conferenceseries.com SciTechnol

Laura Fattorini et al., J Plant Physiol Pathol 2017, 5:5
DOI: 10.4172/2329-955X-C1-011

3rd Global Summit on

Plant Science

August 07-09, 2017 | Rome, Italy

## *Arabidopsis* root formation is altered by cadmium and arsenic

**Laura Fattorini[1], Marilena Ronzan[1], Diego Piacentini[1], Federica Della Rovere[1], Ilaria Buran[1], Adriano Sofo[2], Maria Maddalena Altamura[1]** and **Giuseppina Falasca[1]**

[1]Sapienza University of Rome, Italy

[2]University of Basilicata, Italy

The semimetal arsenic (As) and the heavy metal cadmium (Cd) are highly toxic for plants and animals, evoking enormous concern due to their widespread and persistent presence in polluted ecosystems. Both elements are not essential for plants but easily absorbed by their roots using the same membrane transporters of essential nutrients. The exposure to Cd or As causes inhibition of plant growth, especially in sensitive plants as *Arabidopsis thaliana*, the model species used in this research. It was reported that Cd and As mainly localize in root meristems. The correct organization and functionality of primary (PR), lateral (LR) and adventitious roots (AR) depends on the integrity of their apical meristem, on the correct activity and maintenance over time of a small group of cells which rarely divide, i.e. the quiescent centre (QC) cells. The QC inhibits the differentiation of the surrounding stem cells, allowing the apical root growth and the correct root differentiation. In *A. thaliana* LR and AR originate from pericycle founder cells in the PR and hypocotyl, respectively, their QC is established in a precise stage of primordium development. It was demonstrated that the positioning and maintenance of the QC in these roots is strictly related to a correct transport and biosynthesis of indole-3-acetic acid (IAA), the main plant auxin. To the aim to investigate the effect of Cd and As on auxin-mediated LR and AR development and QC maintenance, the expression of the IAA-sensitive *DR5: GUS*, of *QC25: GUS* (QC-marker), of the auxin biosynthetic gene *YUCCA6*, of the IAA carriers *GUS*-lines *PIN1: GUS* and *LAX3: GUS* and IAA levels in seedlings exposed to $Na_2HAsO_{47}H_2O$ and/or $CdSO_4$ were evaluated. Results indicate that Cd and As alter auxin biosynthesis and transport during root formation, with consequent negative effects on their growth.

### Biography

Laura Fattorini investigated the effects of toxic elements, such as cadmium (Cd) and arsenic (As), on root development in some plants, in order to study the damages caused at cytological/histological level, as in *Arabidopsis thaliana*, and to find natural methods to limit Cd and As absorption in the commercially important species *Nicotiana tabacum*. Her experiences in the hormonal and genetic control of root development have enabled her to verify that some damages are related to an imbalance in the auxin production and transport in these organs. She also studied the effects of a co-exposure to these pollutants even in the As hyperaccumulator *Pteris vittata*, in order to study the possibility of using this fern for the purification of soils containing more (semi)metal contaminants.

laura.fattorini@uniroma1.it

**Notes:**