Transnational Access Report

1. General Information

Project Acronym (ID):	TransL-UV
Project Title	**Impact of UV-B on translation**
Name of Group Leader	Dr. Marie-Theres Hauser
Name of organization	University of Natural Resources and Life Sciences, Vienna (BOKU), Department of Applied Genetics & Cell Biology

2. Project summary (max. 250 words)

Plant growth and development depends on light including ultraviolet A (UV-A; 315-400 nm) and UV-B (280-315 nm). Depending on the wavelength, fluence rate, duration of exposure and ratio to the photosynthetically active radiation (PAR) low fluence rate UV-B radiation stimulates photomorphogenesis and excessive fluence rates causes damage to DNA, RNA, proteins and lipids. Plants have developed survival strategies by activating the biosynthesis of UV-absorbing metabolites. While several studies focus on the transcriptional responses of UV-B radiation on the model plant *Arabidopsis thaliana* little knowledge has been gathered about the translational control of the biosynthesis of UV-B absorbing substances. We used a genetic approach to determine the role of a translation regulator in growth and flavonoids, phenolic acids, anthocyanins, sinapate esters and glucosinolate accumulation in response to long term exposure of different UV-B radiation regimes and different wavelengths of UV-B and UV-A. Two experiments were done in the Sun Simulator at the Helmholtz Zentrum München. In one experiment seedlings of the mutant were expose for 15 days in a 10 hrs light/14 hrs dark cycle supplemented for 4 hrs /day with UV-B 0.3 kJ m^{-2} BE the second experiments increase the UV-B dose to 4.3 kJ m^{-2} BE.
While some of the metabolite quantifications are still missing the glucosinolate analyses show specific UV-B and UV-A responses (see below). Furthermore the growth of the translational regulator mutants is more affected by UV-B than the wild type controls.

3. Main achievements (max. 250 words)

Growth phenotypes show that the translational regulator is involved in the acclimation to UV-B since although the mutants develop generally to larger plants, the growth inhibition by the two UV-B wave length (295 nm and 305 nm) is significantly stronger than the wild type control.

The glucosinolate quantification revealed that aliphatic glucosinolate are induced by UV-B wave lengths while the indolic glucosinolate did not change. Both types of glucosinolates were repressed by UV-A only wave lengths.

The translational regulator mutant constitutively accumulated more indolic glucosinolate and while the aliphatic glucosinolates biosynthesis is reduced compared to wild type.

The effects were seen under both UV-B dose indicating that they are not due to a UV-B stress response.

7. Publications related to the access granted, acknowledging the support by EC.

Please specify the type of publication or presentation (scientific journal, book, patent, abstract, proceedings, article) and provide the full reference or link.

Abstract and oral presentation at the Phytotron 2014 Conference http://www.helmholtz-muenchen.de/phytotron2014/ Publication in preparation