

## **AUTOMATION OF THE AMES II TOXICOLOGY TEST**

Dr Malcolm Crook, Process Analysis & Automation Ltd  
Falcon House, Fernhill Road, Farnborough, Hants, GU14 9RX, United Kingdom  
Tel +44 (0) 1252 373000 FAX +44 (0) 1252 371922  
e-mail [mjc@paa.co.uk](mailto:mjc@paa.co.uk) Website: [www.paa.co.uk](http://www.paa.co.uk)

The Ames test has been the standard method of determining toxicity of new compounds in the pharmaceutical industry. Developed by Dr Bruce Ames (University of California at Berkeley), the test is widely used. However the basic test cannot be automated. With the increasing numbers of compounds to be screened in the pharmaceutical industry, automation is a required development of this technique. A modified test has been developed by Xenometrix, Inc. (Boulder, Colorado) and this poster describes how this can be automated.

The automated procedure is a four-stage process:

Stage 1: CULTURE

Stage 2: EXPOSURE

Stage 3: PLATING

Stage 4: SCORING

To make full use of the investment in an automated system, the system has to function every day. The Ames II test adds a level of complexity, because a sample started on day 1 will be unloaded for the final plate reading on day 3. The control system has to be able to start new sample batches on each day, whilst still keeping track of batches that were started on previous days. This may be automated by using high quality equipment with a flexible control language.

Three Hamilton Microlab S series pipetting stations are used in the system, one to undertake the EXPOSURE plate preparation stage, and two others to undertake the PLATING stage. Two systems are required to keep the throughput through the system to a maximum throughout the 5-day process.

A Hamilton Microlab R3-5 robot is used to transport the plates around the system, a Labsystems Multiskan Ascent is used to scan the plates at the end of the procedure and Kendro incubator (capacity 189 microplates) is used to incubate the 24 well and 384 well microplates. A barcode reader is incorporated to track the microplates throughout the procedure and collated the final results with the starting sample microplate.

The overall control system is OVERLORD, which controls the step-by-step aspect of each stage of the process, as well as keeping track of running batches and collating the data for output at the end of the run. Data can be presented as a paper output, text file, Microsoft EXCEL spreadsheet or Microsoft Access database. An SQL database option will be available later in 2000.

This fully integrated system has been running for 1 year at a major pharmaceutical company in Germany and has allowed fast, accurate and reliable toxicological screening.