ΟΝΟΜΑ	**ΦΑΡΜΑΚΗ Θεοδώρα**
Από 1-4-2013 έως σήμερα	ΚΥΡΙΑ ΕΡΕΥΝΗΤΡΙΑ (Β΄ ΒΑΘΜΙΔΑ) ΙΝΣΤΙΤΟΥΤΟ ΕΦΑΡΜΟΣΜΕΝΩΝ ΒΙΟΕΠΙΣΤΗΜΩΝ (ΙΝ.Ε.Β) ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΈΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΚΗΣ ΑΝΑΠΤΥΞΗΣ (Ε.Κ.Ε.Τ.Α.) 6^{Ο} ΧΛΜ. ΟΔΟΥ ΧΑΡΙΛΑΟΥ-ΘΕΡΜΗΣ Τ.Θ. 361, Τ.Κ. 570 01 ΘΕΡΜΗ, ΘΕΣΣΑΛΟΝΙΚΗ Τηλ. 2310 498279 Fax. 2310 498270 e-mail: mfarmaki@certh.gr
1-5-2007 – 31-3-2013	ΕΝΤΕΤΑΛΜΕΝΗ ΕΡΕΥΝΗΤΡΙΑ (Γ΄ ΒΑΘΜΙΔΑ) ΙΝΣΤΙΤΟΥΤΟ ΑΓΡΟΒΙΟΤΕΧΝΟΛΟΓΙΑΣ (ΙΝ.Α.) ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΕΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΚΗΣ ΑΝΑΠΤΥΞΗΣ (Ε.Κ.Ε.Τ.Α.)
1-8-2003 – 30-4-2007	ΔΟΚΙΜΗ ΕΡΕΥΝΗΤΡΙΑ (Δ΄ ΒΑΘΜΙΔΑ) ΙΝΣΤΙΤΟΥΤΟ ΑΓΡΟΒΙΟΤΕΧΝΟΛΟΓΙΑΣ (ΙΝ.Α.) ΕΘΝΙΚΟ ΚΕΝΤΡΟ ΕΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΚΗΣ ΑΝΑΠΤΥΞΗΣ (Ε.Κ.Ε.Τ.Α.)
ΕΡΕΥΝΗΤΙΚΟ ΑΝΤΙΚΕΙΜΕΝΟ	Μελέτη των μηχανισμών μετάδοσης σήματος κατά τη διάρκεια καταπονήσεων στα φυτά.
ΕΥΡΥΤΕΡΟ ΕΡΕΥΝΗΤΙΚΟ ΠΕΔΙΟ	**-** Φυσιολογία φυτικού και ζωικού κυττάρου **-** Κυτταρική βιολογία – μεμβρανική κυκλοφορία **-** Βιοχημικοί και κυτταρικοί μηχανισμοί σηματοδότησης
ΜΕΤΑΔΙΔΑΚΤΟΡΙΚΟ	**Αντικείμενο**: Γενετική παρέμβαση στη βιοσύνθεση των οξυλιπινών στην πατάτα (*Solanum tuberosum*)
15-7-1999 – 31-7-2003	Departamento de Genética Molecular de Plantas, Centro Nacional de Biotecnología, Consejo Superior de Investigaciónes Científicas Campus de Cantoblanco Universidad Autónoma de Madrid, 28049 ΙΣΠΑΝΙΑ **Αντικείμενο**: Γενετική τροποποίηση της βιοσύνθεσης της οξυλιπίνης στην πατάτα.
ΣΠΟΥΔΕΣ	

1-12-1995 – 31-7-1999 **Ph.D**

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1-10-1994 – 30-9-1995 **M.Sc. Βιοτεχνολογία φυτών**

Wye College,
University of London,
ΜΕΓΑΛΗ ΒΡΕΤΑΝΙΑ
Αντικείμενο: Μοριακή Βιολογία, Μοριακή βιολογία Φυτών, Ιστοκαλλιέργεια φυτών, Αλληλεπίδραση φυτών-μικροβίων, Αλληλεπίδραση φυτών-εντόμων, Γενετική φυτών.
Πτυχιακή Εργασία : Γενετική Μηχανική στη *Discorea alata* για την ανάπτυξη αντίστασης στο Yam Mosaic Virus (YMV) και ανάπτυξη δεικτών για την ανίχνευση του ιού.

1-10-1990 – 30-6-1994
B.SC.(Hons)

Agriculture (εισαγωγικές εξετάσεις με GCE, A levels)
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University of Plymouth,
ΜΕΓΑΛΗ ΒΡΕΤΑΝΙΑ
Πτυχιακή Εργασία: Παράγοντες που επηρεάζουν την
ανάπτυξη της *Brassica oleracea* var. botrytis σε συνθήκες
ιστοκαλλιέργειας.

ΓΛΩΣΣΕΣ ΚΑΙ
ΜΟΥΣΙΚΕΣ ΣΠΟΥΔΕΣ Αγγλικά , Ισπανικά, Γαλλικά
- Απόφοιτος Ωδείου Πειραιά (Πιάνο)
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ΔΗΜΟΣΙΕΥΣΕΙΣ - ΠΕΡΙΓΡΑΦΗ ΚΑΙ ΣΥΝΤΕΛΕΣΤΕΣ ΑΠΗΧΗΣΗΣ (I.F.)

1. Pryde, J.G,* **Farmaki, T**,* and Lucocq, J.M. (1998) Okadaic Acid Induces Selective Arrest of Protein Transport in the Rough Endoplasmic Reticulum and Prevents Export into COPII-Coated Structures. ***Molecular and Cellular Biology***.18(2):1125-35. **I.F. 5,614**

Quantitative immunoelectron microscopy and subcellular fractionation established the site of endoplasmic reticulum (ER)-Golgi transport arrest induced by the phosphatase inhibitor okadaic acid (OA). OA induced the disappearance of transitional element tubules and accumulation of the anterograde-transported Chandipura (CHP) virus G protein only in the rough ER (RER) and not at more distal sites. The block was specific to the early part of the anterograde pathway, because CHP virus G protein that accumulated in the intermediate compartment (IC) at 15 degrees C could gain access to Golgi stack enzymes. OA also induced RER accumulation of the IC protein p53/p58 via an IC-RER recycling pathway which was resistant to OA and inhibited by the G protein activator aluminium fluoride. The role of COPII coats in OA transport block was investigated by using immunofluorescence and cell fractionation. In untreated cells the COPII coat protein sec 13p colocalized with p53/p58 in Golgi-IC structures of the juxtanuclear region and peripheral cytoplasm. During OA treatment, p53/p58 accumulated in the RER but was excluded from sec 13p-containing membrane structures. Taken together our data indicate that OA induces an early defect in RER export which acts to prevent entry into COPII-coated structures of the IC region.

2. **Farmaki, T.**, Ponnambalam, S., Prescott, A.R., Clausen, H., Tang, B.L., Hong, W., Lucocq, J.M. (1999) Forward and Retrograde Trafficking in Mitotic Animal Cells. ER-Golgi Transport Arrest Restricts Protein Export from the ER into COPII-Coated Structures. ***Journal of Cell Science***.112; 589-600. **I.F. 6,4**

Protein transport arrest occurs between the ER and Golgi stack of mitotic animal cells, but the location of this block is unknown. In this report we use the recycling intermediate compartment protein ERGIC 53/p58 and the plasma membrane protein CD8 to establish the site of transport arrest. Recycled ERGIC 53/p58 and newly synthesised CD8 accumulate in ER cisternae but not in COPII-coated export structures or more distal sites. During mitosis the tubulovesicular ER-related export sites were depleted of the COPII component Sec13p, as shown by immunoelectron microscopy, indicating that COPII budding structures are the target for mitotic inhibition. The extent of recycling of Golgi stack residents was also investigated. In this study we used oligosaccharide modifications on CD8 trapped in the ER of mitotic cells as a sensitive assay for recycling of Golgi stack enzymes. We find that modifications conferred by the Golgi stack-resident GalNac transferase do occur on newly synthesised CD8, but these modifications are entirely due to newly synthesised transferase rather than to enzyme recycled from the Golgi stack. Taken together our findings establish for the first time that the site of ER-Golgi transport arrest of mitotic cells is COPII budding structures, and they clearly speak against a role for recycling in partitioning of Golgi stack proteins via translocation to the ER.

3. Prescott, A.R.,* **Farmaki, T.**,* Thomson, C., James, J., Paccaud, J.P., Tang, B.L., Hong, W, Quinn, M, Ponnambalam, S, Lucocq J. (2001) Evidence for Prebudding Arrest of ER Export in Animal Cell Mitosis and its Role in Generating Golgi Partitiong Intermediates. ***Traffic***. 2(5):321-335. **I.F. 5,08**

During mitosis the interconnected Golgi complex of animal cells breaks down to produce both finely dispersed elements and discrete vesiculotubular structures. The endoplasmic reticulum (ER) plays a controversial role in generating these partitioning intermediates and here we highlight the importance of mitotic ER export arrest in this

process. We show that experimental inhibition of ER export (by microinjecting dominant negative Sar1 mutant proteins) is sufficient to induce and maintain transformation of Golgi cisternae to vesiculotubular remnants during interphase and telophase, respectively. We also show that buds on the ER, ER exit sites and COPII vesicles are markedly depleted in mitotic cells and COPII components Sec23p, Sec24p, Sec13p and Sec31p redistribute into the cytosol, indicating ER export is inhibited at an early stage. Finally, we find a markedly uneven distribution of Golgi residents over residual exit sites of metaphase cells, consistent with tubulovesicular Golgi remnants arising by fragmentation rather than redistribution via the ER. Together, these results suggest selective recycling of Golgi residents, combined with prebudding cessation of ER export, induces transformation of Golgi cisternae to vesiculotubular remnants in mitotic cells. The vesiculotubular Golgi remnants, containing populations of slow or nonrecycling Golgi components, arise by fragmentation of a depleted Golgi ribbon independently from the ER.

4. Vancanneyt, G., Sanz, C., **Farmaki, T.**, Paneque, M., Ortego, F., Castanera, P., Sanchez-Serrano, J.J. (2001) Hydroperoxide Lyase Depletion in Transgenic Potato Plants Leads to an Increase in Aphid Performance. ***Proc Natl Acad Sci USA*** 98(14):8139-44. **IF: 10.58**

Hydroperoxide lyases (HPLs) catalyze the cleavage of fatty acid hydroperoxides to aldehydes and oxoacids. These volatile aldehydes play a major role in forming the aroma of many plant fruits and flowers. In addition, they have antimicrobial activity in vitro and thus are thought to be involved in the plant defense response against pest and pathogen attack. An HPL activity present in potato leaves has been characterized and shown to cleave specifically 13-hydroperoxides of both linoleic and linolenic acids to yield hexanal and 3-hexenal, respectively, and 12-oxo-dodecenoic acid. A cDNA encoding this HPL has been isolated and used to monitor gene expression in healthy and mechanically damaged potato plants. HPL gene expression is subject to developmental control, being high in young leaves and attenuated in older ones, and it is induced weakly by wounding. HPL enzymatic activity, nevertheless, remains constant in leaves of different ages and also after wounding, suggesting that posttranscriptional mechanisms may regulate its activity levels. Antisense-mediated HPL depletion in transgenic potato plants has identified this enzyme as a major route of 13-fatty acid hydroperoxide degradation in the leaves. Although these transgenic plants have highly reduced levels of both hexanal and 3-hexenal, they show no phenotypic differences compared with wild-type ones, particularly in regard to the expression of wound-induced genes. However, aphids feeding on the HPL-depleted plants display approximately a two-fold increase in fecundity above those feeding on nontransformed plants, consistent with the hypothesis that HPL-derived products have a negative impact on aphid performance. Thus, HPL-catalyzed production of C6 aldehydes may be a key step of a built-in resistance mechanism of plants against some sucking insect pests.

5. **Farmaki, T**.**, Sanmartín, M., Jiménez, P., Paneque, M., Sanz, C., Vancanneyt, G., Leon, J. and Sanchez-Serrano, J.J. (2007). Differential Distribution of The Enzymes of the Lipoxygenase pathway in Chloroplasts. ***Journal of Experimental Botany*** 58 (3): 555-568. **IF: 6,23**

The lipoxygenase pathway is responsible for the production of oxylipins, which are important compounds for plant defence responses. Jasmonic acid, the final product of the allene oxide synthase/allene oxide cyclase branch of the pathway, regulates wound-induced gene expression. In contrast, C6 aliphatic aldehydes produced via an alternative branch catalysed by hydroperoxide lyase, are themselves toxic to pests and pathogens. Current evidence on the subcellular localization of the lipoxygenase pathway is conflicting, and the regulation of metabolic channelling between the two branches of the pathway is largely unknown. It is shown here that

while a 13-lipoxygenase (LOX H3), allene oxide synthase and allene oxide cyclase proteins accumulate upon wounding in potato, a second 13-lipoxygenase (LOX H1) and hydroperoxide lyase are present at constant levels in both non-wounded and wounded tissues. Wound-induced accumulation of the jasmonic acid biosynthetic enzymes may thus commit the lipoxygenase pathway to jasmonic acid production in damaged plants. It is shown that all enzymes of the lipoxygenase pathway differentially localize within chloroplasts, and are largely found associated to thylakoid membranes. This differential localization is consistently observed using confocal microscopy of GFP-tagged proteins, chloroplast fractionation, and western blotting, and immunodetection by electron microscopy. While LOX H1 and LOX H3 are localized both in stroma and thylakoids, both allene oxide synthase and hydroperoxide lyase protein localize almost exclusively to thylakoids and are strongly bound to membranes. Allene oxide cyclase is weakly associated with the thylakoid membrane and is also detected in the stroma. Moreover, allene oxide synthase and hydroperoxide lyase are differentially distributed in thylakoids, with hydroperoxide lyase localized almost exclusively to the stromal part, thus closely resembling the localization pattern of LOX H1. It is suggested that, in addition to their differential expression pattern, this segregation underlies the regulation of metabolic fluxes through the alternative branches of the lipoxygenase pathway.

6. Kargiotidou, A., Deli D, Galanopoulou, D., Tsaftaris, A. and **Farmaki T****. (2008). Low temperature and light regulate delta 12 fatty acid desaturases (FAD2) at a transcriptional level in cotton (*Gossypium hirsutum*). ***Journal of Experimental Botany*** *59*(8):2043-56. **IF: 6,23**

Lipid modifying enzymes play a key role in the development of cold stress tolerance in cold-resistant plants such as cereals. However, little is known about the role of the endogenous enzymes in cold-sensitive species such as cotton. Delta 12 fatty acid desaturases (FAD2), known to participate in adaptation to low temperatures through acyl chain modifications were used in gene expression studies in order to identify parameters of plant response to low temperatures. The induction of microsomal delta 12 fatty acid desaturases at an mRNA level under cold stress in plants is shown here for first time. Quantitative PCR showed that though both delta 12 omega 6 fatty acid desaturase genes FAD2-3 and FAD2-4 identified in cotton are induced under cold stress, FAD2-4 induction is significantly higher than FAD2-3. The induction of both isoforms was light regulated, in contrast a third isoform FAD2-2 was not affected by cold or light. Stress tolerance and light regulatory elements were identified in the predicted promoters of both FAD2-3 and FAD2-4 genes. Di-unsaturated fatty acid species rapidly increased in the microsomal fraction isolated from cotton leaves, following cold stress. Expression analysis patterns were correlated with the observed increase in both total and microsomal fatty acid unsaturation levels suggesting the direct role of the FAD2 genes in membrane adaptation to cold stress.

Maniatsi, S., Kappas, I., Baxevanis, A.D., **Farmaki, T.** and Abatzopoulos, T.J. (2009). Sharp phylogeographic breaks and patterns of genealogical concordance in the brine shrimp *Artemia franciscana* ***Int J Mol Sci.*** Dec 18;10(12):5455-70. **IF: 3,26**

Genealogical concordance is a critical overlay of all phylogenetic analyses, irrespective of taxonomic level. To assess such patterns of congruence we have compiled and derived sequence data for two mitochondrial (16S rRNA, COI) and two nuclear (ITS1, p26) markers in 14 American populations of the hypersaline branchiopod Artemia franciscana. Cladistic analysis revealed three reciprocally monophyletic mitochondrial clades. For nuclear DNA, incomplete lineage sorting was evident presumably as a result of slower coalescence or male-mediated dispersal. Our findings capture the genealogical interval between gene splitting and population divergence. In this sense, strong indications are provided in favour of a superspecies status and ongoing speciation in A. franciscana.

8. Kargiotidou, A., Kappas, I., Tsaftaris, A. Galanopoulou, D. and **Farmaki, T**.** (2010). Cold acclimation and low temperature resistance in cotton: *Gossypium hirsutum* phospholipase D*alpha* isoforms are differentially regulated by temperature and light. ***Journal of Experimental Botany*** 61(11):2991-3002. **IF: 6,23**

Phospholipase Dalpha (PLDalpha) was isolated from cultivated cotton (Gossypium hirsutum) and characterized. Two PLDalpha genes were identified in the allotetraploid genome of G. hirsutum, derived from its diploid progenitors, G. raimondii and G. arboreum. The genes contained three exons and two introns. The translated products shared a 98.6% homology and were designated as GrPLDalpha and GaPLDalpha. Their ORFs encoded a polypeptide of 807 amino acids with a predicted molecular mass of 91.6 kDa sharing an 81-82% homology with PLDalpha1 and PLDalpha2 from A. thaliana. A possible alternative splicing event was detected at the 5' untranslated region which, however, did not result in alternative ORFs. Cold stress (10 degrees C or less) resulted in gene induction which was suppressed below control levels (25 degrees C or 22 degrees C growth temperature) when plants were acclimated at 17 degrees C before applying the cold treatment. Differences in the expression levels of the isoforms were recorded under cold acclimation, and cold stress temperatures. Expression was light regulated under growth, acclimation, and cold stress temperatures. Characterization of the products of lipid hydrolysis by the endogenous PLDalpha indicated alterations in lipid species and a variation in levels of the signalling molecule phosphatidic acid (PA) following acclimation or cold stress.

9. Varvogli A.-A. C., Fylaktakidou K. C., **Farmaki T.** Stefanakis J. G. and Koumbis A. E. (2012) Versatile Synthesis of a 1-O-(ω-Aminolauryl)-I(4,5)P2. Oct 29, (5855-5862) ***Eur. J. Org. Chem.*** 2012 (29), 5855–5862 **I.F. 3,36**

The synthesis of a model 1-O-(ω-aminoacyl)-IP2 derivative, lauryl 4,5-bisphosphate 31, was realized following a versatile and high-yielding scheme. The flexible synthetic strategy used for this purpose allows the preparation of a range of other useful IP, IP2 and IP3 derivatives. In view of the central role played by IPs and PIPs in cellular life, the preparation of functionalized myo-inositol derivatives of this type may facilitate the isolation and fluorescent localization of related proteins.

10. Karali D., Oxley D., Runions J., Ktistakis N. and **Farmaki T**** (2012). The *Arabidopsis thaliana* immunophylin ROF1 directly interacts with PI(3)P and PI(3,5)P2 and affects seedling emergence under osmotic stress. ***PLoS One***. Nov 2, 7(11) **I.F. 4,24**

A direct interaction of the Arabidopsis thaliana immunophilin ROF1 with phosphatidylinositol-3-phosphate and phosphatidylinositol-3,5-bisphosphate was identified using a phosphatidylinositol-phosphate affinity chromatography of cell suspension extracts, combined with a mass spectrometry (nano LC ESI-MS/MS) analysis. The first FK506 binding domain was shown sufficient to bind to both phosphatidylinositol-phosphate stereoisomers. GFP-tagged ROF1 under the control of a 35S promoter was localised in the cytoplasm and the cell periphery of Nicotiana tabacum leaf explants. Immunofluorescence microscopy of Arabidopsis thaliana root tips verified its cytoplasmic localization and membrane association and showed ROF1 localization in the elongation zone which was expanded to the meristematic zone in plants grown on high salt media. Endogenous ROF1 was shown to accumulate in response to high salt treatment in Arabidopsis thaliana young leaves as well as in seedlings germinated on high salt media (0.15 and 0.2 M NaCl) at both an mRNA and protein level. Plants over-expressing ROF1, (WSROF1OE), exhibited enhanced germination under salinity stress which was significantly reduced in the rof1(-) knock out mutants and abolished in the double mutants of ROF1 and of its interacting homologue ROF2 (WSrof1(-)/2(-)). Our results show that ROF1 plays an important role

in the osmotic/salt stress responses of germinating Arabidopsis thaliana seedlings and suggest its involvement in salinity stress responses through a phosphatidylinositol-phosphate related protein quality control pathway.

11. Oxley, D., Ktistakis, N. and **Farmaki, T****.(2013).
Differential isolation and identification of PI(3)P and PI(3,5)P2 binding proteins from Arabidopsis thaliana using an agarose-phosphatidylinositol-phosphate affinity chromatography. ***J Proteomics.*** 91:580-94. **I.F. 4,12**
A phosphatidylinositol-phosphate affinity chromatographic approach combined with mass spectrometry was used in order to identify novel PI(3)P and PI(3,5)P2 binding proteins from Arabidopsis thaliana suspension cell extracts. Most of the phosphatidylinositol-phosphate interacting candidates identified from this differential screening are characterized by lysine/arginine rich patches. Direct phosphoinositide binding was identified for important membrane trafficking regulators as well as protein quality control proteins such as the ATG18p orthologue involved in autophagosome formation and the lipid Sec14p like transfer protein. A pentatricopeptide repeat (PPR) containing protein was shown to directly bind to PI(3,5)P2 but not to PI(3)P. PIP chromatography performed using extracts obtained from high salt (0.4M and 1M NaCl) pretreated suspensions showed that the association of an S5-1 40S ribosomal protein with both PI(3)P and PI(3,5)P2 was abolished under salt stress whereas salinity stress induced an increase in the phosphoinositide association of the DUF538 domain containing protein SVB, associated with trichome size. Additional interacting candidates were co-purified with the phosphoinositide bound proteins. Binding of the COP9 signalosome, the heat shock proteins, and the identified 26S proteasomal subunits, is suggested as an indirect effect of their interaction with other proteins directly bound to the PI(3)P and the PI(3,5)P2 phosphoinositides.
BIOLOGICAL SIGNIFICANCE:
PI(3,5)P2 is of special interest because of its low abundance. Furthermore, no endogenous levels have yet been detected in A. thaliana (although there is evidence for its existence in plants). Therefore the isolation of novel interacting candidates in vitro would be of a particular importance since the future study and localization of the respective endogenous proteins may indicate possible targeted compartments or tissues where PI(3,5)P2 could be enriched and thereafter identified. In addition, PI(3,5)P2 is a phosphoinositide extensively studied in mammalian and yeast systems. However, our knowledge of its role in plants as well as a list of its effectors from plants is very limited.

12. Taurino, M., Abelenda, J.A., Río-Alvarez, I., Navarro, C., Vicedo, B., **Farmaki**, **T.**, Jiménez, P., García-Agustín, P., López-Solanilla, E., Prat, S., Rojo, E., Sánchez-Serrano, J.J. and Sanmartín, M.(2014) Jasmonate-dependent modifications of the pectin matrix during potato development function as a defense mechanism targeted by *Dickeya dadantii* virulence factors. ***Plant J.*** 77(3):418-29. **I.F. 7,11**
The plant cell wall constitutes an essential protection barrier against pathogen attack. In addition, cell-wall disruption leads to accumulation of jasmonates (JAs), which are key signaling molecules for activation of plant inducible defense responses. However, whether JAs in return modulate the cell-wall composition to reinforce this defensive barrier remains unknown. The enzyme 13-allene oxide synthase (13-AOS) catalyzes the first committed step towards biosynthesis of JAs. In potato (Solanum tuberosum), there are two putative St13-AOS genes, which we show here to be differentially induced upon wounding. We also determine that both genes complement an Arabidopsis aos null mutant, indicating that they encode functional 13-AOS enzymes. Indeed, transgenic potato plants lacking both St13-AOS genes (CoAOS1/2 lines) exhibited a significant reduction of JAs, a concomitant decrease in

wound-responsive gene activation, and an increased severity of soft rot disease symptoms caused by Dickeya dadantii. Intriguingly, a hypovirulent D. dadantii pel strain lacking the five major pectate lyases, which causes limited tissue maceration on wild-type plants, regained infectivity in CoAOS1/2 plants. In line with this, we found differences in pectin methyl esterase activity and cell-wall pectin composition between wild-type and CoAOS1/2 plants. Importantly, wild-type plants had pectins with a lower degree of methyl esterification, which are the substrates of the pectate lyases mutated in the pel strain. These results suggest that, during development of potato plants, JAs mediate modification of the pectin matrix to form a defensive barrier that is counteracted by pectinolytic virulence factors from D. dadantii.

13. Maniatsi, S., **Farmaki, T**.** and Abatzopoulos, T.J******.(2015) FKBP and ubiquitin are strongly related to the stress history of different Artemia species ***Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology***. **I.F. 2,38**

Research on stress response has increased greatly in recent years. Though most studies focus on its cellular and molecular basis, the ecological and evolutionary aspects of stress response gain more and more interest. Here, we use species and parthenogenetic strains of the genus Artemia, an extremophile model organism, to study, for the first time, a protein well known for its chaperon activity during stress. More specifically, the sequence evolution, transcription and protein accumulation of an FK506-Binding Protein (FKBP) homolog was investigated under heat and salt shocks. Additionally, the expression profile of a gene coding for ubiquitin, a heat-inducible protein strongly related to the proteasome pathway, was recorded under the same conditions. Biochemical and phylogenetic analyses showed that the studied FKBP orthologue is a typical representative of the family that clusters with other crustacean sequences. Both genes are expressed regardless of the type of stress. However, our results in combination with the fact that Artemia species and parthenogenetic strains chosen have different characteristics (e.g. different heat or salt tolerance, capability or not to produce clones) provide some suggestions about the evolutionary significance of these proteins. For FKBP, expression patterns seem to depend on the environmental conditions and the evolutionary history of each Artemia population while ubiquitin has a clear and more conserved role under heat shock.

14. **Farmaki T.** (2016) Use of a Phosphatidylinositol Phosphate Affinity Chromatography (PIP Chromatography) for the Isolation of Proteins Involved in Protein Quality Control and Proteostasis Mechanisms in Plants. ***Plant Proteostasis*** Volume 1450 of the series ***Methods in Molecular Biology*** pp 223-232.

Protein functionality depends directly on its accurately defined three-dimensional organization, correct and efficient posttranslational modification, and transport. However, proteins are continuously under a hostile environment threatening with folding aberrations, aggregation, and mistargeting. Therefore, proteins must be constantly "followed up" by a tightly regulated homeostatic mechanism specifically known as proteostasis. To this end other proteins ensure this close surveillance including chaperones as well as structural and functional members of the proteolytic mechanisms, mainly the autophagy and the proteasome related. They accomplish their action via interactions not only with other proteins but also with lipids as well as cytoskeletal components. We describe a protocol based on an affinity chromatographic approach aiming at the isolation of phosphatidyl inositol phosphate binding proteins, a procedure which results into the enrichment and purification of several members of the proteostasis mechanism, e.g. autophagy and proteasome, among other components of the cell signaling pathways.

15. Bourtsala A., **Farmaki T.** and Galanopoulou D. Phospholipases D alpha and delta are involved in local and systemic wound responses in cotton (*G. hirsutum*). ***Biochemistry and Biophysics Reports*** 9:133-139.

Phospholipases D (PLDs) catabolize structural phospholipids to produce phosphatidic acid (PtdOH), a lipid playing central role in signalling pathways in animal, yeast and plant cells. In animal cells two PLD genes have been studied while in model plant *Arabidopsis* twelve genes exist, classified in six classes (α-ζ). This underlines the role of these enzymes in plant responses to environmental stresses. However, information concerning the PLD involvement in the widely cultivated and economically important cotton plant responses is very limited. The aim of this report was to study the activity of conventional cotton PLD and its participation in plant responses to mechanical wounding, which resembles both biotic and abiotic stresses. PLDa activity was identified and further characterized by transphosphatidylation reaction. Upon wounding, cotton leaf responses consist of an acute *in vitro* increase of PLDa activity in both wounded and systemic tissue. However, determination of the *in vivo* PtdOH levels under the same wounding conditions revealed a rapid PtdOH formation only in wounded leaves and a late response of a PtdOH increase in both tissues. Expression analysis of PLDa and PLDδ isoforms in the wounded and systemic tissue showed mRNA accumulation of both isoforms, but only PLDδ exerts a high and sustainable expression in systemic leaves, indicating that this isoform is mainly responsible for the systemic wound-induced PtdOH production. Therefore, our data suggest that PLDa and PLDδ isoforms are involved in different steps in cotton wound signalling.

16. Angeliki Bourtsala, Ioannis Dafnis, Angeliki Chroni, **Theodora Farmaki** **, Dia Galanopoulou **. Study of the involvement of phosphatidic acid formation in the expression of wound-responsive genes in cotton. ***Lipids*** (in press) **I. F.** 1.934

Plants use phospholipase D (PLD, EC 3.1.4.4)/phosphatidic acid (PtdOH) for the transduction of environmental signals including those coming from wounding. Based on our previous findings suggesting that wound-induced PLDa-derived PtdOH can act as a local signaling molecule in cotton (G. hirsutum), we show that wounding immediately increases local NADPH oxidase (NADPHox) and cellulose synthase (CeSA) gene expression. After developing a novel fluorimetric assay for the investigation of n-butanol inhibitory effect on PLD activity, we show that only NADPHox upregulation is reduced when n-butanol is applied prior to wounding. This suggests that NADPHox is a possible downstream target of PLD function, while a different CeSA-involving response system may exist in cotton. Overall, this study provides new knowledge on signal transduction mechanisms following wounding of cotton leaves.

17. Lefa, P., Samiotaki, M., Panagiotou, G. and **Farmaki, T** **. Proteomics study of the thermotolerance mechanism in *Arabidopsis thaliana* using ROF1 and ROF2 mutants (υπό προετοιμασία).

18. Paschalidou, P., Samiotaki, M., Panagiotou, G. and **Farmaki, T** **. A method of discriminating between *T. aestivum* and *T. durum* in wheat mixtures (υπό προετοιμασία).

19. Paschalidou, P., Samiotaki, M., Panagiotou, G. and **Farmaki, T** **. Characterisation and study of an 85 kD band associated with heat stress resistance in *Arabidopsis thaliana*

* Ίση συμμετοχή ** Corresponding author

Citation index : 933 (google scholar), **670** [Scopus and Web of Knowledge (all databases)].

ΣΥΝΕΔΡΙΑ

1. Mantell, S.H., Torres, M., **Farmaki, T.** and Thangavelu, M. 1995. Progress towards Gene Insertion and Molecular Fingerprinting of Dioscorea Food Yams. Tropical and Subtropical Agriculture, Conference Proceedings.

2. Lucocq, J and **Farmaki, T**. 1998. Dynamics of Protein Traffic Between the Endoplasmic Reticulum and Golgi Apparatus in Mitotic and Okadaic Acid Treated Cells. Abstract. The Golgi Complex. Pavia. Italy.

3. **Farmaki, T**. and Lucocq, J. 1999. Cell Cycle Regulation of ER-Golgi Protein Traffic. ECBO (European Congress of Cell Biology), Bologna, Italy.

4. **Farmaki, T**., Vancanneyt, G., Paneque, M. y Sanchez Serrano, J.J. 2001 Manipulación Genetica de la Biosintesis de Oxilipinas en Patata. VI Reunión de Biología Molecular de Plantas. Toledo, Spain.

5. **Farmaki, T.**, Paneque, M., Vancanneyt, G., and Sanchez-Serrano, J.J. 2002 Analysis of ultrastructural localisation and mode of function in wound response of the enzymes involved in the oxylipin pathway. ELSO (European Life Scientist Organisation), Nice, France.

6. **Farmaki, T.**, Paneque, M., Vancanneyt, G., and Sanchez-Serrano, J.J. 2002 Analysis of ultrastructural localisation and mode of function in wound response of the enzymes involved in the oxylipin pathway. 13 th Congress of the Federation of European Societies of Plant Physiology. Crete, Greece.

7. Kargiotidou, A., Deli, D., Solovyev, V., Galanopoulou, D., Tsaftaris, A., and **Farmaki, T.** Cold stress in *Gossypium hirsutum*. Effect of cold and light on gene expression. 2005 EEBMB conference. Athens.

8. Kargiotidou, A., Deli, D., Galanopoulou, D., Tsaftaris, A. and **Farmaki, T.**
Cotton response to low temperatures: Isolation, characterization and expression analysis of membrane modifying enzymes from *Gossypium hirsutum*
European Plant Science Organisation 4th EPSO Conference "Plants for Life"
Toulon (Côte d'Azur), France 22 – 26 June 2008

9. Varvogli, A. A. C., Koumbis, A. E., **Farmaki T**.
Solid phase synthesis of myo –inositol phosphates.
EUCHEMS Chemistry Congress. Torino, Italy. 16-20 September 2008.

10. Oxley, D., Ktistakis, N. and **Farmaki, T**.

Isolation and Identification of PI(3)P and PI(3,5)P_2 binding proteins from Arabidopsis thaliana. Gordon Research Conference. Plant Lipids: Structure Metabolism and Function.
Galveston-Texas (USA). 1-6 February 2009.

11. Kargiotidou A., Deli, D., Kappas I., Tsaftaris A., Galanopoulou D. and **Farmaki T**.
Low temperature regulation of stress responsive genes in cotton. Isolation, characterization and expression study of membrane modifying enzymes. Greek Lipid Forum (Euro Fed Lipid) Athens 15 - 16 June 2009.

12. Geromichalos, G., **Farmaki**, **T.**, Ditsa, M., Lamari, F., Markala, D., Dalezis, P., Papaeorgiou, A. and Sinakos, Z.
The Carotenoids crocine and crocetin inhibit the X factor activity. Study *in silico*
and *in vitro*.
20th Haematological Congress. 4-7 November 2009. Crete, Greece.

13. Stefanakis, J.G. **Farmaki**, **T.** and Koumbis, A.
Solution and solid phase synthesis of functionalized glycerols. 14th Hellenic Symposium of Medicinal Chemistry, April, 2010.

14. Bourtsala, A. **Farmaki**, **T.**, Galanopoulou, D.
Phospholipase D activity from cotton (*G.hirsutum*). Greek Lipid Forum (Euro Fed Lipid) Thessaloniki, 6 June 2011.

15. Karali, D., Oxley, D., Ktistakis, N and **Farmaki**, **T.**
Phosphatidyl-inositol phosphate interaction of the *Arabidopsis thaliana* immunophylin ROF1 and its role in plant osmotic stress responses. Greek Lipid Forum (Euro Fed Lipid) Thessaloniki, 6 June 2011.

16. Karali, D., Oxley, D., Ktistakis, N and **Farmaki**, **T.**
Isolation, identification and study of novel PI(3)P and PI(3,5)P_2 binding proteins from *Arabidopsis thaliana* using an agarose-inositide affinity chromatography 5th European Symposium on Plant Lipids, 10 - 13 July 2011, Gdansk, Poland.

17. Bourtsala A., **Farmaki T**., Galanopoulou D.Study of cotton (*Gossypium hirsutum*) phospholipase D and its involvement in wound stress responses. 62nd HSBMB conference 9-11 December 2011 Eugenides Foundation, Athens.

18. Karali, D., Oxley, D., Amoutzias, G., Runions, J., Ktistakis, N. and **Farmaki, T.** ROF1 and ROF2 affect plant germination under osmotic and salinity stress through a phosphatidylinositol-phosphate related pathway. 20th International Symposium on Plant Lipids. Sevilla, Spain. July 8-13, 2012.

19. Bourtsala A., **Farmaki T.,** Galanopoulou D. Study of cotton (Gossypium hirsutum) phospholipase D and its involvement in wound stress responses. FEBS-workshop: "Lipids: From lipidomics to disease and green energy", August 23-29 2012 Spetses, Greece.

20. Karali, D., Oxley, D., Ktistakis, N and **Farmaki, T.**
A Screen For Novel PI(3,5)P_2 Interacting Proteins. Identification of enzymes participating in plant stress responses through their interaction with PI(3,5)P_2

63rd Congress of the Hellenic Society of Biochemistry and Molecular Biology. November 9-11 2012.

21. Maniatsi, S., **Farmaki, T.** and Abatzopoulos, T.J. The role of FKBPs in the brine shrimp *Artemia* 63rd Congress of the Hellenic Society of Biochemistry and Molecular Biology. November 9-11 2012.

22. Bourtsala, A., **Farmaki, T.**, Galanopoulou, D. Involvement of plant phospholipase D in wound stress responses: expression, activity, phosphatidic acid levels and possible endogenous substrates. Jacques Monod Conference on Molecular basis for membrane remodelling and organization, Roscoff, Brittany, France November 15-19, 2014

23. Bourtsala, A., **Farmaki, T.,** Stratikos, E., Galanopoulou, D. Lipid substrate preference of phospholipase D upon cotton wounding. 66ο Πανελλήνιο Συνέδριο Ελληνικής Εταιρείας Βιοχημείας & Μοριακής Βιολογίας 11-13 Δεκεμβρίου 2015, Αθήνα.

24. Bourtsala, A., **Farmaki, T.,** Galanopoulou, D. Involvement of cotton plant phospholipases D in wound stress responses: expression, activity, phosphatidic acid levels and possible endogenous substrates. FEBS advanced course on lipids. Lipid–protein interactions and organelle function Spetses, Greece September 1–8, 2016.

25. **Farmaki, T.** Cross-talk between proteostatic mechanisms and signaling pathways in plants. HBio conference. Thessaloniki, November 19-22, 2016.

26. Bourtsala, A., Dafnis, I., **Farmaki, T.,** Galanopoulou, D. Phosphatidic acid formation is differentially involved in the expression of wound-responsive genes in cotton. 68th Congress of the Hellenic Society of Biochemistry and Molecular Biology. November 10-12 2017.

Οργανωτική επιτροπή

- HBio 2016 (https://hscbio.wordpress.com/conferences- when/2016-09/)

Μέλος:

- BSCB (British Society of Cell Biology), Greek Society of Molecular Biology and Biochemistry.

- **COST ACTION** BM1307 PROTEOSTASIS

- COST ACTION CA15138 TRANSAUTOPHAGY

ΠΡΟΣΚΕΚΛΗΜΕΝΕΣ ΟΜΙΛΙΕΣ

1. 2nd Protein Summer School. Τίτλος παρουσίασης : «Studying the diverse roles of proteins with PPIase (peptidyl-prolyl cis-trans isomerase) activity»
Εθνικό και Καποδιστριακό Πανεπιστήμιο Αθηνών. Σχολή Θετικών Επιστημών, Τμήμα Βιολογίας. 28-30 Μαΐου 2012.

2. Green Life Sciences Seminar Swammerdam Institute for Life Sciences. University of Amsterdam.
«Identification of proteins participating in plant stress responses through their interaction with PI(3,5)P2». 15 Νοεμβρίου 2013.

3. Charles University, 1st Faculty of Medicine, Institute of Cellular Biology and Pathology. Praha, Czech Republic. "Studying the diverse roles of proteins with PPIase (peptidyl-prolyl cis-trans isomerase) activity". Απρίλιος 2014.

4. Durham University. Durham Centre for Crop Improvement Technology, UK. "Phosphatidylinositolphosphate signalling in plants", 17 Φεβρουαρίου 2016.

ΥΠΟΤΡΟΦΙΕΣ - ΒΡΑΒΕΙΑ

1. "Ph.D. studentship", University of Dundee. (1996-1999).
(Επιλογή της διδακτορικής διατριβής ως καλύτερη διδακτορική διατριβή για το έτος 1999).
2. Marie Curie research training. European Commission. Directorate F, Human potential and mobility. (MCFI-1999-00988) (1999-2001)
3. Postdoctoral Fellowship. Natural Oxylipins and Defence in Ornamentals (NODO).
(QLK5-CT-2001-02445) (2001-2003)
4. Short term EMBO fellowship, ASTF 395.00-2007 (2008). Χρηματοδότηση 7 000 €.

ΑΚΑΔΗΜΑΪΚΕΣ ΔΡΑΣΤΗΡΙΟΤΗΤΕΣ

1. Επισκέπτρια Καθηγήτρια στο *Swammerdam Institute for Life Sciences (SILS)* Πανεπιστήμιο του Amsterdam. 1-30 Νοεμβρίου, 2013.

2. ΕΠΙΒΛΕΨΗ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΚΑΙ ΜΕΤΑΔΙΔΑΚΤΟΡΙΚΩΝ ΦΟΙΤΗΤΩΝ

2003-2005: 1 μεταπτυχιακή φοιτήτρια
2005-2010: 3 υποψήφιοι διδάκτορες στο πρόγραμμα ΠΕΝΕΔ (σε συνεργασία με τα συνεργαζόμενα Πανεπιστημιακά Τμήματα)
2008-2010: 1 μεταπτυχιακή φοιτήτρια
2010-σήμερα: 1 μεταδιδακτορική φοιτήτρια, 1 υποψήφια διδάκτωρ σε συνεργασία με την Δρ. Γαλανοπούλου, ΕΚΠΑ.
2016 -: Επίβλεψη τριών προπτυχιακών διατριβών σε συνεργασία με το Πανεπιστήμιο Θεσσαλίας.

ΕΠΙΒΛΕΨΗ ΦΟΙΤΗΤΩΝ ΚΑΙ ΣΧΕΤΙΚΕΣ ΔΗΜΟΣΙΕΥΣΕΙΣ – ΑΝΑΚΟΙΝΩΣΕΙΣ.

1. Καργιωτίδου Αναστασία (2003-2005) : Επίβλεψη μεταπτυχιακής διατριβής. Θέση μετά την ολοκλήρωση της συνεργασίας : Διδάκτωρ στο Δημοκρίτειο Πανεπιστήμιο Θράκης. Ερευνήτρια Δ, ΕΘΙΑΓΕ.

Σχετικές δημοσιεύσεις:

1. Kargiotidou, A., Deli D, Galanopoulou, D., Tsaftaris, A. and **Farmaki T****. (2008). Low temperature and light regulate delta 12 fatty acid desaturases (FAD2) at a transcriptional level in cotton (*Gossypium hirsutum*). ***Journal of Experimental Botany*** 59(8):2043-56.

2. Kargiotidou, A., Kappas, I., Tsaftaris, A. Galanopoulou, D. and **Farmaki, T**.** (2010). Cold acclimation and low temperature resistance in cotton: *Gossypium hirsutum* phospholipase D*alpha* isoforms are differentially regulated by temperature and light. ***Journal of Experimental Botany*** 61(11):2991-3002.
3. Kargiotidou, A. and **Farmaki, T**.**
Over-expression of Fad2-4 fatty acid desaturase from *G. hirsutum* confers membrane resistance to cold stress in cotton plants (υπό προετοιμασία).
4. Kargiotidou, A., Deli, D., Solovyev, V., Galanopoulou, D., Tsaftaris, A., and **Farmaki, T.** Cold stress in *Gossypium hirsutum*. Effect of cold and light on gene expression. 2005 EEBMB conference. Athens.
5. Kargiotidou, A., Deli, D., Galanopoulou, D., Tsaftaris, A. and **Farmaki, T.**
Cotton response to low temperatures: Isolation, characterization and expression analysis of membrane modifying enzymes from *Gossypium hirsutum*
European Plant Science Organisation 4th EPSO Conference "Plants for Life"
Toulon (Côte d'Azur), France 22 – 26 June 2008
6. Kargiotidou A., Deli, D., Kappas I., Tsaftaris A., Galanopoulou D. and **Farmaki T**.
Low temperature regulation of stress responsive genes in cotton. Isolation, characterization and expression study of membrane modifying enzymes. Greek Lipid Forum (Euro Fed Lipid) Athens 15 - 16 June 2009.

2. Καραλή Αικατερίνη-Δεβόρα (2008-2010): Μεταπτυχιακή εξάσκηση.
Θέση μετά την ολοκλήρωση της συνεργασίας : Μεταπτυχιακή φοιτήτρια στο Πανεπιστήμιο Κρήτης.
Σχετικές δημοσιεύσεις:
1. Karali D., Oxley D., Runions J., Ktistakis N. and **Farmaki T**** (2012).
The *Arabidopsis thaliana* immunophylin ROF1 directly interacts with PI(3)P and PI(3,5)P2 and affects seedling emergence under osmotic stress. ***PLOS one***. Nov 2, 7(11).
2. Karali, D., Oxley, D., Ktistakis, N and **Farmaki**, **T.**
Phosphatidyl-inositol phosphate interaction of the *Arabidopsis thaliana* immunophylin ROF1 and its role in plant osmotic stress responses. Greek Lipid Forum (Euro Fed Lipid) Thessaloniki, 6 June 2011.
3. Karali, D., Oxley, D., Ktistakis, N and **Farmaki**, **T.**
Isolation, identification and study of novel PI(3)P and PI(3,5)P_2 binding proteins from *Arabidopsis thaliana* using an agarose-inositide affinity chromatography 5th European Symposium on Plant Lipids, 10 - 13 July 2011, Gdansk, Poland.
4. Karali, D., Oxley, D., Amoutzias, G., Runions, J., Ktistakis, N. and Farmaki, T. ROF1 and ROF2 affect plant germination under osmotic and salinity stress through a phosphatidylinositol-phosphate related pathway. 20th International Symposium on Plant Lipids. July 8-13, 2012.
5. Karali, D., Oxley, D., Ktistakis, N and Farmaki, T.
A Screen For Novel PI(3,5)P_2 Interacting Proteins. Identification of enzymes participating in plant stress responses through their interaction with PI(3,5)P_2 63rd Congress of the Hellenic Society of Biochemistry and Molecular Biology. November 9-11 2012.

3. Μανιάτση Στεφανία (2008 – 2014) : Υποψήφια διδάκτωρ, ΠΕΝΕΔ 2003, Επίβλεψη μεταδιδακτορικής μελέτης.

Σχετικές δημοσιεύσεις:

1. Maniatsi, S., Kappas, I., Baxevanis, A.D., **Farmaki, T.** and Abatzopoulos, T.J. (2009). Sharp phylogeographic breaks and patterns of genealogical concordance in the brine shrimp *Artemia franciscana* ***Int J Mol Sci.*** Dec 18;10(12):5455-70.1.

2. Maniatsi, S., **Farmaki, T**. and Abatzopoulos, T.J. The role of FKBPs in the brine shrimp *Artemia* 63rd Congress of the Hellenic Society of Biochemistry and Molecular Biology.

3. Maniatsi, S., **Farmaki, T**.** and Abatzopoulos, T.J******.(2015) FKBP and ubiquitin are strongly related to the stress history of different Artemia species ***Comparative Biochemistry and Physiology Part B: Biochemistry and Molecular Biology***.

4. Μπουρτσάλα Αγγελική (2010 – σήμερα). Επίβλεψη μεταπτυχιακής και διδακτορικής διατριβής σε συνεργασία με την Καθ. κ. Γαλανοπούλου Ν. (ΕΚΠΑ).

Σχετικές δημοσιεύσεις:

1. Bourtsala, A. **Farmaki**, **T.**, Galanopoulou, D.
Phospholipase D activity from cotton (*G.hirsutum*). Greek Lipid Forum (Euro Fed Lipid) Thessaloniki, 6 June 2011.

2. Bourtsala A., **Farmaki T**., Galanopoulou D.Study of cotton (*Gossypium hirsutum*) phospholipase D and its involvement in wound stress responses. 62nd HSBMB conference 9-11 December 2011 Eugenides Foundation, Athens.

3. Bourtsala A., **Farmaki T.,** Galanopoulou D. Study of cotton (Gossypium hirsutum) phospholipase D and its involvement in wound stress responses. FEBS-workshop: "Lipids: From lipidomics to disease and green energy", August 23-29 2012 Spetses, Greece.

4. Bourtsala A., **Farmaki T.,** Galanopoulou D. Involvement of plant phospholipase D in wound stress responses: expression, activity, phosphatidic acid levels and possible endogenous substrates. Jacques Monod Conference on Molecular basis for membrane remodelling and organization, Roscoff, Brittany, France November 15-19, 2014

5. Bourtsala, A., **Farmaki, T.,** Stratikos, E., Galanopoulou, D. Lipid substrate preference of phospholipase D upon cotton wounding. 66ο Πανελλήνιο Συνέδριο Ελληνικής Εταιρείας Βιοχημείας & Μοριακής Βιολογίας 11-13 Δεκεμβρίου 2015, Αθήνα.

6. Bourtsala, A., **Farmaki, T.,** Galanopoulou, D. Involvement of cotton plant phospholipases D in wound stress responses: expression, activity, phosphatidic acid levels and possible endogenous substrates. FEBS advanced course on lipids. Lipid–protein interactions and organelle function Spetses, Greece September 1–8, 2016.

7. Bourtsala A., **Farmaki T.** and Galanopoulou D. Phospholipases D alpha and delta are involved in local and systemic wound responses in cotton (*G. hirsutum*). ***Biochemistry and Biophysics Reports*** 9:133-139.

8. Bourtsala, A., Dafnis, I., **Farmaki, T.,** Galanopoulou, D. Phosphatidic acid formation is differentially involved in the expression of wound-responsive genes in cotton. 68th Congress of the Hellenic Society of Biochemistry and Molecular Biology. November 10-12 2017.

9. Angeliki Bourtsala, Ioannis Dafnis, Angeliki Chroni, **Theodora Farmaki** **, Dia Galanopoulou **. Study of the involvement of phosphatidic acid formation in the expression of wound-responsive genes in cotton. ***Lipids*** (in press).

3. ΔΙΔΑΣΚΑΛΙΑ:

Έτη 2006 και 2007:	"Σύγρονες τεχνικές και εφαρμογές στη Βιολογία Κυττάρου". Ειδικά μαθήματα Μοριακής Βιολογίας και Εργαστήρια Μοριακής Βιολογίας. Δημοκρίτειο Πανεπιστήμιο Θράκης.
2006 β΄ εξάμηνο:	"Βιολογία κυττάρου ΙΙ". Δημοκρίτειο Πανεπιστήμιο Θράκης .
2007 στ΄ εξάμηνο:	"Ειδικά θέματα κυτταρικής Βιολογίας". Δημοκρίτειο Πανεπιστήμιο Θράκης.
2016 -:	Εισηγήτρια Μεταπτυχιακού μαθήματος του Γεωπονικού Πανεπιστημίου Αθηνών. Τίτλος εισήγησης: Plant proteolytic systems: lessons from mammals.
2016 -:	Εισηγήτρια του μαθήματος «Μοριακή και Αναπτυξιακή Βιολογία Φυτών» του προπτυχιακού προγράμματος σπουδών του Τμήματος Βιοχημείας και Βιοτεχνολογίας, Πανεπιστήμιο Θεσσαλίας. Τίτλος εισήγησης: «Ρόλοι των φωσφατίδυλο-ινοσιτιδίων σε μηχανισμούς σηματοδότησης στα φυτά»

ΚΡΙΤΗΣ
Α) ΣΕ ΔΙΕΘΝΗ ΕΠΙΣΤΗΜΟΝΙΚΑ ΠΕΡΙΟΔΙΚΑ
Ενδεικτικά :

1. Nature scientific reports
2. PLoS ONE
3. BMC Plant Biology
4: BioSystems
5. Journal of Plant Physiology
6. Plant Cell Reports
7: Plant Physiology and Biochemistry
8: Plant Molecular Biology Reporter
9: Theoretical and Applied Genetics
10: British Microbiology Research Journal
11: Molecular Systems Biology
12: Journal of Integrative Plant Biology
13: American Journal of Botany
14: International Journal of American Sciences

Β) ΣΕ ΔΙΑΤΡΙΒΕΣ
8 μεταπτυχιακές διατριβές που υποβλήθηκαν στο Μεσογειακό Αγρονομικό Ινστιτούτο Χανίων (MAICh) από το 2009.

Γ) Σε ανταγωνιστικές προτάσεις ΕΣΠΑ και άλλες προτάσεις.

ΠΡΟΓΡΑΜΜΑΤΑ ΠΟΥ ΥΛΟΠΟΙΗΘΗΚΑΝ Η ΕΧΟΥΝ ΕΓΚΡΙΘΕΙ

1. Συνεργαζόμενο μέλος της συντονιστική ομάδας για την πρόταση: **CANVAS: Τίτλος πρότασης :** Cotton Varieties Classification and Identification. Research Cooperation for the Enhancement of the Competitiveness and for the Technological Improvement of Greek Cotton using Biotechnology and Integrated Cultivation Management Techniques. EPAN / Food, Agricultural Development and Aquaculture. GSRT. Λήξη προγράμματος: 31-12-2006 (Εντεταγμένο έργο). Προϋπολογισμός για τον φορέα: 171 360 00 €.

2. Επιστημονικώς Υπεύθυνη και Συντονίστρια του συνολικού έργου.
Τίτλος πρότασης: Βελτίωση της Αντοχής των Φυτών στο Κρύο. Ο Ρόλος των Βιολογικών Μεμβρανών και η Αναγνώριση και Χαρακτηρισμός των Συνεργαζόμενων με τα Φωσφολιπίδια Πρωτεϊνών.
Πρόγραμμα Ενίσχυσης του Ερευνητικού Δυναμικού (ΠΕΝΕΔ)-2003.
Έναρξη έργου : 1-3-2006
Λήξη : 30-6-2009 (Εντεταγμένο έργο)
Γ΄Κοινοτικό Πλαίσιο Στήριξης
Γενική Γραμματεία Έρευνας και Τεχνολογίας.
Χρηματοδότηση για τον φορέα: 204 000 €.

3. Συνεργαζόμενο μέλος ερευνητικής ομάδας που συμμετέχει στο έργο:
Τίτλος πρότασης: Μεταφοράσες της γλουταθειόνης: μοριακά εργαλεία για την ανάπτυξη βασικής και εφαρμοσμένης έρευνας στα πεδία της *πράσινης* και *κόκκινης βιοτεχνολογίας*
Επιχειρησιακό πρόγραμμα: «Εκπαίδευση και Δια βίου Μάθηση», ΕΣΠΑ 2007 - 2013 Πράξη «Θαλής». Χρηματοδότηση για την ομάδα του ΕΚΕΤΑ (100 000 €).

4. Short term EMBO fellowship, ASTF 395.00-2007 (2008). **Τίτλος πρότασης :** "Structural And Functional Characterisation of the Transporting Intermediates of a Novel PI(3)P And PI(3,5)P_2 Binding Protein From *Arabidopsis thaliana*." Χρηματοδότηση 7 000 €.

ΑΛΛΕΣ ΔΡΑΣΤΗΡΙΟΤΗΤΕΣ
Συμμετοχή σε προγράμματα προβολής του ΕΚΕΤΑ (Ανοιχτές Θύρες), σε επιτροπές διαγωνισμού και αξιολόγησης ερευνητικού εξοπλισμού και μέλος τριμελών επιτροπών διδακτορικών διατριβών.

ΕΡΕΥΝΗΤΙΚΕΣ ΔΡΑΣΤΗΡΙΟΤΗΤΕΣ ΤΟΥ ΕΡΓΑΣΤΗΡΙΟΥ ΚΑΙ ΣΥΝΕΡΓΑΣΙΕΣ
1. Απομόνωση, χαρακτηρισμός και μελέτη των πρωτεϊνών που αλληλεπιδρούν με τα PI(3)P και PI(3,5)P_2 φωσφοινοσιτίδια από το φυτό *Arabidopsis thaliana* με χρήση χρωματογραφίας αγχιστείας ινοσιτιδίου-αγαρόζης. Σε συνεργασία με τα εργαστήρια των Nicolas Ktistakis, Babraham Institute, UK και David Oxley, Babraham Institute, UK.

2. Μελέτη των FKBP ROF1 και ROF2 της *A. thaliana* κάτω από συνθήκες αλατότητας, οσμωτικής καταπόνησης και την επίδραση διαφορετικών αναπτυξιακών παραγόντων. Ο ρόλος τους μέσω μηχανισμών αποδόμησης ή επιδιόρθωσης των πρωτεϊνών. Πρωτεομική μελέτη σε συνεργασία με την Δρ.

Μαρτίνα Σαμιωτάκη και τον Δρ. Γιώργο Παναγιώτου, BSRC "Alexander Fleming".

3. Δομική ανάλυση και μελέτη αλληλεπίδρασης και συν-κρυστάλλωσης των ROF1 και ROF2 με φωσφοινοσιτίδια σε συνεργασία με το εργαστήριο τον Δρ. Ehmke Pohl, University of Durham, UK.

4. Μελέτη εντοπισμού του $PI(3,5)P_2$ σε σπόρους *A. thaliana* υπό φύτρωση.

5. Μελέτη των μηχανισμών εγκλιματισμού του βάμβακος (*G. hirsutum*) σε χαμηλές θερμοκρασίες.

6. Μελέτη της φωσφολιπάσης D στο βαμβάκι μετά από μηχανική καταπόνηση σε συνεργασία με το εργαστήριο της Καθ. κ. Γαλανοπούλου, (ΕΚΠΑ).

ΠΕΡΙΓΡΑΦΗ ΤΩΝ ΕΡΕΥΝΗΤΙΚΩΝ ΔΡΑΣΤΗΡΙΟΤΗΤΩΝ ΤΟΥ ΕΡΓΑΣΤΗΡΙΟΥ

Οι ερευνητικές δραστηριότητες του εργαστηρίου εστιάζονται στην κατανόηση των μηχανισμών που σχετίζονται με την μετάδοση σήματος κατά την διάρκεια περιβαλλοντικών καταπονήσεων στα φυτά, κυρίως σε συνθήκες αλατότητας, ξηρασίας και χαμηλών θερμοκρασιών. Συγκεκριμένα στη μελέτη της μεμβρανικής και πρωτεϊνικής διακίνησης και τον ρόλο των λιπιδίων και των φωσφοινοσιτιδίων ως μέσα μετάδοσης σήματος.
Ένας τομέας που αναπτύχθηκε στο εργαστήριο είναι η ταυτοποίηση πρωτεϊνών οι οποίες αλληλεπιδρούν με φωσφορυλιομενα παράγωγα της ινοσιτόλης, η αναγνώριση των περιοχών πρόσδεσης των πρωτεϊνών στα λιπίδια αυτά και η μελέτη της ενδοκυτταρικής διακίνησης τους. Προς το παρόν οι μελέτες αυτές εστιάζονται στο φυτό μοντέλο *Arabidopsis thaliana* με προοπτική να επεκταθούνε και σε άλλα φυτά οικονομικής σημασίας. Για το λόγο αυτό αναπτύχθηκαν και εφαρμόζονται διάφορες τεχνικές χρωματογραφίας με σκοπό, την απομόνωση, εμπλουτισμό και ταυτοποίηση πρωτεϊνών, τεχνικές γενετικής μηχανικής προκειμένου οι πρωτεΐνες να υπερεκφραστούνε και να χρησιμοποιηθούνε σε περαιτέρω βιοχημικές μελέτες, στην δημιουργία αντισωμάτων και στην κρυσταλλογράφισή τους όπως επίσης και τεχνικές μικροσκοπίας.

Ένας δεύτερος τομέας στον οποίο έχουν επικεντρωθεί οι μελέτες του εργαστηρίου είναι η μελέτη του μηχανισμού ανάπτυξης αντοχής του βάμβακος σε περιβαλλοντικές καταπονήσεις, και πιο συγκεκριμένα στο κρύο. Το βαμβάκι, καλλιέργεια υψηλής αξίας και καθοριστικής οικονομική σημασίας για την ελληνική γεωργία είναι μία από τις καλλιέργειες που πλήττονται άμεσα από ένα ευρύ φάσμα περιβαλλοντικών συνθηκών. Η θερμοκρασία είναι ο κυρίαρχος περιβαλλοντικός παράγοντας που μπορεί να περιορίσει την ανάπτυξη των καλλιεργειών του βάμβακος κατά τη διάρκεια των πρώτων ημερών της ανάπτυξης του φυτού, του φωτοσυνθετικού του ιστού και του άνθους, καθώς και κατά την περίοδο της συγκομιδής του. Η χαμηλή θερμοκρασία κατά τα πρώτα στάδια της ανάπτυξης παρεμποδίζει ή και καταργεί την ανάπτυξη του νεαρού φυτού ενώ το κρύο μπορεί να καταστρέψει τη συγκομιδή. Η καλλιέργεια

του βάμβακος στις εύκρατες περιοχές έχει προσαρμοστεί στις κλιματικές απαιτήσεις για την ανάπτυξη των φυτών και μία μικρή περίοδος για την ανάπτυξη και την συγκομιδή έχει θεσπιστεί ώστε να εξασφαλιστεί η ποσότητα, η απόδοση και η ποιότητα της ίνας. Ωστόσο, λαμβάνοντας υπόψιν τις κλιματικές αλλαγές που επηρεάζουν άμεσα τη διαθεσιμότητα της γης για την ανάπτυξη του βάμβακος στην ελληνική επικράτεια, υπάρχει αυξανόμενη ζήτηση για το χειρισμό της περιόδου ανάπτυξης, ανάλογα με την περιοχή της καλλιέργειας και τις εδαφολογικές απαιτήσεις της, προκειμένου να εξασφαλιστεί η επιθυμητή απόδοση.
Το εργαστήριο έχει εστιάσει την έρευνα σε ότι αφορά την μελέτη των μηχανισμών ανταπόκρισης του βάμβακος σε χαμηλές θερμοκρασίες σε ένζυμα τροποποίησης λιπιδίων (υδρόλυσης και αποκορεσμού), αρχικά στην απομόνωση και τον χαρακτηρισμό τους και κατόπιν στην μελέτη του ρόλου τους στην μετάδοση σήματος και στον εγκλιματισμό του βάμβακος σε χαμηλές θερμοκρασίες. Ταυτόχρονα η δραστικότητα των ενζύμων αυτών μελετάται και σε αλλές συνθήκες ενεργοποίησής τους όπως οι μηχανικές βλάβες.

ΤΕΧΝΟΓΝΩΣΙΑ ΠΟΥ ΕΧΕΙ ΑΝΑΠΤΥΧΘΕΙ ΣΤΟ ΕΡΓΑΣΤΗΡΙΟ

1) Τεχνικές πρωτεομικής. Προετοιμασία δειγμάτων για φασματομετρία μάζας. Προετοιμασία δειγμάτων για κρυσταλογραφία.
2) Χαρακτηρισμός αλληλεπιδράσεων πρωτεϊνών με λιπίδια.
3) Τεχνικές απομόνωσης και χαρακτηρισμού λιπιδίων (σε συνεργασία με το εργαστήριο της κας Γαλανοπούλου.
4) Τεχνικές γενετικής τροποποίησης φυτών.
5) Τεχνικές μικροσκοπίας (συνεστιακού και ηλεκτρονικού μικροσκοπίου) και ανοσοιστοχημείας.
6) Τεχνικές μελέτης διαφορικής έκφρασης γονιδίων.