CURRICULUM VITAE

NAME Subba Reddy Palli

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EDUCATION

POSTDOCTORAL SCHOLAR	1988-1992, University of Washington Seattle, WA 98195 U.S.A with Dr. L.M. Riddiford
Ph.D.	1984-87, University of Western Ontario, London, Ontario, Canada, with Dr. M. Locke

WORK EXPERIENCE

INTERIM CHAIR	2023-present Department of Plant Pathology
CHAIR AND STATE ENTOMOLOGIST	2015-present Department of Entomology
CO-DIRECTOR	2013-2025 NSF I/UCRC Center for Arthropod Management Technologies (CAMTech)
PROFESSOR	2008: Department of Entomology and Graduate Center for Toxicology, University of Kentucky, Lexington, KY
ASSOCIATE PROFESSOR	2005-2008: Department of Entomology and Graduate Center for Toxicology, University of Kentucky, Lexington, KY
ASSISTANT PROFESSOR	2002-2005: Department of Entomology, University of Kentucky, Lexington, KY
SENIOR SCIENTIST	1998-2002: RheoGene LLC, Rohm and Haas Company, Spring House, PA
RESEARCH SCIENTIST	1992-1998: Great Lakes Forestry Centre, Canadian Forest Service, Sault Ste. Marie, Ontario, Canada

HONORS AND AWARDS

2024: Gatton Foundation Distinguished Professor
2023, 2024: Recognized as among the top 2% cited researchers in the world based on data compiled by Stanford and Elsevier
2017: Nan Yao Su Award, Entomological Society of America
2017: Fellow, American Association for the Advancement of Science
2014: Fellow, Entomological Society of America
2014: Fulbright-Nehru Academic and Professional Excellence Award
2013: President, Bluegrass Indo-American Cultural Society
2013: Recognition Award in Insect Physiology, Biochemistry, and Toxicology, Entomological Society of America

2013: Prestigious Research Paper Award, University of Kentucky
2012: President, Physiology, Biochemistry, and Toxicology Section, Entomological Society of America
2011: High Impact Research/Extension Award, University of Kentucky
2010: University Research Professor, University of Kentucky
2009: Bobby Pass Excellence in Grantsmanship Award, University of Kentucky
2008: Thomas Cooper Research Award, University of Kentucky
1997: Research Award for Foreign Specialists, National Institute of Sericulture and Entomological Science, Tsukuba, Japan

EXPERIENCE

Administration:

- Serving as Chair of the Entomology Department for the past nine years.
- Serving as Interim chair of the Plant Pathology department for one year.
- Serving as Kentucky State Entomologist, for the past nine years.
- Serving as Site Director and co-Director of the Center for Arthropod Management Technologies, for the past 12 years.
- Led a group of faculty and staff from UK colleges and the state of Kentucky to establish an interdisciplinary One Health center.
- Organized national and international conferences and served on the advisory boards of many international conferences.
- Chief Field Editor of the Frontiers of Insect Science Journal.
- Chaired the department chairs' committee on federal formula funds.
- Served in leadership roles in the Entomological Society of America.
- Leading a team to survey, identify, and test for human pathogens in disease vectors in Kentucky.
- Chaired multiple departmental committees, including graduate education and new faculty recruitment.
- Chaired multiple search committees for college recruitment, including Associate Dean for Instruction, chair of the Veterinary Science department, and departmental reviews.
- Served on several UK committees, including the Center for Computational Sciences Advisory Committee and the UK Microscopy Advisory Board.
- Serving on the KY Department of Agriculture Pest Control Advisory Board.
- Assembled and led transdisciplinary teams of over 100 PIs from multiple institutions and government agencies in the Appalachian region to apply for a CDC center grant on vector-borne diseases.

Research:

- My research focuses on the molecular analysis of physiological process insects with the goal of identifying new target sites that could be used for developing improved pest and disease vector management methods.
- Published 265 peer-reviewed journal articles and 22 book chapters. Co-editor of a book and two special volumes of journals. These papers have been cited 19174 times with an h-index of 76 and an i10-index of 250 (Google Scholar 4/15/2025).
- I am among the top 2% of the world's most-cited researchers in the world in 2023 and 2024 based on data compiled by Stanford University and Elsevier.
- Co-inventor on 37 issued U.S. patents, 15 European and 11 world patents, and received more than $10 million in grants from government and private agencies.
- Serving on the editorial boards of eleven international journals, four as Associate Editor, and as a Chief Editor of Frontiers in Insect Science Journal; served on grant review panels of USDA, NIH, and NSF.
- Developed ecdysone receptor-based gene switches for use in humans and plants; some of these products are in clinical trials.
- Developed sprayable dsRNA methods; one RNAi product is already commercialized, and others are in development.
- Contributed to uncovering the role of xenobiotic transcription factors in insecticide resistance.
- Conducting pioneering research on epigenetic regulation of hormone action in insects.
- Developed methods for RNAi, transgenesis, and genome editing in pest and disease vectors.
- Conducting surveillance, speciation and pathogen diagnostics in ticks and mosquitoes in all 120 counties in Kentucky.

Focused Areas of Research:

1. **Development of Gene switches for use in Medicine and Agriculture (Rohm and Haas Company)**

While working at Rohm and Hass Company, I was involved in engineering ecdysone receptors (EcR) and retinoid X receptors (RXR) for gene switch applications. Gene switches are used for conditional expression of transgenes and hence improve the safety of gene therapy in medicine and genetically modified crops in agriculture. Both ecdysone and its receptor are absent in humans, and Rohm and Haas Company developed thousands of ecdysone agonists in their insecticide development program. We proposed that Rohm and Haas ligands and insect EcRs would make good candidates for regulation of genes in humans, animals, and plants for improving the safety of gene therapy and genetically modified animals and crops. After receiving seed funding from Rohm and Haas Company, we created hundreds of EcR and RXR constructs that were modified using site-directed or random mutagenesis, domain swapping, or truncations. All the constructs were analyzed in mammalian cell lines such as CHO, CV1, 3T3, and 293. We were able to improve both the sensitivity (micromolar to nanomolar) and magnitude of gene induction (100s to 1000s) controlled by these receptors. Stable cell lines were developed using the best switch formats. The stable cell lines were used to screen for ligands with improved properties. The utility of EcR-based gene switches was demonstrated in cell lines as well as in animal models. The EcR gene switches are being tested for applications in medicine and agriculture. I played a key role in securing two grants (total: $4 million) from the National Institute of Standards and Technology to the RheoGene Company for developing EcR gene switches. The results from our projects became the basis for

30 patents issued over the past ten years. The Phase II gene therapy trials using EcR gene switch for cancer gene therapy are currently underway. I continued to work on the gene switch project after joining the University of Kentucky to develop ecdysone receptor-based gene switches for use in agriculture. This work resulted in a patent that has been issued. Some of the gene switches we developed are being used by Metabolomics Company to produce raw materials in plants for bioplastics applications.

2. Epigenetic regulation of hormone action (University of Kentucky)

There has been continuous demand for the development of insect control methods that are target-specific. Juvenile hormone (JH) and ecdysteroids are the major hormones that regulate development and reproduction in insects. As these hormones are not present in vertebrates, they represent attractive targets for the development of insect control methods. Hindering this effort is the lack of understanding of the molecular basis of JH action. My laboratory along with other laboratories around the world used RNA interference in the *Tribolium castaneum* beetle to identify the receptor for JH, methoprene-tolerant and showed that JH works through methoprene-tolerant and a steroid receptor co-activator. We identified JH response elements in the promoter region of juvenile response gene, kr-h1 and these response elements were used to develop screening assays in mosquito cell lines. These assays are being used to identify insecticides to control mosquitoes. We also studied the mode of action of growth regulators, ecdysone, and juvenile hormone analogs. Our studies led to the identification of ecdysone analogs that can kill mosquitoes but not moths and butterflies. We also elucidated the mode of action of the juvenile hormone analog, methoprene, in mosquitoes and moths. In moths, methoprene works by blocking metamorphosis. By contrast, methoprene does not block larval-pupal metamorphosis in mosquitoes. Rather, it kills mosquitoes by interfering with the degeneration of larval tissues such as the midgut.

Recent studies in our laboratory showed that Cyclic AMP response-element binding protein (CBP) is required for acetylation of histone H3 as well as for induction of JH-response genes in *Tribolium castaneum* tissues, and in the TcA and Aag-2 cell lines. In addition, the histone deacetylase (HDAC) inhibitor, Trichostatin A (TSA) also induces expression of JH-response genes in TcA and Aag-2 cells. Chromatin modifiers Brahma, Snr1 and CHD1 but not DNA methyl transferase are required for regulation of metamorphosis and reproduction in *T. castaneum*. JH exerts diverse functions in different tissues and under various physiological conditions. We hypothesize that epigenetic and posttranslational modification of proteins involved in JH action play critical roles in multi-dimensional gene regulation strategies employed by JH. The current work in our laboratory is focused on identifying epigenetic modifiers and determining their mechanisms of action in the modulation of JH and ecdysone response using *T. castaneum* (beetle) and *Aedes aegypti* (mosquito) as model systems.

3. Molecular analysis of Insecticide Resistance (University of Kentucky)

Our studies on molecular analysis of insecticide resistance in the red flour beetle, Colorado potato beetle and bed bugs identified key genes responsible for resistance in these insects. These studies also uncovered unique mechanisms employed by bed bugs (expression of P450s in the epidermis) and Colorado potato beetles (employing the same overexpressed P450s for detoxification of both synthetic insecticides and plant toxins). We then employed RNAi and next-generation sequencing to identify the transcription factor, CncC and its heterodimeric partner Maf, that regulate proteins involved in all three phases of insecticide detoxification. The results from these studies will be useful in managing insecticide resistance, which is a huge problem in pest management.

4. RNAi-based pest management (University of Kentucky)

Many applications of RNA interference (RNAi) are being developed for use in medicine and agriculture. We have developed the first feeding (sprayable) dsRNA method for controlling Colorado potato beetle, which was published in 2011. This paper has already been cited more than 430 times, and the methods described in this paper are being used by many researchers worldwide to develop sprayable RNAi approaches for controlling insect pests and disease vectors. Industry (GreenLight BioSciences) has developed sprayable RNAi products with EPA registration of the first product, Calantha, in 2024. RNAi efficiency is variable among insects; it works very well in coleopteran insects but not in insects belonging to the orders Lepidoptera, Diptera, and Hemiptera. We investigated the mechanism of RNAi in lepidopteran insects and discovered that digestion of dsRNA by dsRNases present in the lumen and endosomal trapping of dsRNA in the cells are the major reasons for the inefficiency of RNAi in lepidopteran insects. We are developing novel formulations of dsRNA composited with polymers and particulate cores, resulting in nanostructured delivery vehicles, or dsRNA nanocomposites (dsRNA-NCs). Using these approaches, RNAi efficiency has been improved in lepidopteran insects such as the fall armyworm, a global pest threatening food security in Africa and Asia, and the disease vector *Aedes aegypti*. Two patents have been granted, and one application has been filed during the past three years based on advances in RNAi in my laboratory.

5. Surveillance, speciation and pathogen diagnostics and Genetic Pest Management (University of Kentucky)

In collaboration with KDPH and Southeast Center for Agricultural Health and Injury Prevention, we are conducting surveillance, speciation and pathogen diagnostics in ticks and mosquitoes in all 120 counties in Kentucky. We are also working on biotechnology-based management methods for a global pest, the fall armyworm, which is causing food security problems in Asia and Africa, and the disease vector, the yellow fever mosquito, which transmits many viruses that cause diseases in humans; we developed transgenic, genome editing and RNAi methods for these two insects. The methods developed are being used to study the biology of these insects to identify novel target sites for use in their management. The methods developed are also being used to develop new tools to control pests and disease vectors.

Grants awarded:

2002-present: > $10 million in grants. Current grant support includes 12 active projects funded by NIH, NSF, USDA and industry.

43 Intestinal Stem cells. To isolate and characterize stem cells. PI: S.R. Palli. Agency: CAMTech. Award: $160,000 (1/1/2023 to 12/31/2024).

42 Southeast Center for Agricultural Health and Injury Prevention – Vector-borne Diseases. To monitor and manage disease vectors in Kentucky. PI: S.R. Palli. Agency: National Institute of Occupational Safety and Health. Award: $324,499,000 (9/30/2022-9/29/2025).

41 Japanese Beetle Control. PI: S.R. Palli. Agency: USDA- APHIS. Award: $250,000 (9/30/2023-9/29/2025).

40 Tick Tick Surveillance and Outreach. To survey ticks, identify ticks and pathogens. Agency: Kentucky Department of Public Health. Award: $164,000 (07/01/2023-06/30/2025).

39 Epigenetic regulation of hormone hormone action. PI: S.R. Palli. Agency: National Institute of Health. Award: $1,120,000 (5/1/2020-4/30/2024).

38 Methoprene mode of action. To study mode of action of Methoprene. PI: S.R. Palli. Agency: National Institute of Health. Award: $420,000 05/1/2022-04/30/2024).

37 The fall armyworm functional genomics: genome editing and RNAi. To develop technologies to control fall armyworm. PI: S.R. Palli. Agency: USDA-AFRI. Award: $454,000 (3/15/2019-3/14/2022).

36 Development of RNAi-based control technologies for use in plant pest emergencies. To develop RNAi to control Asian longhorn beetle and other pests. PI: S.R. Palli. Agency: USDA-APHIS. Award: $114,000/year (9/1/2016-6/30/2021).

35 Center for Arthropod Management Technologies. To administer UK part of CAMTech. PI: S.R. Palli. Agency: NSF. Award: $599,000 (07/01/2018 to 06/30/2023).

34 Tissue specific promoters. To identify tissue-specific promoters for use in insect pests. PI: S.R. Palli Agency: CAMTech Award: $120,000 (1/1/2019 to 12/31/2021).

33 Mechanisms of RNA interference. To study the mechanisms of RNAi in different insect species. PI: S.R. Palli. Agency: CAMTech. Award: $120,000 (1/1/2018 to 12/31/2020).

32 RNAi methods for Zika vector control. PI: S.R. Palli. Agency: National Institute of Health. Award: $385,000 (2/14/2017-1/31/2019).

31 Development of RNAi-based control of Asian long-horn beetle. PI: S.R. Palli. Agency: USDA-APHIS. Award: $160,000 (9/30/2016-9/29/2018).

30 Epigenetic and posttranslational modifier regulation of Juvenile hormone action. PI: S.R. Palli. Agency: National Institute of Health. Award: $1,120,000 (2/1/2016-1/31/2020).

29 Development of novel insecticide synergists. To identify synergists for pyrethriod insecticides. PI: S.R. Palli. Agency: USDA-ARS. Award: $250,000 (9/1/2014 to 9/30/2016).

28 Mechanisms of RNA interference II. To study the mechanisms of RNAi in different insect species. PI: S.R. Palli. Agency: CAMTech. Award: $120,000 (1/1/2016 to 12/31/2017).

27 Mechanisms of RNA interference. To study the mechanisms of RNAi in different insect species. PI: S.R. Palli. Agency: CAMTech. Award: $120,000 (1/1/2014 to 12/31/2015).

26 Research Experience for Undergraduates. To train two undergraduate students during summer. PI: S.R. Palli. Agency: NSF. Award: $8,000 (08/01/2013 to 07/31/2014).

25 Center for Arthropod Management Technologies. To administer UK part of CAMTech. PI: S.R. Palli. Agency: NSF. Award: $360,000 (08/01/2013 to 07/31/2018).

24 Ecdysteroid Signaling in Filarial Parasite PI: Thomas Unnasch Co-PI: S.R. Palli. Agency: NIH. Award: $275,000 (08/15/2013 to 07/31/2015); $32,666 to Palli lab.

23 P450 Inhibition Assays. PI: S.R.P alli. Agency: USDA-ARS. Award: $125,918 (02/1/2013 to 08/30/2014).

22 Planning grant to establish National Science Foundation Industry/University Collaborative Research Center on Arthropod Management Technologies. PI: S.R. Palli. Agency: NSF. Award: $11,582 (08/22/2012 to 07/31/2013).

21 Molecular Analysis of Xenobiotic Response: To study role of P450s in xenobiotic response of Colorado potato beetle. PI: S.R. Palli. Agency: USDA-AFRI. Award: $499,000 (02/14/2011 to 02/14/2015).

20 Molecular mechanisms of synthetic pyrethroid resistance: To identify genes responsible for synthetic pyrethroid resistance in the bed bugs. PIs: S.R. Palli, K.F. Haynes and M. F. Potter. Agency: Bayer. Award: $100,000. (2010-2013)

19 Molecular Insect Physiology: Basic science to applications: To organize a symposium at ESA meeting. PI: S.R. Palli. Agency: USDA. Award: $10,000 (01/01/2010-12/31/2010).

18 20-hdryoxyecdysone suppression of juvenile hormone action: To study the function and JH regulation of accessory gland proteins. PI: S.R. Palli. Agency: NSF. Award: $450,000 (08/01/2010 to 07/31/2014).

17 Molecular analysis of juvenile hormone action. To identify molecules involved in juvenile hormone action. PI: S.R. Palli. Agency: National Institute of Health. Award: $820,000 (2/1/2010-1/31/2014).

16 Functional genomics on nuclear receptors: Target sites for insecticide development and resistance management. To characterize nuclear receptors and develop screening assays for identifying new insecticides as well as for fighting insecticide resistance development. PI: S.R. Palli. Agency: USDA-NRI. Award: $567,944 (01/01/08 to 12/31/11).

15 20-hdryoxyecdysone suppression of juvenile hormone action: NSF supplement to attract high school students into science. PI: S.R. Palli. Agency: NSF. Award: $6,000 (07/01/2006-06/30/2008).

14 Development of tightly regulated ecdysone receptor-based gene switches. Dow AgroSciences match for CPBR project. PI: S.R. Palli, Co-PI: Dr. Collins of Agronomy department. Agency: Dow AgroSciences Inc. Award: $50,000 (01/01/2006 to 12/31/2007).

13 Development of tightly regulated ecdysone receptor-based gene switches. To develop two-hybrid gene switch so that background activity in the absence of ligand and ligand sensitivity are improved. PI: S.R. Palli, Co-PI: Dr. Collins, Agronomy. Agency: Consortium for Plant Biotechnology Research. Award: $162,000 (01/01/2006 to 12/31/2007).

12 Novel active insecticidal compounds from Kentucky native plants. To screen natural products against insect pests. PI: S.R. Palli. Agency: Neprogenix Inc. Award: $51,000 (01/01/2006 to 12/31/2006).

11 Evaluation methoxyfenozide as gene switch legend. To evaluate formulations for methoxyfenozide for use as gene switch ligands. PI: S.R. Palli, Co-PI: Dr. Collins, Agronomy. Agency: Dow AgroSciences. Award: $32,000 (01/01/2005 to 5/31/2005).

10 Development of tightly regulated gene switches for trait improvement, pest resistance and functional genomics applications in tobacco plants. To develop and test tight gene switches for use in agriculture. PI: S.R. Palli, Co-PI: Dr. Collins,Agronomy. Agency: Kentucky Tobacco Research and Development Center. Award: $116,382 (07/01/2005 to 06/30/2007).

9 Molecular analysis of juvenile hormone action. To identify molecules involved in juvenile hormone action. PI: S.R. Palli. Agency: National Institute of Health. Award: $1,020,000 (2/1/2005-1/31/2010).

8 Identification of juvenile hormone receptors: Research award, UK VP research, $15,000 (11/01/03-10/30/04).

7 Development of ligand inducible gene switches for simultaneous and independent regulation of expression of two genes in transgenic tobacco plants. PI: S.R. Palli, Co-PIs: Drs. Collins and Dinkins, Agronomy. Agency: KTRDC, Award: $119,643 years (01/01/2003 to 06/30/2005).

6 Micro array analysis of JH-response: To conduct pilot studies on JH-response in Drosophila L57 cells. PI: S.R. Palli. Agency: UK micro array core facility. Award: $5,000.

5 HATCH: Molecular Analysis of Pest Development and Resistance to Insecticides.

4 Molecular analysis of juvenile hormone action in *Heliothis virescens*: To identify and characterize critical genes involved in JH action in Heliothis virescens. PI: S.R. Palli. Agency: USDA-NRI. Award: $260,033 (12/1/2004-11/30/2007).

3 Characterization of EcR-based gene switches: To understand the functioning of ecdysone receptor-based gene switches. PI: S.R. Palli. Agency: RheoGene Inc. Award: $196,000 (09/01/2004 to 08/30/2008).

2 20-hdryoxyecdysone suppression of juvenile hormone action: To study the cross-talk between 20E and JH. PI: S.R. Palli. Agency: NSF. Award: $482,296 (08/01/2004 to 07/31/2008).

1 Studies on EcR-based gene switch: To develop ecdysone receptor-based gene switches for use in medicine. PI: S.R. Palli. Agency: RheoGene Inc. Award: $196,000 (09/01/2002 to 08/30/2004).

1992-1998: Canadian Forest Service: PI and Co-PI on grants ($1,200,000) received from Canadian government agencies (Canadian Biotechnology Strategy Fund, Science and Technology Fund andEngineering and Natural Sciences Research Council) and Industries (Rohm and Haas and American Cyanamid).

1998-2002: Rohm and Haas/RheoGene Inc. Co-PI on two grants ($4,000,000) awarded by NIST to RheoGene Inc.

Journal publications: Published 266 papers in refereed journals.

266. Darrington M, Solocinski J, Zhou SK, Lecheta MC, Palli SR, Chen YH, Teets NM. Environmental factors affecting RNAi efficacy: Temperature but not plant cultivar influences Colorado potato beetle's response to insecticidal dsRNA. Insect Mol Biol. 2025 May 23;. doi: 10.1111/imb.12996. [Epub ahead of print] PubMed PMID: 40410128.
265. Balasubramani S, Palli SR (2025). Identification of histone and N-terminal acetyltransferases required for reproduction and embryonic development of yellow fever mosquito, *Aedes aegypti*. Arch Insect Biochem Physiol 118(4), e70055. doi: 10.1002/arch.70055. PMID: 40235318.
264. Sun H, Bu LA, Zhang XY, Zhang ZR, Su SC, Guo D, Gao CF, Palli SR, Champer J, Wu SF (2025). β2-tubulin regulates the development and migration of eupyrene sperm in *Spodoptera frugiperda*. Cell Mol Life Sci 82(1), 191. doi: 10.1007/s00018-025-05722-9. PMID: 40314796; PMCID: PMC12048385.
263. Jiao Y, Sengodan K, Chen J, Palli SR (2025). Role of histone methylation in insect development: KMT5A regulates ecdysteroid biosynthesis during metamorphosis of *Tribolium castaneum.* Insect Biochem Mol Biol 180, 104316. doi: 10.1016/j.ibmb.2025.104316. PMID: 40287070.
262. Arya SK, Palli SR (2025). N-alpha-acetyltransferase 40 modulates ecdysteroid action through chromatin accessibility changes near the promoters of 20-hydroxyecdysone response genes in *Tribolium Castaneum* TcA cells. Insect Biochem Mol Biol179, 104285. doi: 10.1016/j.ibmb.2025.104285. PMID: 39986546.
261. Wang P, Zhao Y, Cheng Y, Tian S, Bai Y, Zuo J, Palli SR, Chen X (2025). Knockout of a testis-specific gene cluster impairs male fertility in the fall armyworm, *Spodoptera frugiperda*. Pest Manag Sci 81(4), 2355-2363. doi: 10.1002/ps.8634. PMID: 39764585.
260. Liu C, Wu MZ, Zheng ZJ, Fan ST, Tan JF, Jiao Y, Palli SR, Zhu GH (2025). KnockoutBR-C induces premature expression of E93 thus triggering adult differentiation under larval morphology. Pest Manag Sci 81(4), 1923-1933. doi: 10.1002/ps.8592. PMID: 39641237.
259. Gaddelapati SC, Palli SR (2025). Histone deacetylases synergistically regulate juvenile hormone signaling in the yellow fever mosquito, *Aedes aegypti*. Insect Biochem Mol Biol 177, 104256. doi: 10.1016/j.ibmb.2024.104256. PMID: 39742981; PMCID: PMC11893979.
258. Wang W, Chen JS, He PY, Zhang MH, Cao HQ, Palli SR, Sheng CW (2025). Identification and pharmacological characterization of pH-sensitive chloride channels in the fall armyworm, *Spodoptera frugiperda*. Insect Biochem Mol Biol 177, 104243. doi: 10.1016/j.ibmb.2024.104243. PMID: 39645056.
257. Chen X, Koo J, Kumar Arya S, Palli SR (2024). Chronologically inappropriate morphogenesis Chinmo is required for maintenance of larval stages of fall armyworm. Proc Natl Acad Sci USA 121(49), e2411286121. doi: 10.1073/pnas.2411286121. PMID: 39589873; PMCID: PMC11626174.
256. Arya SK, Harrison DA, Palli SR (2024). Deciphering cellular heterogeneity in *Spodoptera frugiperda* midgut cell line through single cell RNA sequencing. Genomics 116(5):110898. doi: 10.1016/j.ygeno.2024.110898. PMID: 39047877.

255. Jiao Y, Palli SR. RNA modifications in insects (2024). Front Insect Sci. 4,1448766. doi: 10.3389/finsc.2024.1448766. PMID: 39253349; PMCID: PMC11381373.

254. Gao Y, Alyokhin A, Zhang R, Smagghe G, Palli SR, Jurat-Fuentes JL, Tabashnik BE (2024). Proactive resistance management for sustaining the efficacy of RNA interference for pest control. J Econ Entomol. 117(4), 1306-1308. doi: 10.1093/jee/toae099. PMID: 38748467.

253. Yan J, Nauen R, Reitz S, Alyokhin A, Zhang J, Mota-Sanchez D, Kim Y, Palli SR, Rondon SI, Nault BA, Jurat-Fuentes JL, Crossley MS, Snyder WE, Gatehouse AMR, Zalucki MP, Tabashnik BE, Gao Y (2024). The new kid on the block in insect pest management: sprayable RNAi goes commercial. Sci China Life Sci. 67(8), 1766-1768. doi: 10.1007/s11427-024-2612-1. PMID: 38782871.

252. Koo J, Palli SR (2024). Recent advances in understanding of the mechanisms of RNA interference in insects. Insect Mol Biol 2024 Jul 3, 10.1111/imb.12941. doi: 10.1111/imb.12941. PMID: 38957135; PMCID: PMC11695441.

251. Koo J, Palli SR (2024). StaufenC facilitates utilization of the ERAD pathway to transport dsRNA through the endoplasmic reticulum to the cytosol. Proc Natl Acad Sci USA 121(26), e2322927121. doi: 10.1073/pnas.2322927121. PMID: 38885386; PMCID: PMC11214074.

250. Zhang Z, Liu X, Hu B, Chen K, Yu Y, Sun C, Zhu D, Bai H, Palli SR, Tan A (2024). The mechanoreceptor Piezo is required for spermatogenesis in Bombyx mori. BMC Biol 22(1), 118. doi: 10.1186/s12915-024-01916-y. PMID: 38769528; PMCID: PMC11106986.

249. Jia Q, Yang L, Wen J, Liu S, Wen D, Luo W, Wang W, Palli SR, Sheng L (2024). Cyp6g2 is the major P450 epoxidase responsible for juvenile hormone biosynthesis in *Drosophila melanogaster*. BMC Biol 22(1), 111. doi: 10.1186/s12915-024-01910-4. PMID: 38741075; PMCID: PMC11092216.

248. Gaddelapati SC, George S, Moola A, Sengodan K, Palli SR (2024). N(alpha)-acetyltransferase 40-mediated histone acetylation plays an important role in ecdysone regulation of metamorphosis in the red flour beetle, *Tribolium castaneum*. Commun Biol 7(1), 521. doi: 10.1038/s42003-024-06212-7. PMID: 38702540; PMCID: PMC11068786.

247. Koo J, Zhu GH, Palli SR (2024). CRISPR-Cas9 mediated dsRNase knockout improves RNAi efficiency in the fall armyworm. Pestic Biochem Physiol 200, 105839. doi: 10.1016/j.pestbp.2024.105839. PMID: 38582601.

246. Chen J, Sheng CW, Peng Y, Wang K, Jiao Y, Palli SR, Cao H (2024). Transcript level and sequence matching are key determinants of off-target effects in RNAi. J Agric Food Chem 72(1), 577-589. doi: 10.1021/acs.jafc.3c07434. PMID: 38135672.

245. Wang XZ, Chen JS, Wang W, Niu DB, Wu HZ, Palli SR, Cao HQ, Sheng CW (2023). Knockdown of the glutamate-gated chloride channel gene decreases emamectin benzoate susceptibility in the fall armyworm, *Spodoptera frugiperda*. Pestic Biochem Physiol 196, 105636. doi: 10.1016/j.pestbp.2023.105636. PMID: 37945267.

244. Palli SR (2023). RNAi turns 25: contributions and challenges in insect science. Front Insect Sci. 3, 1209478. doi: 10.3389/finsc.2023.1209478. PMID: 38469536; PMCID: PMC10926446.

243. Koo J, Gurusamy D, Palli SR (2023). Inefficient uptake of small interfering RNAs is responsible for their inability to trigger RNA interference in Colorado potato beetle cells. Arch Insect Biochem Physiol 114(2), 1-12. doi: 10.1002/arch.22036. PMID: 37452750; PMCID: PMC10528746.

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Patents: Inventor of 37 U.S. patents.

United States

- Development of polylysine:epigallocatechin-3-o-gallate and dsRNA polyplexes for control of mosquitoes

Patent number: 11793829
Date of Patent: October 24, 2023
Inventors: Subba Reddy Palli, Ramesh Dhandapani

- Modified-RNA nanoparticles for induction of RNA interference

Patent number: 11571394
Date of Patent: February 7, 2023
Inventors: Subba Reddy Palli, Ramesh Kumar Dhandapani

- Substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 10190124
Date of Patent: January 29, 2019
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar, Dean Ervin Cress, Ted Tsutomu Fujimoto

- Substitution mutant receptors and their use in an ecdysone receptor-based inducible gene expression system

Patent number: 10087231
Date of Patent: October 2, 2018
Inventors: Subba Reddy Palli, Marianna Zinovievna Kapitskaya

- Ecdysone receptor/invertebrate retinoid X receptor-based inducible gene expression system

Patent number: 9493540
Date of Patent: November 15, 2016
Inventors: Subba Reddy Palli, Marianna Zinovievna Kapitskaya

- Substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 9322026
Date of Patent: April 26, 2016
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar, Dean Ervin Cress, Ted Tsutomu Fujimoto

- Substitution mutant receptors and their use in an ecdysone receptor-based inducible gene expression system

Patent number: 9249207
Date of Patent: February 2, 2016
Inventors: Subba Reddy Palli, Marianna Zinovievna Kapitskaya

- Mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 9163256
Date of Patent: October 20, 2015
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar

- Whitefly ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 9063140
Date of Patent: June 23, 2015
Inventors: Jianzhong Zhang, Dean Ervin Cress, Subba Reddy Palli, Tarlochan Singh Dhadialla

- Substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 9029152
Date of Patent: May 12, 2015
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar, Dean Ervin Cress, Ted Tsutomu Fujimoto

- Ecdysone receptor-based inducible gene expression system

Patent number: 8822754
Date of Patent: September 2, 2014
Inventors: Subba Reddy Palli, Marianna Zinovjevna Kapitskaya, Dean Ervin Cress

- Multiple inducible gene regulation system

Patent number: 8728808
Date of Patent: May 20, 2014
Inventors: Tarlochan Singh Dhadialla, Dean Ervin Cress, Glenn Richard Carlson, Robert Eugene Hormann, Subba Reddy Palli, Arthur John Kudla, Ronald Phillip Herzig, Jr., Mohan Philip

- Substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 8715959
Date of Patent: May 6, 2014
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar, Dean Ervin Cress, Ted Tsutomu Fujimoto

- Substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 8691527
Date of Patent: April 8, 2014
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar, Dean Ervin Cress, Ted Tsutomu Fujimoto

- Leafthopper ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 8680249
Date of Patent: March 25, 2014
Inventor: Subba Reddy Palli

- Substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 8669051
Date of Patent: March 11, 2014
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar, Dean Ervin Cress, Ted Tsutomu Fujimoto

- Non-human organism comprising a gene expression modulation system encoding a chimeric retinoid X receptor

Patent number: 8598409
Date of Patent: December 3, 2013
Inventors: Marianna Zinovievna Kapitskaya, Subba Reddy Palli

- Leafhopper ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 8497093
Date of Patent: July 30, 2013
Inventor: Subba Reddy Palli

- Method of modulating gene expression using an ecdysone receptor-based inducible gene expression system

Patent number: 8236556
Date of Patent: August 7, 2012
Inventors: Marianna Zinovjevna Kapitskaya, Subba Reddy Palli

- Ecdysone receptor-based inducible gene expression system

Patent number: 8202718
Date of Patent: June 19, 2012
Inventors: Subba Reddy Palli, Marianna Zinovjevna Kapitskaya, Dean Ervin Cress

- Multiple inducible gene regulation system

Patent number: 8168426
Date of Patent: May 1, 2012
Inventors: Tarlochan Singh Dhadialla, Dean Ervin Cress, Glenn Richard Carlson, Robert Eugene Hormann, Subba Reddy Palli, Arthur John Kudla, Ronald Phillip Herzig, Jr., Mohan Philip

- Gene expression modulation system for use in plants and method for modulating gene expression in plants

Patent number: 8115059
Date of Patent: February 14, 2012
Inventors: Subba Reddy Palli, Ajay Kumar Singh

- Multiple inducible gene regulation system

Patent number: 8105825
Date of Patent: January 31, 2012

Inventors: Tarlochan Singh Dhadialla, Dean Ervin Cress, Glenn Richard Carlson, Robert Eugene Hormann, Subba Reddy Palli, Arthur John Kudla, Ronald Phillip Herzig, Jr., Mohan Philip

- Mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 8076454
Date of Patent: December 13, 2011
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar

- Whitefly ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 8030067
Date of Patent: October 4, 2011
Inventors: Jianzhong Zhang, Dean Ervin Cress, Subba Reddy Palli, Tarlochan Singh Dhadialla

- Leafhopper ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 8021878
Date of Patent: September 20, 2011
Inventor: Subba Reddy Palli

- Mutant receptors and their use in a nuclear receptor-based inducible gene expression system

Patent number: 7935510
Date of Patent: May 3, 2011
Inventors: Subba Reddy Palli, Mohan Basavaraju Kumar

- Whitefly ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 7919269
Date of Patent: April 5, 2011
Inventors: Jianzhong Zhang, Dean Ervin Cress, Subba Reddy Palli, Tarlochan Singh Dhadialla

- Whitefly ecdysone receptor antibody

Patent number: 7829676
Date of Patent: November 9, 2010
Inventors: Jianzhong Zhang, Dean Ervin Cress, Subba Reddy Palli, Tarlochan Singh Dhadialla

- Ecdysone receptor-based inducible gene expression system

Patent number: 7807417
Date of Patent: October 5, 2010
Inventors: Subba Reddy Palli, Marianna Zinovjevna Kapitskaya, Dean Ervin Cress

- Ecdysone receptor-based inducible gene expression system

Patent number: 7776587
Date of Patent: August 17, 2010
Inventors: Subba Reddy Palli, Marianna Zinovjevna Kapitskaya, Dean Ervin Cress

- Whitefly ecdysone receptor polypeptide and methods

Patent number: 7601508
Date of Patent: October 13, 2009
Inventors: Subba Reddy Palli, Tarlochan Singh Dhadialla, Jianzhong Zhang, Dean Ervin Cress

- Leafhopper ecdysone receptor nucleic acids, polypeptides, and uses thereof

Patent number: 7563879
Date of Patent: July 21, 2009
Inventor: Subba Reddy Palli

- Chimeric retinoid X receptors and their use in a novel ecdysone receptor-based inducible gene expression system

Patent number: 7531326
Date of Patent: May 12, 2009
Inventors: Marianna Zinovjevna Kapitskaya, Subba Reddy Palli

- Ecdysone receptor-based inducible gene expression system

Patent number: 7091038
Date of Patent: August 15, 2006
Inventors: Subba Reddy Palli, Marrianna Zinovjevna Kapitskaya, Dean Ervin Cress

- Method for identifying products employing gene expression

Patent number: 6576422
Date of Patent: June 10, 2003
Inventors: Barry Weinstein, Lorraine Holowach Keller, Subba Reddy Palli

- Transgenic virus

Patent number: 5891431
Date of Patent: April 6, 1999
Inventors: Subba Reddy Palli, Basil M. Arif, Sardar S. Sohi, Arthur Retnakaran

European Patents (15)

Palli, S.R. and Dhandapani, R. (2023) RNAi control of Japanese beetle. Application filed.

Palli SR & Kapitskaya MZ (2012) Novel Ecdysone Receptor/invertebrate Retinoid X Receptor-based Inducible Gene Expression System. (EP Patent 1,456,346).

Palli SR & Kapitskaya MZ (2012) Chimeric Retinoid x receptors and their use in a novel ecdysone receptor-based inducible gene expression system. (EP Patent 1,572,862).

Palli SR & Kapitskaya MZ (2012) Novel substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system. (EP Patent 1,534,738).

Palli SR, Kumar MB, Cress DE, & Fujimoto TT (2011) Novel substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system. (EP Patent 2,275,558).

Palli SR & Kapitskaya MZ (2011) Chimeric retinoid X receptors and their use in a novel ecdysone receptor-based inducible gene expression system. (EP Patent 2,374,891.

Palli SR & Kumar MB (2007) Mutant receptors and their use in a nuclear receptor-based induciblegene expression system. (EP Patent 1,744,619).

Palli SR, Kapitskaya MZ, & Cress DE (2006) Ecdysone receptor-based inducible gene expressionsystem. (EP Patent 1,266,015).

Michelotti EL, Tice CM, Palli SR, Thompson CS, & Dhadialla TS (2005) Tetrahydroquinolines formodulating the expression of exogenous genes via an ecdysone receptor complex. (EP Patent 1,513,530).

Zhang J, Cress DE, Palli SR, & Dhadialla TS (2004) Whitefly Ecdysone receptor nucleic acids, polypeptides, and uses thereof. (EP Patent 1,490,686).

Palli SR, Kumar MB, Cress DE, & Fujimoto TT (2004) Novel substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system. (EP Patent 1,373,470).

Palli SR (2004) Leafhopper ecdysone receptor nucleic acids, polypeptides, and uses thereof. (EP Patent 1,436,394).

Palli SR, Arif BM, Sohi SS, & Retnakaran A (2003) Transgenic Virus for use as a pesticide. (EP Patent 1,323,822).

Weinstein B, Keller LH, & Palli SR (2002) Methods for identifying products employing reporter gene expression. (EP Patent 1,199,371).

Palli SR, Arif BM, Sohi SS, & Retnakaran A (1998) Recombinant insect viruses comprising insecttranscription factors. (EP Patent 0,861,901).

World Patents (11)

Palli SR & Kumar M (2005) Mutant receptors and their use in a nuclear receptor-based inducible gene expression system. (WO Patent 2,005,108,617).

Zhang J, Cress D, Palli S, & Dhadialla T (2003) Whitefly Ecdysone receptor nucleic acids, polypeptides, and uses thereof. (WO Patent 2,003,027,266).
Palli S (2003) Minimal DNA binding domain polynucleotides, polypeptides, and uses thereof. (WO Patent 2,003,060,103).
Palli S (2003) Leafhopper ecdysone receptor nucleic acids, polypeptides, and uses thereof. (WO Patent 2,003,027,289).
Michelotti E, Tice C, Palli S, Thompson C, & Dhadialla T (2003) Tetrahydroquinolines for modulating the expression of exogenous genes via an ecdysone receptor complex. (WO Patent2,003,105,849).
Palli S, Kumar M, Cress D, & Fujimoto T (2002) Novel substitution mutant receptors and their usein a nuclear receptor-based inducible gene expression system. (WO Patent 2,002,066,612).
Palli S & Kapitskaya MZ (2002) Novel ecdysone receptor/invertebrate retinoid x receptor-based inducible gene expression system. (WO Patent 2,002,066,613).
Palli S & Kapitskaya MZ (2002) Chimeric Retinoid x receptors and their use in a novel ecdysone receptor-based inducible gene expression system. (WO Patent 2,002,066,614).
Palli S & Kapitskaya MZ (2002)) Novel substitution mutant receptors and their use in a nuclear receptor-based inducible gene expression system. (WO patent 2,002,066,615).
Dhadialla T, Palli S, et al. (2002) Multiple inducible gene regulation system. (WO Patent 2,002,029,075).
Palli S & Kapitskaya MZ, & Cress D (2001) Ecdysone receptor-based inducible gene expression system. (WO Patent 2,001,070,816).

INVITED PRESENTATIONS

Presented 98 invited talks at national and international conferences.

INSTRUCTION

- Served as the chairman of the advisory committees of 22 Ph.D. and MS students.
- Served on the committees of 40 graduate students.
- Trained over 40 post-doctoral scholars and visiting scientists.
- Trained >20 ABT students in my lab and advised >40 ABT students.
- Trained High School students.
- Along with Dr. Obrycki, I wrote a proposal and started the Entomology MS online program.
- ENT 567 Applications of Molecular Genetics (taught once).
- ENT 635 Internal Morphology and Insect Physiology (taught twice).
- ENT 690 Molecular Entomology (taught twice).
- ENT 635 Insect Physiology (taught eight times) ENT 636 Molecular Entomology (taught twice).
- ABT460 Advanced Molecular Genetics (taught four times).
- ENT 695, Introduction to Insect Physiology and Toxicology DL section (Taught three times).
- Participated in teaching ENT 770 and TOX 509.

EXTENSION, OUTREACH AND PUBLIC SERVICE

- As the KY State Entomologist for the past nine years, I led the outreach and regulatory services performed by the State Entomologist office.
- Leading a team on surveillance, speciation, and pathogen testing in disease vectors in Kentucky. Leading a team of faculty and staff from different colleges in the UK and personnel from the Kentucky Department of Public Health to perform outreach activities related to one health.
- As a distinguished professor of the Gatton Foundation, I educate the public on vector-borne diseases and their prevention.
- I gave many interviews with media outlets to disseminate information on disease vectors and the products of my research programs.
- Gave presentations at public outreach events.
- As KY State Entomologist and Chair of Entomology and Plant Pathology departments, I interacted with the public, including responding to phone calls and emails on pests and diseases.
- Provide leadership to multiple public service programs, including pesticide applicator training, Insect museum, pest identification, and plant disease diagnostic laboratory.

Service to Profession

- Vice-president elect, vice-president, president, and past president of the PBT section of Entomological Society of America, ESA (2011-2014).
- Member of ESA Publications Council (2013-2018).
- Member of Awards Committee for ESA Nan-Yao Su Award for Innovation and Creativity in Entomology (2013-2018).
- Chair, Lillian & Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, and Molecular Biology (2012-2017).
- Member of teams who organized program symposia at multiple ESA annual meetings.
- Member of ESA annual meeting program committee (2011-2012).
- Member, ESA Science Policy Committee (2014-2016).
- Member of the International Congress of Entomology (2024) organizing committees and several other Entomology meetings.

Service to Department, College, and University

- Serving as Chair of the Entomology department for the past 9 years.
- Serving as interim chair of the Plant Pathology department for the past 12 months
- Chaired multiple departmental committees, including graduate education and new faculty recruitment.
- Chaired multiple search committees for college recruitment, including Associate Dean for Instruction, chair of the Veterinary Science department, and departmental reviews.
- Served on several UK committees, including the Center for Computational Sciences Advisory Committee and the UK Microscopy Advisory Board.
- Serving on the KY Department of Agriculture Pest Control Advisory Board.
- Co-director of the Center for Arthropod Management Technologies, an NSF Industry/University Collaborative research center at UK and University of Florida.

- Assembled and led transdisciplinary teams of over 100 PIs from multiple institutions and government agencies in the Appalachian region to apply for a CDC center grant on vector-borne diseases.
- Serving as the principal investigator for the recently awarded Gatton Foundation One Health Grand Challenge research focus area grant, leading a team of 12 co-PIs from multiple UK colleges to develop one health center.

Member of Editorial Boards

- Journal of Insect Physiology (1998-)
- The Canadian Entomologist, Associate Editor (2002- 2014)
- Biopesticides International (2004--)
- Archives of Insect Biochemistry and Physiology, Associate Editor (2005-)
- Psyche-A Journal of Entomology (2007-)
- BMC Developmental Biology, Associate Editor (2009-)
- Insect Biochemistry and Molecular Biology (2009-)
- Insects (2010-2018) PLoSOne (2011--) Scientific Reports (2013---)
- Annual Review of Entomology (2013-- 2018)
- PloSGenetics Associate Editor (2020--)
- Journal Pest Science, Subject Editor (2021--)
- Frontiers of Insect Science, Insect Molecular Genetics, Chief Editor (2021-2024)
- Frontiers of Insect Science, Field Chief Editor (2023--)

Member grant review panels

- USDA-NRI (2005, 2006, 2008)
- NIH-VECTOR BIOLOGY (2005, 2006, permanent member for five years from 2009-2014)
- NIH-MCE (2009)
- NSF-BIO-IOS (2009, 2015)
- NIH-VB/PTHE (2014, 2015,2016,2017,2018,2019, 2021, 2023, 2024)

Membership in scientific societies

- American Society for Cell Biology (1989-93).
- Entomological Society of America (1988-91, 1998-).
- American Society for Microbiology (1998-2002).
- American Society for Gene Therapy (1999- 2002).