TECHSIGHTING
SOFTWARE

Evolutionary Upgrade

A new version of the powerful scientific graphing software, SigmaPlot 5.0, has been released. SigmaPlot has long been popular for its flexible data analysis tools, including basic statistics and user-friendly plotting abilities. The new release is evolutionary rather than revolutionary and does not break significant new ground, largely providing welcome enhancements of existing functions.

SigmaPlot 5.0
SPSS, Inc.
Chicago, IL.
$595, upgrade $199.
www.spss.com

Highlights of the new version include: (i) Facilitated automation of the program with macros. These may be written in the macro programming language included or recorded through point-and-click operations with the macro recorder. (ii) A series of function wizards, which allow the user to plot multiple functions and vary parameters easily. (iii) Improvements in the data worksheet, which allow manipulation of very large data sets. (iv) Expanded graph layout options and graphing wizards to assist in plot generation. (v) Compatibility with Windows 98, Windows NT, and Microsoft Office 97 functions including Excel, Powerpoint, and Word. SigmaPlot 5.0 is certified as Y2K compliant.

Data is entered into SigmaPlot in a spreadsheet format or may be imported from a variety of sources, including the Microsoft packages referred to above and Lotus 1-2-3, Quattro Pro, and Paradox.

The program supports a standard set of plotting options common to graphing applications. A series of user-friendly linear and nonlinear regression analyses are available through a regression wizard. Regression lines and error bars or brackets may be displayed on graphs. Documentation of both data and analyses may be carried out with a helpful report generator.

SigmaPlot 5.0 now supports OLE2 (Object Linking and Embedding–2), allowing easy information transfer between the program and other OLE2 applications. Users can move SigmaPlot graphs or plots into other applications for additional modifications not possible in the program. One strength of SigmaPlot 5.0 is the variety of options for moving information into and out of the program. Graphs can be exported in common file formats, such as Windows metafile, TIFF, generic bitmap, and file formats compatible with earlier versions of SigmaPlot. Printed output can be directed to a file, instead of a printer. This allows one to print the file on a different computer with a better printer, without the need to install the program on the second computer. SigmaPlot can save print files in the popular HPGL (Hewlett-Packard Graphics Language) graphics format.

Users of previous versions of SigmaPlot should have little trouble adjusting to the new release, as the general format is basically the same. The program uses three windows (see figure)—a data entry window (spreadsheet format), a graphics display window, and a file tree window, which allows the user to select specific notebooks (folders) for each study. The data manipulation and graph generation features are also like those in earlier versions, but often more user friendly.

The program was not without bugs. When plotting or performing data analysis applications, SigmaPlot was occasionally unpredictable in using the default symbol size or, in the case of bar charts, bar widths. The simple solution was to edit the graph or chart.

SigmaPlot 5.0 requires Windows 95, Windows 98, or Windows NT with at least 32 MB of RAM, 20 MB of hard drive space, and SVGA or better display capability. The Macintosh version is no longer supported by the company.

—ALLEN B. RAWITCH

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TECHSIGHTING
IMMUNOLOGY

Tolerating Differences

Bone marrow transplantation is a life-saving treatment for patients with malignancies of the hematopoietic lineage. Donor cells are removed from a healthy individual's marrow and used to reconstitute the entire spectrum of blood cells in a recipient. When drawn on a whiteboard with simple arrows and circles, the procedure looks like a silver bullet. In real life, however, the procedure is more like a silver hammer. It works to some degree, but it is not pretty.

What can go wrong? Early on, the patient may succumb to infections or to the side effects of the high doses of chemotherapeutic drugs. Later in the treatment, recurrence of the cancer or appearance of graft versus host disease may occur. A recent advance in solving the graft versus host problem has now been reported.

With histocompatibility mismatches between donor and recipient, donor T cells can become activated against recipient cells. At its core, graft versus host disease is a problem of T cell activation in the donor marrow. The process by which T cells are activated is becoming clearer, primarily through analysis of the surface molecules that are required for the process. One molecule, CTLA-4, is a key surface player in T cell inactivation. In fact, CTLA-4 knockout mice develop a lymphoproliferative disease. In the current model of T cell activation, CTLA-4 interacts with cells that present antigen, and experiments in animals have shown that soluble CTLA-4 can produce a negative signal in T cells that results in anergy. A group from Boston (*1*) investigated whether soluble CTLA-4 could be used in humans to block graft versus host disease.

The researchers selected a group of patients with end-stage leukemia who were in need of a bone marrow transplant but for whom only a poorly matched donor was available. These patients will typically face significant difficulties with graft versus host disease after the transplant. The researchers collected peripheral blood mononuclear cells from the recipient before the transplant and froze them. Next, they harvested bone marrow from donors who were partially HLA (human lymphocyte antigen) matched.

To induce anergy in the donor T cells, they mixed irradiated mononuclear cells from the donor with bone marrow in the presence of soluble CTLA-4. The idea was that the CTLA-4 molecules would bind to the recipient's T cells and, in the presence of stimulating donor cells, produce anergy. They looked at the T cells's function in vitro and in vivo to determine if the procedure worked.

In vitro, they measured the precursor T cells in the donor bone marrow of nine donors before and after the procedure. Using a stimulation assay to measure the activation of recipient T cells to donor bone marrow, they showed a dramatic drop in activable recipient T cells by in vitro analysis. The recipient T cells were not nonspecifically anergic, because unmatched donor cells plus CTLA-4 yielded a stable number of responsive recipient T cells.

What about in vivo? They followed 12 patients and looked for signs of graft versus host disease. Because of the poor match of the donors, this group of patients was at high risk, a fact borne out in the results. Seven patients died of infections, complications, or relapse. Five lived to a complete remission 132 to 863 days after the transplant. Signs of graft versus host

disease (skin rash, diarrhea, and the like), however, were either mild or totally absent. Without CTLA-4, it would be expected that all of these patients would have had significant graft versus host disease.

This successful use of soluble CTLA-4 to modify the immune response ex vivo shows clearly how basic science can be translated to clinical treatments. Long-term survival in the end, however, will require new approaches to the infections and to other complications of this procedure as well.

—ROBERT SIKORSKI AND RICHARD PETERS

References
1. E. C. Guinan *et al.*, *N. Engl. J. Med.* **340**, 1704 (1999).

TECHSIGHTING
DATA MANAGEMENT

Growing Databases

If you are one of those investigators who has decided to start keeping some of your data in a database, this column is for you. First, you should be congratulated for having adopted database technology for your laboratory. Databases are indeed a great way to keep track of structured data by allowing you to capture thousands, if not millions, of records and by facilitating easy searches of entries. Once you have become familiar with the use of a database to store your laboratory data, chances are that you will find it hard to turn back. You will find ever-increasing data collections that could benefit from fast searching and easy storage. After a while, as your database grows, you may find that your desktop application just does not do the job anymore—perhaps the database needs to be accessed by more than one user simultaneously or you have so many records that the performance of the database has slowed down significantly.

In these cases, you will need to upgrade to another database system. Unfortunately, this is not a painless process. But if you plan ahead, you can design your original databases in a way that could save you a lot of headaches down the road. As an example, we will walk you through upgrading a Microsoft Access database to a SQL 7.0 database and to an Oracle8 database.

Before you do anything, you should first create back-up copies of your database: the files can sometimes become corrupted during the transfer process and you want to make sure that you can always roll back to the original. The good news is that both SQL and Oracle have a migration wizard that will help you migrate the structure and data of a Microsoft Access database. If you are using Microsoft Access 97, however, there is no wizard available yet for migrating to Oracle (Microsoft Access 95 or 2.0 does have this feature). For SQL 7, you will have to download an Upsizing Wizard at www.microsoft.com/AccessDev/ProdInfo/AUT97dat.htm

Before you attempt any migration, you should be aware of a number of limitations. For instance, the names for SQL 7 tables and fields should be less than 30 characters in length, should start with a letter, and should contain no spaces or nonalphanumeric characters except the dollar sign ($) and the underscore (_). If you have any of those occurrences in your Access tables or fields, you will need to correct them before attempting a migration. In the case of Oracle8, Microsoft Access tables with two or more MEMO or OLE datatype columns, which need to be mapped to a LONG or LONGRAW datatype column in Oracle8, will not be converted. Oracle8 only supports one such LONG field per table, so you will have to change the Microsoft Access structure to move the additional MEMO or OLE columns to a separate table before migration.

Upon migration, some fields become modified. For instance, SQL 7 does not support Yes/No, True/False, On/Off, Hyperlink, ReplicationID, Memo, and OLE datatypes. They will be migrated to appropriate, but not always equivalent, datatypes in SQL 7.

What does all this mean? To be safe, you should plan early on to avoid any potential field names and datafield conflicts. Make it a habit not to use spaces and nonalphanumeric characters in naming your fields. Avoid MEMO datatypes, if possible. These simple guidelines will save you problems down the road when you upgrade to a more robust database system.

—RICHARD PETERS AND ROBERT SIKORSKI

TECHSIGHTING
COMPUTER VIRUSES

Deworming Treatment

Another computer virus made the headlines recently—the "worm" virus, a typical "Trojan horse" virus: it gets into your system by tagging along with other files. In this case, the worm virus enters your system via e-mail messages and uses Microsoft Outlook, Outlook Express, or Exchange (or any Mail Application Interface–compliant e-mail client) to further propagate itself.

We have discussed the perils of opening e-mail messages from unknown senders, as their message may contain Trojan horse viruses (*1*). The worm virus, however, gets in by using messages of known people. Here is how it works: assume that the computer of a colleague is infected with the worm virus. You e-mail him a message. As your message is received in his inbox, the worm virus fires off a reply to your message with text like this: "Hi. I received your e-mail and I shall send you a reply ASAP. Til then, take a look at the attached zipped documents. Bye."

Because you received the above message from a familiar colleague, you are less suspicious; intrigued by his message, you click on the attached zipped file to see what he is talking about. A fake error message is displayed, and voila! You are now infected, too! The supposed zipped file is actually an executable file named "zipped_files.exe" When you open it, you activate this file, which copies itself to your Windows System directory with the file name Explore.exe or to your Windows directory with the file name _setup.exe. The worm modifies your WIN.INI or registry and when this happens, the file Explore.exe is executed each time you start Windows. It then monitors your inbox and propagates as described above.

The virus also looks through your computer for files with the following extensions: .h, .c, .cpp, .asm, .doc, .xls, and .ppt. When it finds those files, it deletes their content. So, for instance, you would lose all the information that exists in Excel, Word, and PowerPoint files. Moreover, if your computer is on a network, the worm virus will search the mapped drives and networked machines for Windows installations and copy itself to the Windows directory of the remote machines.

If you have been infected by the worm virus, you can deworm your system by running Symantec's KILL_EZ.EXE tool or McAfee's KILLEZIP.EXE tool. Of course, frequent back-ups will allow you to recover any data you may have lost in the meantime. To protect yourself from infection in the future, you should download the latest antivirus updates from the Web site of your antivirus utility manufacturer. For instance, both McAfee and Symantec offer free upgrades to their software.

Links to additional information, tools, and software upgrades are available on our Web site at www.mednav.com/features/Science/.

—RICHARD PETERS AND ROBERT SIKORSKI

References
1. R. Peters and R. Sikorski, *Science* **281**, 1822 (1998).

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