I-1 Setting up the Operational Environment

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Here are the preparations for using simBio. In simBio, Java is used for describing formulas, and XML is used for describing model structures. You need to set up the Java runtime environment to use simBio to run a simulation of a myocardial cell model, and to develop a myocardial cell model you need the Java development environment.

Java

A programming language developed by Sun Microsystems. It is explained in information available on the internet, and books such as "The Java Programming Language" , "The Java Tutorial" , "Head First Java" . However, for a simulation that uses simBio, the knowledge of Java which is necessary to create a model on your own is limited, so we will explain about Java programming in the text as needed.

XML

XML is one of the markup languages for describing the structure and meaning of documentation and data, using special strings called tags which embed structural information in the text. It has the characteristics that it is easy to operate from a program, yet can be directly manipulated by people using a text editor, etc. The details are explained in II-2.

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1. Hardware Preparation

Provide a PC which can run Java 1.4.2 or greater. The PC which simBio was developed with is Windows XP, Pentium 4 2.4 GHz, RAM 512 MB. You can check the simBio operating environment below.

- CPU Celeron 400 MHz or greater
- OS Windows 98, 2000, Me, XP, Vista, Mac OS X, Red Hat Linux 8.0, 9.0, Fedora Core 4, Vine Linux 2.6, Ubuntu 6.06
- 196 MB memory or more

2. Software Installation

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about the notation

About the display of commands and buttons, they are enclosed by [] notation, about input characters, they are represented with the `command` font, and outputted characters are enclosed with "".

2.1. Java

First, check that Java can be used. In the case of Windows, click on the [Start] button ->[All Programs]->[Accessories]->[Command Prompt]. Type `java -version` in the open window and press the Enter key, and if "java version 1.4.2" is displayed, then it is possible to use Java (`java` is a command to run the Java program, `-version` is an option for displaying the version of Java which can be used. They are divided by a space.). When "java is not recognized as an internal or external command" etc. is displayed, please install Java from Free Java Download. When you click on "Download Now", latest version of J2SE Runtime Environment will be installed, but to create programs, JDK (Java Development Kit) is needed, so please select "JDK 6", and install.

Using Java version 1.4.2 or greater

> Please be sure to install Java version 1.4.2 or greater. 1.3 and earlier versions do not provide standard support for XML-related packages, so they cannot be used. The next software to be installed, Eclipse 3.1.2, will not run with 1.4.1 and earlier versions.

Other JDK

IBM JDK 1.4.2 is used for simBio development. You can get it as a set with Eclipse from the IBM site. Also BEA JROCKIT etc. JDKs are available.

2.2. Eclipse

Java has many development environments, but here Eclipse is used.

Click on "Downloads" in http://eclipse.org/ and download the latest stable relase of eclipse SDK, and extract it into a suitable location. Here it is expanded in c:\. In the case of Windows XP, when you right click on the zip file, select "Extract All" and select `c:\` as the folder extraction destination, the folder "c:\eclipse" will be created.

Eclipse (eclipse)

Operations which are necessary for creating a program (edit and compile, debug) can be unified into one by using an Integrated Development Environment (IDE). Regarding Eclipse, you can refer to "The Eclipse Community Page" . To understand about Eclipse more deeply, please refer to "Getting started with the Eclipse Platform" etc. Various documents have been published.

2.2.1. XML Editor

To edit XML files which are used in simBio, it is convenient if you have a suitable editor. Please download a file which matches the Eclipse version (for "eclipse SDK 3.2.2" this is currently "xmlbuddy_2.0.72.zip") from "XMLBuddy", and extract it to the Eclipse plugins folder (c:\eclipse\plugins). In the case of Windows XP, right click on the zip file, and select "Extract All". If you select the Eclipse plugin folder as the file extraction destination, the folder com.objfac.xmleditor_ 2.0.72 is created, and an environment for editing XML files is ready.

XML file editor

Please refer to "XMLBuddy for Eclipse"

Plugins

are software which add features to Eclipse. Using Eclipse plugins adds various features to the base, and provides varied functions.

Alternatives

There are several XML editors. For example, the Eclipse Web Tools Platform (WTP) Project includes a nice XML editor, which needs Java2SE5 or later.

3. Eclipse Initial Settings

When you start eclipse.exe (c:\eclipse\eclipse.exe) which is in the eclipse folder, the Workspace Launcher Dialog asks which folder to use to save the programs which you will creates.

When you leave the default value as it is and press [OK], Eclipse starts, and a screen called "Welcome to Eclipse" appears. First, select [Window]->[Preferences...] to adjust the initial settings.

Screenshots
were made with Eclipse SDK 3.2.1 with several plugins. So, details might be different from other versions and installed plugins.

3.1. Set the character encoding to UTF-8

The simBio character code is UTF-8, so in [General]->Workspace dialog set [text/file/encoding] to UTF-8.

3.2. Separation of Source and Output Folders

In the [Java]->Build Path dialog, select [Folders] in [Source and output folder]. In [Source folder name] enter src/main/java, and in [Output folder name] enter target/classes.

Folder Structure
simBio uses the folder structure of Maven, a project administration tool which is often used with open source projects.

3.3. Add tools.jar User Library

With Eclipse 3.3, in the Preferences dialog select [Java] -> [Build Path] -> [User Libraries]. Click [New...] and enter TOOLS as [User library name], and click [OK] to confirm. Click [Add JARs...] and in the file dialog open the file tools.jar found in the lib folder of installed jdk. Click [OK] to confirm.

tools
tools.jar is used to separately generate both English and Japanese Javadoc from a common source.

3.4. XML Display Colour

In the initial settings of XMLBuddy, tags and attribute names are shown with the same colour. Let's try changing the colour to make it easier to see. Please select [XMLBuddy]#[XML]#[Colors]#[Attribute name], and choose a colour that you like.

Save setting contents
The current settings can be extracted to a file using the Eclipse [File]->[Export] menu.