a general template in Excel spreadsheet for lab investigators. Then, we let DBSEA do data entry automatically by transferring data from spreadsheet to database tables.

**Secure storage:** The DBSEA will use a custom authentication schema to ensure data security. The username and password will be required when logging to DBSEA. The investigator can access his/her own data in DBSEA. The data can be shared only after the original investigator issues permission for it.

**Web-based system:** The DBSEA is not just for a group of investigators connected by a local network. It will mainly provide data services for broad research communities. As a user-friendly Web application, the DBSEA will be effectively used through the Internet for data saving, data retrieval, and data sharing.

**Data sharing method:** The DBSEA shall provide the mechanism for data sharing among broad research communities. The data will be available for sharing once the original investigator releases permission. The DBSEA shall let investigators download the data in multiple methods, such as spreadsheet and XML document. By downloading data in XML, investigators can use their own tools to parse XML files and analyze data.

Discussion

The DBSEA will be implemented in ASP.NET using C# language with Microsoft .NET Framework. The relational database of DBSEA is implemented with Microsoft SQL Server 2000. Microsoft ADO.NET is used as a means of accessing and storing data in the database. As a further research, the DBSEA will be combined with some statistical tools for providing data process functions.

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