



ABSTRACT

*“Mining the active proteome from
plant-pathogen interactions”*

Dr Renier Van der Hoorn

Chemical Genomics Centre of the Max Planck Society

Max Planck Institute for Plant Breeding Research

Cologne

GERMANY

The activity of proteins in proteomes and living organisms can be displayed with Activity-based Protein Profiling (ABPP). ABPP is a technology that makes use of small molecule probes that label the active site of enzyme classes in an activity-dependent manner. Labeling is covalent and irreversible and facilitates the separation and detection of labeled proteins using protein gels and the purification and identification by mass spectrometry. This method displays functional proteomic information, which contrasts strongly with traditional transcriptomic and proteomic datasets, which are poor predictors on the functional state of proteins. The introduction and application of ABPP in plant science is the mission of the Plant Chemetics laboratory. We have validated and introduced activity-based probes for papain-like cysteine proteases, vacuolar processing enzymes, serine hydrolases, lipases, acyltransferases and the proteasome. Probes for kinases, glycosidases and other enzymes are being developed and tested. Procedures for in vivo labeling and imaging have been established. Studies of plant-pathogen interactions using these probes have revealed that the proteasome and Cys proteases are activated during immune responses, and suppressed during infection by successful pathogens. These examples illustrate the use of ABPP to study protein activities in any organism to address many different biological questions.