Austria

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Please describe any new experimental resources and/or software tools available to Arabidopsis researchers that have been initiated or funded in your country in 2020 or early 2021

PHENOplant was funded by the FFG and final construction work finished in early 2021 at the GMI. The new platform is designed for mid-size crop plants as well as Arabidopsis and is fully integrated into a state-of-the-art walk-in phytotron providing highly homogeneous plant growth conditions. Furthermore, the platform will allow precise environmental simulations across different climate zones as well as controlled plant stress experiments. Within the planned infrastructure, plants will be transported on conveyor belts from the growth area to the imaging cabinets equipped with high-tech sensors. Apart from 3D RGB imaging, morphometric parameters, and color classifications derived from top- and side-view RGB imaging, the infrastructure will deliver data on PAM chlorophyll fluorescence which is used for monitoring abiotic and biotic stresses that affect photosynthetic mechanisms (e.g. drought-, heat-, and light stress, nutrient deficiencies, heavy metal toxicities, fungal infections etc.). Hyperspectral imaging (VNIR and SVIR) will provide additional complex data on crop condition and health.

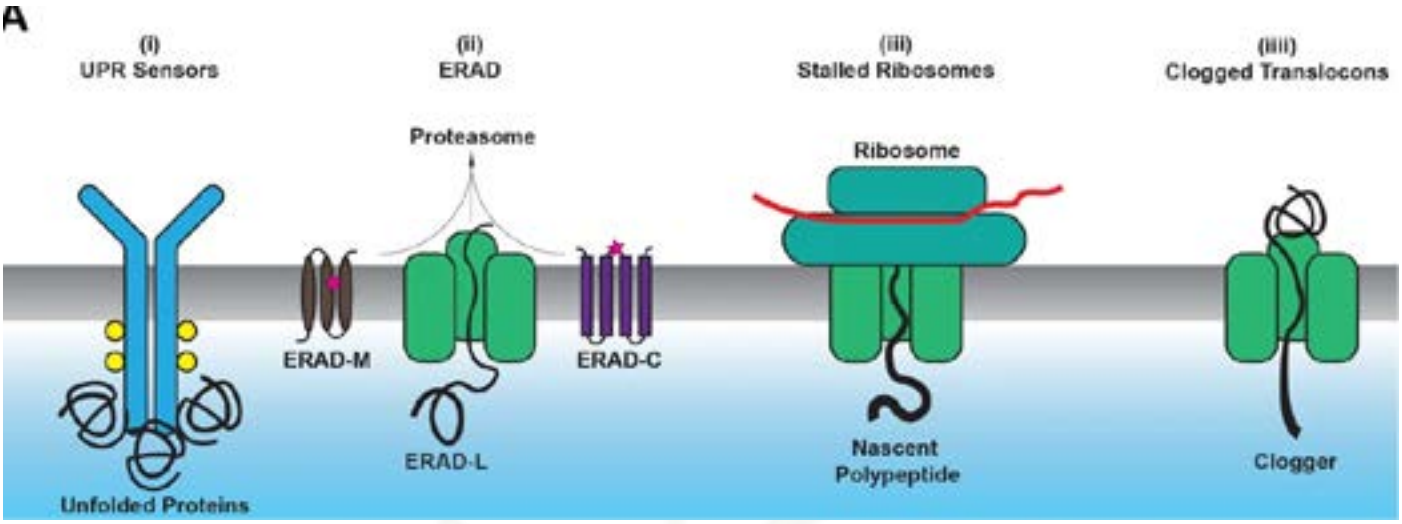
Please provide a paragraph describing the general impact of the COVID19 pandemic on the scientific community in your country

This year has been extraordinarily challenging. However, thanks to outstanding initiatives developing SARS-CoV2-testing pipelines at the Campus Vienna BioCenter/GMI as well as at the Department of Applied Genetics and Cell Biolology (DAGZ) of the University of Natural Resources and Life Sciences, Vienna regular PCR/LAMP tests 2-3 times weekly have allowed to continue doing research but with reduced laboratory hours.

Planned events for 2021 and 2022

In 2020, most of our outreach activities moved online:
- The GMI provided teachers with an online-learning- and game tool “GMI4kids” and participated in the ZOOM-childrens’ University, broadcasted podcasts (within the academy’s podcast-series “makro-mikro”).

- Furthermore, the GMI published several “science for the public”-films via their youtube channel. In addition, the GMI developed a new outdoor game, an extension to “Botanic Quest” – ND-quest. This is a quiz around some of the natural monuments in Vienna. It had been developed together with the City of Vienna and proved to be ideal for people of all ages during the pandemic.



C53 is not activated by associating with UPR sensors. Cartoon depicting the four scenarios we tested to understand the mechanism of activation of C53. doi: 10.7554/eLife.58396

Selected Publications

- Borg M, Jacob Y, Susaki D, LeBlanc C, Buendía D, Axelsson E, Kawashima T, Voigt P, Boavida L, Becker J, Higashiyama T, Martienssen R, Berger F. (2020) Targeted reprogramming of H3K27m;3 resets epigenetic memory in plant paternal chromatin. Nat Cell Biol, Bd. 22 (6), S. 621-629. DOI: 10.1038/s41556-020-0515-y

This works describes a novel mechanism that enables plants to reset epigenetic states with specialized histone variants.

- Stephani M, Picchianti L, Gajic A, Beveridge R, Skarwan E, Sanchez de Medina Hernandez V, Mohseni A, Clavel M, Zeng Y, Naumann C, Matuszkiewicz M, Turco E, Loefke C, Li B, Dürnberger G, Schutzbier M, Chen HT, Abdrakhmanov A, Savova A, Chia KS, Djamei A, Schaffner I, Abel S, Jiang L, Mechtler K, Ikeda F, Martens S, Clausen T, Dagdas Y. (2020) A cross-kingdom conserved ER-phagy receptor maintains endoplasmic reticulum homeostasis during stress. Elife, 9:e58396. doi: 10.7554/eLife.58396.

This work was a large collaboration involving all 4 institutes at the Vienna BioCenter, detailing the discovery of a cross-kingdom conserved ER autophagy receptor.ATM controls meiotic DNA double-strand break formation and recombination and affects synaptonemal complex organization in plants

- Kurzbauer MT, Janisiw MP, Paulin LF, Prusén Mota I, Tomanov K, Krsicka O, Haeseler AV, Schubert V, Schlögelhofer P. Plant Cell. 2021 doi: 10.1093/plcell/koab045.

ATM is essential to limit the number of meiotic double-strand breaks and affects chromatin loop size and synaptonemal complex length and width.

Major Funding Sources

- Austrian Science Fund (FWF) https://www.fwf.ac.at/

- European Research Council (ERC) https://erc.europa.eu/ - Vienna Science and Technology Fund (WWTF) https://www.wwtf.at/

- Austrian Research Promotion Agency (FFG) https://www.ffg.at/en