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Li, C., Wood, J.C., Vu, H.A., Hamilton, J.P., Rodríguez-López, C.E., Payne, R.M.E., Serna Guerrero, D.A., Yamamoto, K., Vaillancourt, B., Caputi, L.\*, O'Connor, S.E.\*, Buell, C.R.\*  
Single-cell multi-omics enabled discovery of alkaloid biosynthetic pathway genes in the medical plant *Catharanthus roseus*.

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*In revision.*

Grzech, D., Hong, B., Caputi, L., Sonawane, P.D., O'Connor, S.E.\*  
Engineering the biosynthesis of late-stage vinblastine precursors precondylocarpine acetate, catharanthine and tabersonine in *Nicotiana benthamiana*. (2022) *ACS Syn. Bio.*  
<https://doi.org/10.1021/acssynbio.2c00434>

Palmer L., Chuang L., Siegmund, M., Kunert, M., Yamamoto, K., Sonawane, P.D., O'Connor, S.E.\*  
In vivo characterization of key iridoid biosynthesis pathway genes in catnip (*Nepeta cataria*). (2022) *Planta*, 256, 99.

Cuello, C., Stander, E.A., Jansen, H.J., Dugé de Bernonville, T., Lanoue, A., Giglioli-Guivarc'h, N., Papon, N., Dirks, R.P., Jensen, M.K., O'Connor, S.E., Besseau, S., Courdavault, V.\* (2022) Genome Assembly of the Medicinal Plant *Voacanga thouarsii*. *Genome Biol. Evol.* 14, evac158.

Koellner, T.G.\*, David, A., Luck, K., Kunert, G., Beran, F., Zhou, J.-J., Caputi, L., O'Connor, S.E.\* (2022) Biosynthesis of iridoid sex pheromones in aphids. *Proc. Natl. Acad. Sci.* 119, e2211254119.

Langley, C., Tatsis, E., Hong, B., Nakamura, Y., Paetz, C., Stevenson, C.E.M., Basquin, J., Lawson, D.M., Caputi, L.\*, O'Connor, S.E.\* (2022) Expansion of the catalytic repertoire of alcohol dehydrogenases in plant metabolism. *Angew. Chem. Intl. Ed.* 61, e202210934.

Kamileen, M.O., DeMars, M. Hong, B., Nakamura, Y., Paetz, C., Lichman, B.R., Sonawane, P.D., Caputi, L.\*, O'Connor, S.E.\* (2022) Recycling upstream redox enzymes expands the regioselectivity of cycloaddition in pseudo-aspidosperma alkaloid biosynthesis. *J. Am. Chem. Soc.* 144, 19673-19679.

Dudley, Q.M., Jo, S., Serna Guerrero, D.A., O'Connor, S.E., Caputi, L.\*, Patron, N.J.\* (2022) Reconstitution of monoterpene indole alkaloid biosynthesis in genome engineered *Nicotiana benthamiana*. *Communications Biology*, 5, 949.

Stander, E.A., Cuello C., Birer-Williams, C., Kulagina, N., Jansen, H., Carqueijeiro, I., Méteignier, L.V., Vergès, V., Oudin A., Papon, N., Dirks, R., Jensen, M.K., O'Connor, S.E., Dugé de Bernonville, T., Besseau, S., Courdavault, V.\* (2022) The *Vinca* minor genome highlights conserved evolutionary traits in monoterpene indole alkaloid synthesis. G3, jkac268.

Zhang, J., Hansen, L.G., Gudich, O., Viehrig, K., Lassen, L.M.M., Schrübbers, L., Adhikari, K.B., Rubaszka, P., Carrasquer-Alvarez, E., Chen, L., D'Ambrosio, V., Lehka, B., Haidar, A.K., Nallapareddy, S., Giannakou, K., Laloux, M., Arsovska, D., Jørgensen, M.A.K., Chan, L.J.G., Kristensen, M., Christensen, H.B., Sudarsan, S., Stander, E.A., Baidoo, E., Petzold, C.J., Wulff, T., O'Connor, S.E., Courdavault, V., Jensen, M.K.\*, Keasling, J.D.\* (2022) A microbial supply chain for production of the anti-cancer drug vinblastine. *Nature*. doi: 10.1038/s41586-022-05157-3.

Hernández Lozada, N.J., Hong, B., Wood, J.C., Caputi, L., Basquin, J., Chuang, L., Kunert, M., Rodríguez López, C.E., Langley, C., Zhao, D., Buell, C.R., Lichman, B.R., O'Connor, S.E.\* (2022) Biocatalytic routes to stereo-divergent iridoids. *Nature Commun.* 13, 4718.

Hong, B., Grzech, D., Caputi, L., Sonawane, P., López, C.E.R., Kamileen, M.O., Hernández Lozada, N.J., Grabe, V., O'Connor, S.E.\* (2022) Biosynthesis of strychnine. *Nature*. 607, 617-622.

Boccia, M., Grzech, D., Lopes, A.A., O'Connor, S.E.\*, Caputi, L.\* (2022) Directed biosynthesis of new to nature alkaloids in a heterologous *Nicotiana benthamiana* expression host. *Front. Plant Sci.* 13, 919443.

Yamamoto, K.\*, Takahashi, K., O'Connor, S.E., Mimura, T.\* (2022) Imaging MS analysis in *Catharanthus roseus*. *Methods Mol. Biol.* 2505, 33-43.

Kulagina N, Méteignier LV, Papon N, O'Connor SE, Courdavault V.\* (2022) More than a *Catharanthus* plant: A multicellular and pluri-organelle alkaloid-producing factory. *Curr. Opin. Plant Biol.* 67, 102200.

Rodríguez-López, C.E.\*, Jiang, Y., Kamileen, M.O., Lichman, B.R., Hong, B., Vaillancourt, B., Buell, C.R., O'Connor, S.E.\* (2022) Phylogeny-aware chemoinformatic analysis of chemical diversity in the Lamiaceae enables iridoid pathway assembly and discovery of aucubin synthase. *Mol. Biol. Evol.* 39, msac057.

Koudounas, K., Guirimand, G., Rojas Hoyos, L.F., Carqueijeiro, I., Lemos Cruz, P., Stander, E., Kulagina, N., Perrin, J, Oudin, A., Besseau, S., Lanoue, A., Atehortúa, L., St-Pierre, B., Giglioli-Guivarc'h, N., Papon, N., O'Connor, S.E., Courdavault, V.\* (2022) Peroxisome targeting of  $\gamma$ -tocopherol N-methyltransferase homologs involved in the synthesis of monoterpene indole alkaloids. *Plant Cell Physiol.* 63, 200-216.

Bat-Erdene, U., Billingsley, J.M., Turner, W.C., Lichman, B.R., Ippoliti, F.M., Garg, N.K., O'Connor, S.E., Tang, Y.\* (2021) Cell-Free Total Biosynthesis of Plant Terpene Natural Products using an Orthogonal Cofactor Regeneration System. *ACS Catal.* 11, 9898-9903.

Yamamoto, K., Grzech, D., Koudounas, K., Stander, E.A., Caputi, L., Mimura, T., Courdavault, V., O'Connor, S.E.\* (2021) Improved virus-induced gene silencing allows discovery of a serpentine synthase gene in *Catharanthus roseus*. *Plant Physiol.* 187, 846-857.

Courdavault, V.\*, O'Connor, S.E., Jensen, M.K., Papon, N. (2021) Metabolic engineering for plant natural products biosynthesis: new procedures, concrete achievements and remaining limits. *Nat. Prod. Rep.* 38, 2145-2153.

Trenti, F., Yamamoto, K., Hong, B., Paetz, C., Nakamura, Y., O'Connor, S.E.\* (2021) Early and late steps of quinine biosynthesis. *Org. Lett.* 231793-1797.

Carqueijeiro, I., Koudounas, K., Dugé de Bernonville, T., Sepúlveda, L.J., Mosquera, A., Bomzan, P.D., Oudin, A., Lanoue, A., Besseau, S., Cruz, P.L., Kulagina, N., Stander, E.A., Burlaud-Gaillard, J., Blanchard, E., Clastre, M., Atehortúa, L., St-Pierre, B., Giglioli-Guivarc'h, N., Papon, N., Nagegowda, D.A., O'Connor, S.E., Courdavault, V.\* (2021) Alternative splicing directs a pseudo-strictosidine  $\beta$ -D-glucosidase modulating alkaloid synthesis. *Plant Physiol.* 185, 836-856.

Rodríguez-López, C.E., Hong, B., Paetz, C., Nakamura, Y., Koudounas, K., Passeri, V., Baldoni, L., Alagna, F., Calderini, O., O'Connor, S.E.\* (2021) Two bi-functional cytochrome P450 CYP72 enzymes from olive (*Olea europaea*) catalyze the oxidative C-C bond cleavage in the biosynthesis of secoxy-iridoids - flavor and quality determinants in olive oil. *New Phytol.* 229, 2288-2301.

Brose J, Lau KH, Dang TTT, Hamilton JP, Martins LDV, Hamberger B, Hamberger B, Jiang J, O'Connor SE, Buell CR.\* (2021) The *Mitragyna speciosa* (Kratom) genome: a resource for data-mining potent pharmaceuticals that impact human health. *G3*, 11, jkab058.

O'Connor, S.E. (2021) Symbionts, peptides, and (no) iron: how ants defend their fungal crop. *ACS Cent. Sci.* 7, 225-227.

- Davis, K., Gkotsi, D.S., Smith, D.R.M., Goss, R.J.M., Caputi, L., O'Connor, S.E.\* (2020) *Nicotiana benthamiana* as a transient expression host to produce auxin analogs. *Front. Plant Sci.* 11, 581675.
- Stander, E.A., Sepúlveda, L.J., Dugé de Bernonville, T., Carqueijeiro, I., Koudounas, K., Cruz, P.L., Besseau, S., Lanoue, A., Papon, N., NGiglioli-Guivarc'h, N., Dirks, R., O'Connor, S.E., Atehortúa, L., Oudin, A., Courdavault, V.\* (2020) Identifying genes involved in alkaloid biosynthesis in *Vinca* minor through transcriptomics and gene co-expression analysis. *Biomolecules.* 10, 1595.
- Nguyen, T.D., O'Connor, S.E.\* (2020) The progesterone 5 $\beta$ -reductase/iridoid synthase family: a catalytic reservoir for specialized metabolism across land plants. *ACS Chem. Biol.* 15, 1780-1787.
- Lichman, B.R.\*, Godden, G.T., Hamilton, J.P., Palmer, L., Kamileen, M.O., Zhao, D., Vaillancourt, B., Wood, J.C., Sun, M., Kinser, T.J., Henry, L.K., Rodriguez-Lopez, C., Dudareva, N., Soltis, D.E., Soltis, P.S., Buell, C.R.\*, O'Connor, S.E.\* (2020) The evolutionary origins of the cat attractant nepetalactone in catnip. *Science Adv.* 6, eaba0721.
- Dávila-Lara, A., Rodríguez-López, C.E., O'Connor, S.E., Mithöfer, A.\* (2020) Metabolomics analysis reveals tissue-specific metabolite compositions in leaf blade and traps of carnivorous *Nepenthes* plants. *Int. J. Mol. Sci.* 21, 4376.
- Palmer, L., O'Connor, S.E.\* (2020) Virus-induced gene silencing in *Nepeta*. *Methods Mol. Biol.* 2172, 111-121.
- Dugé de Bernonville, T., Maury, S., Delaunay, A., Daviaud, C., Chaparro, C., Tost, J., O'Connor, S.E., Courdavault V.\* (2020) Developmental methylome of the medicinal plant *Catharanthus roseus* unravels the tissue-specific control of the monoterpene indole alkaloid pathway by DNA methylation. *Int. J. Mol. Sci.* 21, E6028.
- Chung, K., O'Connor, S.E.\* (2020) Biosynthesis of vinblastine. In: Hung-Wen (Ben) Liu, Tadhg P. Begley (eds.) *Comprehensive Natural Products III: Chemistry and Biology.* vol. 2, pp. 642-685.
- Caputi, L., Franke, J., Bussey, K., Farrow, S.C., Curcino Vieira, I. J., Stevenson, C. E. M., Lawson, D. M., O'Connor, S.E.\* (2020) Structural basis of cycloaddition in biosynthesis of iboga and aspidosperma alkaloids. *Nat. Chem. Biol.* 16, 383-386.
- Walia, M., Tejaro, C.N., Gardner, A., Tran, T., Kang, J., Zhao, S., O'Connor, S.E., Courdavault, V., Andrade, R.B.\* (2020) Synthesis of (-)-Melodinine K: A case study of efficiency in natural product synthesis. *J. Nat. Prod.* 83, 2425-2433.
- Courdavault, V., O'Connor, S.E., Oudin, A., Besseau, S., Papon, N.\* (2020) Towards the Microbial production of plant-derived anticancer drugs. *Trends Can.* 6, 444-448
- Neumann, M., Prahl, S., Caputi, L., Hill, L., Kular, B., Walter, A., Patallo, E.P., Milbredt, D., Aires, A., Schöpe, M., O'Connor, S., van Pée, K.H., Ludwig-Müller, J.\* (2020) Hairy root transformation of *Brassica rapa* with bacterial halogenase genes and regeneration to adult plants to modify production of indolic compounds. *Phytochemistry.* 175, 112371.
- Walter, A., Caputi, L., O'Connor, S., van Pée, K.H., Ludwig-Müller, J.\* (2020) Chlorinated auxins-How does *Arabidopsis thaliana* deal with them? *Int. J. Mol. Sci.* 21, 2567.
- Courdavault, C.\*, Besseau, S., Oudin, A., Papon, N., O'Connor, S.E. (2020) Virus-induced gene silencing: Hush genes to make them talk. *Trends Plant Sci.* 25, 714-715.
- de Bernonville, T.D., Papon, N., Clastre, M., O'Connor, S.E., Courdavault, V.\* (2020) Identifying missing biosynthesis enzymes of plant natural products. *Trends Pharmacol. Sci.* 41, 142-146.

O'Connor, S.E.\*, Caputi, L., Payne, R.E., (2020) United Kingdom Patent Application No. 1804289.5 - METHOD (PAS/DPAS)

O'Connor, S.E.\*, Lichman, B. United Kingdom Patent Application No. 1808663.7 - METHOD (NEPS)

Carqueijeiro, I., Langley, C., Grzech, D., Koudounas, K., Papon, N., O'Connor, S.E., Courdavault V.\* (2019) Beyond the semi-synthetic artemisinin: metabolic engineering of plant-derived anti-cancer drugs. *Curr. Opin. Biotechnol.* 65, 17-24.

Carqueijeiro, I., Langley, C., Grzech, D., Koudounas, K., Papon, N., O'Connor, S.E., Courdavault V.\* (2019) Beyond the semi-synthetic artemisinin: metabolic engineering of plant-derived anti-cancer drugs. *Curr. Opin. Biotechnol.* 65, 17-24.

Yamamoto, K., Takahashi, K., Caputi, L., Mizuno, H., Rodriguez-Lopez, C.E., Iwasaki, T., Ishizaki, K., Fukaki, H., Ohnishi, M., Yamazaki, M., Masujima, T., O'Connor, S.E., Mimura, T.\* (2019) The complexity of intercellular localisation of alkaloids revealed by single-cell metabolomics. *New Phytol.* 224, 848-859.

Farrow, S.C., Kamileen, M. O., Caputi, L., Bussey, K., Mundy, J. E.A., McAtee, R.C., Stephenson, C.R. J., O'Connor, S.E.\* Biosynthesis of an anti-addiction agent from the Iboga plant. (2019) *J. Am. Chem. Soc.* 141, 12979-12983.

Lichman, B.R., O'Connor, S.E., Kries, H.\* (2019) Biocatalytic strategies towards [4+2] cycloadditions. *Chemistry.* 25, 6864-6877.

Lichman, B.R., Kamileen, M.O., Titchiner, G.R., Saalbach, G., Stevenson, C.E.M., Lawson, D.M., O'Connor, S.E.\* (2019) Uncoupled activation and cyclisation in catmint reductive terpenoid biosynthesis. *Nat. Chem. Biol.* 15, 71-79.

Johnson, S.R., Bhat, W.W., Bibik, J., Turmo, A., Hamberger, B. (2019) Evolutionary Mint Genomics Consortium, Hamberger B.\* (2019) A database-driven approach identifies additional diterpene synthase activities in the mint family (Lamiaceae). *J. Biol. Chem.* 294, 1349-1362.

Franke, J., Kim, J., Hamilton, J.P., Zhao, D., Pham, G.M., Wiegert-Rininger, K., Crisovan, E., Newton, L., Vaillancourt, B., Tatsis, E.C., Buell, C.R., O'Connor, S.E.\* (2019) Gene discovery in *Gelsemium* highlights conserved gene clusters in monoterpene indole alkaloid biosynthesis. *ChemBioChem* (VIP paper) 20, 83-87.

Farrow, S.C., Kamileen, M. O., Meades, J., Ameyaw, B., Xiao, Y., O'Connor, S.E.\* (2018) Cytochrome P450 and O-methyltransferase catalyze the final steps in the biosynthesis of the anti-addictive alkaloid ibogaine from *Tabernanthe iboga*. *J. Biol. Chem.* 293, 13821-13833.

Carqueijeiro, I., Brown, S., Chung, K., Dang, T. T. T., Dugé de Bernonville, T., Lanoue, A., Dang, T. T., Teijaro, C., Paetz, C., Billet, K., Mosquera, A., Oudin, A., Besseau, S., Papon, N., Glévarec, G., Atehortúa, L., Clastre, M., Giglioli-Guivarc'h, N., St Pierre, B., Andrade, R., O'Connor, S., Courdavault, V.\* (2018) Two tabersonine 6,7-epoxidases start synthesis of lochnericine-type alkaloids in *Catharanthus roseus*. *Plant Physiol.* 177, 1473-1486.

Carqueijeiro, I., Sepúlveda, L. J., Mosquera, A., Payne, R., Corbin, C., Papon, N., de Bernonville, T. D., Besseau, S., Lanoue, A., Glévarec, G., Clastre, M., St-Pierre, B., Atehortúa, L., Giglioli-Guivarc'h, N., O'Connor, S.E., Oudin, A., Courdavault, V.\* (2018) Vacuole-targeted proteins: ins and outs of subcellular localization studies. *Methods Mol. Biol.* 1789, 33-54.

The Mint Consortium. (2018) Phylogenomic mining of the mints: elucidating evolution in a chemically diverse clade. *Mol. Plant*. 11, 1084-1096.

Dang, T.T.T., Franke, J., Carqueijeiro, I., Langley, C., Courdavault, V., O'Connor, S.E.\* (2018) Cyclization vs. aromatization: The substrate-guided double face of cytochrome P450 homologues provides entry into both sarpagan and  $\beta$ -carboline alkaloids. *Nat. Chem. Biol.* 14, 760-763.

Caputi, L., Franke, J., Farrow, S.C., Chung, K., Payne, R.M.E., Nguyen, T.-D., Dang, T. T. T., Carqueijeiro, I.S.T., Koudounas, K., Dugé de Bernonville, T., Ameyaw, B., Jones, D.M., Vieira, I. J.C., Courdavault, V.\*, O'Connor, S.E.\* (2018) Missing enzymes in the biosynthesis of the anticancer drug vinblastine in Madagascar periwinkle. *Science*. 360, 1235-1239.

Casini, A., Chang, F.-Y., Eluere, R., King, A., Young, E., Dudley, Q., Karim, A., Pratt, K., Bristol, C., Forget, A., Ghodasara, A., Warden-Rothman, R., Gan, R., Cristofaro, A., Espah Borujeni, A., Ryu, M.-H., Li, J., Kwon, Y., Wang, H., Tatsis, E., Rodriguez-Lopez, C., O'Connor, S., Medema, M., Fischbach, M., Jewett, M., Voigt, C.\*, Gordon, D.B. (2018) A Pressure Test to Make 10 Molecules in 90 Days: External Evaluation of Methods to Engineer Biology. *J. Am. Chem. Soc.* 140, 4302-4316.

Carqueijeiro, I., Dugé de Bernonville, T., Lanoue, A., Dang, T.T., Tejjaro, C., Paetz, C., Billet, K., Mosquera, A., Oudin, A., Besseau, S., Papon, N., Glévarec, G., Atehortúa, L., Clastre, M., Giglioli-Guivarc'h, N., Schneider, B., St Pierre, B., Andrade, R., O'Connor, S., Courdavault, V.\* (2018) A novel BAHF acyltransferase catalyzing 19-O-acetylation of tabersonine derivatives in roots of *Catharanthus roseus* enables combinatorial synthesis of new-to-nature monoterpene indole alkaloids. *Plant J.* 94, 469-484

Stavrínides, A.K., Tatsis, E.C., Dang, T.T., Caputi, L., Stevenson, C.E.M., Lawson, D.M., Schneider, B., O'Connor, S.E.\* (2018) Discovery of a short chain dehydrogenase from *Catharanthus roseus* that produces a novel monoterpene indole alkaloid. *ChemBioChem. (VIP paper)*. 19, 940-948.

Sherden, N.H., Lichman, B., Caputi, L., Zhao, D., Kamileen, M.O., Buell, C.R., O'Connor, S.E.\* (2018) Identification of Iridoid Synthases from *Nepeta* species: Iridoid cyclization does not determine nepetalactone stereochemistry. *Phytochemistry*. 145, 48-56.

Patallo, E. P., Walter, A., Milbredt, D., Thomas, M., Neumann, M., Caputi, L., O'Connor, S., Ludwig-Müller, J., van Pée, K.-H.\* (2017) Strategies to Produce Chlorinated Indole-3-Acetic Acid and Indole-3-Acetic Acid Intermediates. *ChemistrySelect*. 2, 11148-11153.

Kries, H., Franziska Kellner, F. Kamileen, M.O., O'Connor, S.E.\* (2017) Inverted stereocontrol of iridoid synthase in snapdragon. *J. Biol. Chem.* 292, 14659-14667

Dang, T.T.T., Franke, J., Tatsis, E., O'Connor, S.E.\* (2017) Dual catalytic activity of a cytochrome P450 controls bifurcation at a metabolic branch point of alkaloid biosynthesis in *Rauwolfia serpentina*. *Angew. Chem. Intl. Ed.* 56, 9440-9444.

Larsen, B., Fuller, V.L., Pollier, J., Van Moerkercke, A., Schweizer, F., Payne, R.E.M., O'Connor, S.E., Goossens, A., Halkier, B.A.\* (2017) Identification of iridoid glucoside transporters in *Catharanthus roseus*. *Plant Cell Physiol.* 58, 1507-1518.

Tatsis, E.C., Carqueijeiro, M.I.S.T, Dugé de Bernonville, T., Franke, J., Dang, T.T., Oudin, A., Lanoue, A., Lafontaine, F., Stavrínides, A.K., Clastre, M., Courdavault, V.\*, O'Connor, S.E.\* (2017) A three enzyme system to generate the Strychnos alkaloid scaffold from a central biosynthetic intermediate. *Nat. Commun.* 8, 316.

Leisner, C.P., Conway, M.E., Buell, C.R., Kamileen, M.O., O'Connor, S.E.\* (2017) Differential iridoid production as revealed a diversity panel of 84 cultivated and wild blueberry species. *PloS One*. 12, e0179417.

- Dugé de Bernonville, T., Carqueijeiro, I., Lanoue, A., Lafontaine, F., Sánchez Bel, .P, Liesecke, F., Musset, K., Oudin, A., Glévarec, G., Pichon, O., Besseau, S., Clastre, M., St-Pierre, B., Flors, V., Maury, S., Huguet, E., O'Connor, S.E.\*, Courdavault, V.\* (2017) Folivory elicits a strong defense reaction in *Catharanthus roseus*: metabolomic and transcriptomic analyses reveal distinct local and systemic responses. *Sci. Rep.* 7, 40453.
- Payne, R.M.E., Xu, D., Foureau, E., Soares Teto Carqueijeiro, M. I., Oudin, A., Dugé de Bernonville, T., Novak, V., Burow, M., Olsen, C.-E., Jones, D.M., Tatsis, E.C., Pendle, A., Halkier, B.A., Geu-Flores, F., Courdavault, V., Nour-Eldin, H.H., O'Connor, S.E.\* (2017) An NPF transporter exports a central monoterpene indole alkaloid intermediate from the vacuole. *Nature Plants*. 3, 16208.
- Jakubczyk, D., Caputi, L., Stevenson, C.E., Lawson, D.M., O'Connor, S.E.\* (2016) Structural characterization of EasH (*Aspergillus japonicus*) - an oxidase involved in cycloclavine biosynthesis. *Chem. Comm.* 52, 14306-14309.
- Jakubczyk, D., O'Connor, S.\* (2016) Ergot alkaloids. *RSC Drug Discovery Series*. 50, 379-397.
- Parage, C., Foureau, E., Kellner, F., Burlat, V., Mahroug, S., Lanoue, A., Dugé de Bernonville, T., Londono, M.A., Carqueijeiro, I., Oudin, A., Besseau, S., Papon, N., Glévarec, G., Atehortúa, L., Giglioli-Guivarc'h, N., St-Pierre, B., Clastre, M., O'Connor, S.E.\*, Courdavault, V.\* (2016) Class II cytochrome p450 reductase governs the biosynthesis of alkaloids. *Plant Physiol.* 172, 1563-1577.
- Tatsis, E.C., O'Connor, S.E.\* (2016) New developments in engineering plant metabolic pathways. *Curr. Opin. Biotech.* 42, 126-132.
- Stavrinos, A., Tatsis, E.C., Caputi, L., Foureau, E., Stevenson, C.E.M., Lawson, D.M., Courdavault, V.\*, O'Connor, S.E.\* (2016) Structural investigation of heteroyohimbine alkaloid synthesis reveals active site elements that control stereoselectivity. *Nat. Commun.* 12116.
- Kries, H., Caputi, L., Stevenson, C.E., Kamileen, M.O., Sherden, N.H., Geu-Flores, F., Lawson, D.M.\*, O'Connor, S.E.\* (2016) Structural determinants of reductive terpene cyclization in iridoid biosynthesis. *Nat. Chem. Biol.* 12, 6-8.
- Kries, H., O'Connor, S.E.\* (2016) Biocatalysts from alkaloid producing plants. *Curr. Opin. Chem. Biol.* 31, 22-30.
- Alagna, F.\*, Geu-Flores, F., Kries, H., Panara, F., Baldoni, L., O'Connor, S.E., Osbourn, A.\* (2015) Identification and characterization of the iridoid synthase involved in oleuropein biosynthesis in Olive (*Olea europaea*) Fruits. *J. Biol. Chem.* 29, 5542-5545.
- Brown, S., O'Connor, S.\* (2015) Halogenase engineering for the generation of novel natural products. *Chembiochem* 6, 2129-2135.
- O'Connor, S.E.\* (2015) Metabolic engineering of secondary metabolism. *Ann. Rev. Gen.* 49, 71-94.
- Dugé de Bernonville, T., Foureau, E., Parage, C., Lanoue, A., Clastre, M., Londono, M.A., Oudin, A., Houillé, B., Papon, N., Besseau, S., Glévarec, G., Atehortúa, L., Giglioli-Guivarc'h, N., St-Pierre, B., De Luca, V., O'Connor, S.E.\*, Courdavault, V.\* (2015) Characterization of a second secologanin synthase isoform producing both secologanin and secoxyloganin allows enhanced de novo assembly of a *Catharanthus roseus* transcriptome. *BMC Genomics* 16, 619.
- Patron, N. J.,...O'Connor, S.,...Haseloff, J.\* (2015) Standards for plant synthetic biology: a common syntax for exchange of DNA parts. *New Phytol.* 208, 13-19.

- Van Moerkercke, A., Steensma, P., Schweizer, F., Pollier, J., Gariboldi, I., Payne, R., Vanden Bossche, R., Miettinen, K., Espoz, J., Purnama, P.C., Kellner, F., Seppänen-Laakso, T., O'Connor, S.E., Rischer, H., Memelink, J., Goossens, A.\* (2015) The bHLH transcription factor BIS1 controls the iridoid branch of the monoterpene indole alkaloid pathway in *Catharanthus roseus*. *Proc. Natl. Acad. Sci. USA* 112, 8130-8135.
- Kellner, F., Geu-Flores, F., Sherden, N.H., Brown, S., Courdavault, V.\*, O'Connor, S.E.\* (2015) Discovery of a P450-catalyzed step in vindoline biosynthesis: a link between the aspidosperma and eburnamine alkaloids. *Chem. Commun.* 51, 7626-7628.
- Kellner, F., Kim, J., Clavijo, B.J., Hamilton, J.P., Childs, K.L., Vaillancourt, B., Cepela, J., Steuernagel, B., Clissold, L., McLay, K., Buell, C.R.\*, O'Connor, S.E.\* (2015) Genome biology elucidation of plant natural product biosynthesis. *Plant J.* 82, 680-692.
- Brown, S., Clastre, M., Courdavault, V.\* O'Connor, S.E.\* (2015) De novo production of the plant-derived alkaloid strictosidine in yeast. *Proc. Natl. Acad. Sci. USA* 112, 3205-3210.
- Jakubczyk, D., Caputi, L., Hatsch, A., Nielsen, C.A.F., Diefenbacher, M., Klein, J., Molt, A., Schröder, H., Cheng, J. Z., Naesby, M.\*, O'Connor, S.E.\* (2015) Discovery and reconstitution of the cycloclavine biosynthetic pathway - enzymatic formation of a cyclopropyl group. *Angew. Chem. Int. Ed. Engl.* 54, 5117-5121.
- Stavrinos, A., Tatsis, E.C., Foureau, E., Caputi, L., Kellner, F., Courdavault, V.\*, O'Connor, S.E.\* (2015) Unlocking the diversity of alkaloids in *Catharanthus roseus*: nuclear localization suggests metabolic channeling in secondary metabolism. *Chem. Biol.* 19, 336-341.
- Munkert, J., Pollier, J., Miettinen, K., Van Moerkercke, A., Payne, R., Müller-Urli, F., Burlat, V., O'Connor, S.E., Memelink, J., Kreis, W., Goossens, A.\* (2015) Iridoid synthase activity is common among the plant progesterone 5 $\beta$ -reductase family. *Mol. Plant* 8, 136-152.
- Lindner, S., Geu-Flores, F., Bräse, S., Sherden, N.H.\*, O'Connor, S.E.\* (2014) Conversion of substrate analogs suggests a Michael cyclization in iridoid biosynthesis. *Chem. Biol.* 21, 1452-1456.
- O'Connor, S.E.\*, Brutnell, T.P. (2014) Growing the future: synthetic biology in plants. *Curr. Opin. Plant Biol.* 19, iv-v.
- Nielsen, C.A. F., Folly, C., Hatsch, A., Molt, A., Schröder, H., O'Connor, S.E., Naesby, M.\* (2014) The important ergot alkaloid intermediate chanoclavine-I produced in the yeast *Saccharomyces cerevisiae* the combined action of EasC and EasE *Aspergillus japonicus*. *Microb Cell Fact.* 13, 95.
- Jakubczyk, D., Cheng, J.Z., O'Connor, S.E.\* (2014) Biosynthesis of the ergot alkaloids. *Nat. Prod. Rep.* 31, 1328-1338.
- Besseau, S., Kellner, F., Lanoue, A., Thamm, A. M., Salim, V., Schneider, B., Geu-Flores, F., Höfer, R., Guirimand, G., Guihur, A., Oudin, A., Glevarec, G., Foureau, E., Papon, N., Clastre, M., Giglioli-Guivarc'h, N., St-Pierre, B., Werck-Reichhart, D., Burlat, V., De Luca, V., O'Connor, S.E.\*, Courdavault, V.\* (2013) A pair of tabersonine 16-hydroxylases initiates the synthesis of vindoline in an organ-dependent manner in *Catharanthus roseus*. *Plant Physiol.* 163, 1792-1803.
- Runguphan, W., O'Connor, S.E.\* (2013) Diversification of monoterpene indole alkaloid analogs through cross-coupling. *Org. Lett.* 15, 2850-2853.
- Glenn, W.S., Runguphan, W., O'Connor, S.E.\* (2013) Recent progress in the metabolic engineering of alkaloids in plant systems. *Curr Opin Biotechnol.* 24, 354-365.

O'Connor, S.E.\*, Gibbons, S. (2013) Editorial: Modern methods in plant natural products themed issue. *Nat. Prod. Rep.* 30, 483-484.

Góngora-Castillo, E., Childs, K.L., Fedewa, G., Hamilton, J.P., Liscombe, D.K., Magallanes-Lundback, M., Mandadi, K. K., Nims, E., Runguphan, W., Vaillancourt, B., Varbanova-Herde, M., Dellapenna, D., McKnight, T.D., O'Connor, S., Buell, C.R.\* (2012) Development of transcriptomic resources for interrogating the biosynthesis of monoterpene indole alkaloids in medicinal plant species. *PLoS One.* 7, e52506.

Geu-Flores, F., Sherden, N.H., Courdavault, V., Burlat, V., Glenn, W. S., Wu, C., Nims, E., Cui, Y., O'Connor, S.E.\* (2012) An alternative route to cyclic terpenes by reductive cyclization in iridoid biosynthesis. *Nature.* 492, 138-142.

DellaPenna D., O'Connor S.E.\* (2012) Plant science. Plant gene clusters and opiates. *Science* 336, 1648-1649 (invited perspective).

Glenn, W. S., Runguphan, W., O'Connor, S.E.\* (2012) Recent progress in the metabolic engineering of alkaloids in plant systems. *Curr. Opin. Biotechnol.* 24, 354-365.

Glenn, W. S., Runguphan, W., O'Connor, S.E.\* (2012) Redesign of a dioxygenase in morphine biosynthesis. *Chem. Biol.* 19, 674-678.

Ruff, B.M. Brase, S., O'Connor, S.E.\* (2012) Biocatalytic production of tetrahydroisoquinolines. *Tetrahedron Lett.* 53, 1071-1074.

O'Connor S.E.\* (2012) Strategies for engineering plant natural products: the iridoid-derived monoterpene indole alkaloids of *Catharanthus roseus*. *Meth. Enzymology* 515 189-206.

O'Connor, S.E.\* (2012) Alkaloids. *Natural Products in Chemical Biology*, 209-237.

Panjikar, S., Stoeckigt, J., O'Connor, S., Warzecha, H. (2012) The impact of structural biology on alkaloid biosynthesis research. *Nat. Prod. Rep.* 29, 1176-1200.

Glenn, W., Nims, N.E., O'Connor, S.E.\* (2011) Reengineering a tryptophan halogenase to preferentially chlorinate a direct alkaloid precursor. *J. Am. Chem. Soc.* 133, 19346-19349.

Hicks, M.A., Barber II, A.E., Giddings, L.A., O'Connor, S.E., Babbitt, P.C.\* (2011) The evolution of function in strictosidine synthase-like proteins. *Proteins.* 79, 3082-3098.

Liscombe, D.K., O'Connor, S.E.\* (2011) A virus-induced gene silencing approach to understanding alkaloid metabolism in *Catharanthus roseus*. *Phytochemistry.* 72, 1969-1977.

Goetz, K.A., Coyle, C.M., Cheng, J.Z., O'Connor, S.E., Panaccione, D.M.\* (2011) Ergot cluster-encoded catalase is required for synthesis of chanoclavine-I in *Aspergillus fumigatus*. *Curr. Gen.* 57, 201-211.

Giddings, L.A., Liscombe, D.K., Hamilton, J.P., Childs, K.L., DellaPenna, D., Buell, C.R., O'Connor, S.E.\* (2011) A stereoselective hydroxylation step of alkaloid biosynthesis in *Catharanthus roseus*. *J. Biol. Chem.* 286, 16751-16757.

Runguphan, W., Xudong, Q., O'Connor, S.E.\* (2010) Integrating carbon-halogen bond formation into medicinal plant metabolism. *Nature.* 468, 461-464.

Liscombe, D.K. Usera, A.R., O'Connor, S.E.\* (2010) A homolog of tocopherol C-methyltransferases catalyzes N-methylation in anticancer alkaloid biosynthesis. *Proc. Natl. Acad. Sci. USA* 107, 18793-18798.



Cheng, J.Z., Coyle, C. M., Panaccione, D.M., O'Connor, S.E.\* (2010) Controlling a structural branch point in ergot alkaloid biosynthesis. *J. Am. Chem. Soc.* 132, 12835-12837.

Bernhardt, P., Usera, A.R., O'Connor, S.E.\* (2010) Biocatalytic asymmetric formation of tetrahydro-beta-carbolines. *Tetrahedron Lett.* 51, 4400-4402.

Coyle, C.M., Cheng, J.Z., O'Connor, S.E., Panaccione, D.M.\* (2010) An old yellow enzyme required for ergot alkaloid biosynthesis in *Aspergillus fumigatus* and its role at the branch point between *A. fumigatus* and *Claviceps purpurea* ergot alkaloid pathways. *App. Environ. Microbiol.* 76, 3898-3903.

Cheng, J. Z., Coyle, C. M., Panaccione, D. M., O'Connor, S.E.\* (2010) A role for old yellow enzyme in ergot alkaloid biosynthesis. *J. Am. Chem. Soc.* 132, 1776-1777.

O'Connor, S.E.\* "Alkaloids" in *Comprehensive Natural Products II*. L. Mander, H.-W. Lui, Eds. Elsevier: Oxford, 2010; Vol. 1, pp. 977-1007.

Bernhardt, P., Yerkes, N., O'Connor, S.E.\* (2009) Bypassing stereoselectivity in the early steps of alkaloid biosynthesis. *Org. Bio. Chem.* 7, 4166-4168.

Bernhardt, P., O'Connor, S.E.\* (2009) Synthesis and biochemical evaluation of des-vinyl secologanin aglycones with alternate stereochemistry. *Tetrahedron Lett.* 50, 7118-7120.

Lee, H.-Y., Yerkes, N., O'Connor, S.E.\* (2009) Aza-tryptamine substrates in monoterpene indole alkaloid biosynthesis. *Chem. Biol.* 16, 1225-1229.

Runguphan, W. Maresh J.J., O'Connor, S.E.\* (2009) Silencing of tryptamine biosynthesis for production of unnatural alkaloids in plant culture. *Proc. Natl. Acad. Sci. USA* 106, 13673-13678.

Bernhardt, P., Yerkes, N., O'Connor, S.E.\* (2009) Chemo-enzymatic synthesis of heteroyohimbine alkaloid stereoisomers. *Org. Biomol. Chem.* 7, 4166-4168.

Usera, A.R., O'Connor, S.E.\* (2009) Mechanistic advances in plant natural product enzymes. *Curr. Opin. Chem. Biol.* 13, 485-491.

Leonard, E., Runguphan, W., O'Connor, S., Prather, K.J. (2009) Opportunities in metabolic engineering to enable scalable alkaloid production. *Nat. Chem. Biol.* 5, 292-300.

Bernhardt, P., O'Connor, S.E.\* (2009) Opportunities for enzyme engineering in natural product biosynthesis. *Curr. Opin. Chem. Biol.* 13, 35-42.

Runguphan, W., O'Connor, S.E.\* (2009) Metabolic reprogramming of periwinkle plant culture. *Nat. Chem. Biol.* 5, 151-153.

Friedrich, A., Brase, S., O'Connor, S.E.\* (2009) Synthesis of 4-, 5-, 6- and 7-azido tryptamines, *Tetrahedron Lett.* 50, 75-76.

O'Connor, S.E.\* (2009) peer reviewed chapter "Elucidation of Natural Product Pathways in Plants" for "Plant-derived natural products; Synthesis, function and application" Springer, A. E. Osbourn, V. Lanzotti, Ed.

Maresh, J., Giddings, L.A., Friedrich, A., Loris, E.A., Panjikar, S., Stockigt, J.\*, Peters, B.\*, O'Connor, S.E.\* (2008) Strictosidine Synthase: Mechanism of a Pictet-Spengler catalyzing enzyme. *J. Am. Chem. Soc.* 130, 710-723.

Yerkes, N., Wu, J., McCoy, E., Galan, M.C., Chen, S., O'Connor, S.E.\* (2008) Substrate specificity

and diastereoselectivity of strictosidine glucosidase. *Bioorg. Med. Chem. Lett.* 18, 3095-3098.

O'Connor, S.E.\* (2008) Alkaloid Biosynthesis. in: *Encyclopedia of Chemical Biology*. WileyBlackwell, T. Begley Ed.

McCoy, E., O'Connor, S.E.\* (2008) Natural products from plant cell culture. *Prog Drug Res.* 65, 331-370.

Galan, M.C., McCoy, E., O'Connor, S.E.\* (2007) Chemoselective derivatization of unnatural alkaloids in periwinkle. *Chem. Comm.* 3249-3251.

Bernhardt, P., McCoy, E., O'Connor, S.E.\* (2007) Rapid identification of enzyme variants for reengineered alkaloid biosynthesis in periwinkle. *Chem. Biol.* 14, 888-897.

Chen, S., Galan, M.C., Coltharp, C., O'Connor, S.E.\* Redesign of a central enzyme in alkaloid biosynthesis. (2006) *Chem. Biol.* 13, 1137-1141.

McCoy, E., O'Connor, S.E.\* (2006) Directed biosynthesis of alkaloid analogs in the medicinal plant *Catharanthus roseus*. *J. Am. Chem. Soc.* 128, 14276-14277.

O'Connor, S.E.\*, Maresh, J.M. (2006) Chemistry and biology of terpene indole alkaloid biosynthesis. *Nat. Prod. Rep.* 23, 532-547.

Galan, M.C., O'Connor, S.E.\* (2006) Semisynthesis of secologanin derivatives. *Tetrahedron Lett.* 47, 1563-1565.

McCoy, E., Galan, M.C., O'Connor, S.E.\* (2006) Substrate specificity of strictosidine synthase. *Bioorg. Med. Chem. Lett.* 16, 2475-2478.

O'Connor, S.E.\*, McCoy, E.M. (2006) Terpene indole alkaloid biosynthesis. *Rec. Adv. Phytochem.* 40, 1-22.

Vaillancourt, F.H., Yeh, E., Vosburg, D.A., O'Connor, S.E., Walsh, C.T.\* (2005) Cryptic chlorination a non-haem iron enzyme during cyclopropyl amino acid biosynthesis. *Nature.* 436, 1191-1194.

Hicks, L.M., O'Connor, S.E., Mazur, M.T., Walsh, C.T.,\* Kelleher, N.L.\* (2004) Mass spectrometric interrogation of thioester-bound intermediates in the initial stages of epothilone biosynthesis. *Chem. Biol.* 11, 327-335.

Couch, R., O'Connor, S.E., Seidle, H., Walsh, C.T., Parry, R.\* (2004) Characterization of CmaA, an adenylation-thiolation didomain enzyme involved in the biosynthesis of coronatine. *J. Bacter.* 186, 35-42.

O'Connor, S.E., Walsh, C.T.\*, Liu, F. (2003) Biosynthesis of epothilone intermediates with alternate starter units: Engineering polyketide-nonribosomal interfaces. *Angew. Chem. Int. Ed.* 42, 3917-3921.

Walsh, C.T.\*, O'Connor, S.E., Schneider, T.L. (2003) Polyketide-nonribosomal peptide epothilone antitumor agents: the EpoA, B, C subunits. *J. Indus. Microbiol. Biotech.* 30, 448-455.

O'Connor, S.E., Chen, H., Walsh, C.T.\* (2002) Enzymatic assembly of epothilones: EpoC synthase and reconstitution of the EpoA/B/C PKS/NRPS/PKS interfaces. *Biochemistry* 41 5685-5694.

Schneider, T.L., Walsh, C.T.\*, O'Connor, S.E. (2002) Utilization of alternate substrates by the first three modules of the epothilone synthetase assembly line. *J. Am. Chem. Soc.* 124, 11272-11273.

Chen, H., Hubbard, B.K., O'Connor, S.E., Walsh, C.T.\* (2002) Formation of beta-hydroxy histidine in the biosynthesis of nikkomycin antibiotics. *Chem. Biol.* 9, 103-112.

Chen, H., O'Connor, S., Cane, D.E., Walsh, C.T.\* (2001) Epothilone biosynthesis: assembly of the methylthiazolylcarboxy starter unit on the EpoB subunit. *Chem. Biol.* 8, 899-912.

Chen, H., Thomas, M.G., O'Connor, S.E., Hubbard, B.K., Burkart, M.D., Walsh, C.T.\* (2001) Aminoacyl-S-enzyme intermediates in  $\beta$ -hydroxylations and  $\alpha,\beta$ -desaturations of amino acids in peptide antibiotics. *Biochemistry* 40, 11651-11659.

O'Connor, S.E., Pohlmann, J., Saskiawan, I., Yamamoto, K., Imperiali, B.\* (2001) Probing the effect of the outer saccharide residues of N-Linked glycans on peptide conformation. *J. Am. Chem. Soc.* 123, 6187-6188.

Imperiali, B.\*, O'Connor, S.E., Hendrickson, T., L., Kellenberger, C. (1999) Chemistry and biology of asparagine-linked glycosylation. *Pure Appl. Chem.* 71, 777-787.

Imperiali B.\*, O'Connor, S.E. (1999) Effect of N-linked glycosylation on glycopeptide and glycoprotein structure. *Curr. Opin. Chem. Biol.* 3, 643-649.

Imperiali, B.\*, O'Connor S.E. (1998) The conformational basis of asparagine-linked glycosylation. *Pure Appl. Chem.* 70, 33-40.

O'Connor, S.E., Imperiali B.\* (1998) A molecular basis for glycosylation-induced conformational switching. *Chem. Biol.* 5, 427-437.

O'Connor, S.E., Imperiali, B.\* (1997) Conformational switching by asparagine-linked glycosylation. *J. Am. Chem. Soc.* 119, 2295-2296.

Opila, R.L.\*, Konstadinidis, K., O'Connor, S. (1997) X-ray photoelectron spectroscopic study of the reactions between metals (Cr, Ti, Al) and polymers (triazine and polyimide). *Polymer Surfaces and Interfaces: Characterization, Modification and Application* 179-187.

O'Connor, S.E., Imperiali, B.\* (1996) Modulation of protein structure by asparagine-linked glycosylation. *Chem. Biol.* 3, 803-812.