



# PEF System

## Bibliography

### **Galvanize Therapeutics**

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## Clinical Experience

### Publications

Jimenez M, Hatton B, Moreno-Gonzalez A, Iding JS, Flandes J, Van Der Heijden EHFM, Ng CSH, Prieto C, Teodosio C, Flores-Montero JA, Rodriguez-Gonzalez M, Cedeno Diaz OM, Vos S, Lau RWH, Kaiza ME, Moore WH, Orfao A, Bruno TC. Pulsed Electric Field Ablation Reprograms Tumor Immunity and Stimulates Germinal Center Formation in Tertiary Lymphoid Structures in Patients with Non-Small Cell Lung Cancer. *Clinical Cancer Research*. 2026; doi: 10.1158/1078-0432.CCR-25-3847

Mahmood K, Giovacchini CX, Mullikin TC, Clarke JM, Kelsey C, Shofer SL, Dorry M, Salmon C, Sanders E, Mammarappallil J. Safety and Efficacy of Bronchoscopic Pulsed Electric Field Ablation for Lung Cancer and Metastases. *JTO Clinical and Research Reports*. 2026; doi: 10.1016/j.jtocrr.2026.100983

Harris JP, Boyd C, Shi M, Reilly M, Simon A, Seyedin SN, Chen W-P, Nagasaka M, Abi-Jaoudeh N, Hoyt MA. Addition of Pulsed Electric Field Ablation to SBRT for Lung Tumors: Effect on Health-Related Quality of Life. *Lung Cancer Manag*. 2026; Mar 5;15(1):2635332. doi: 10.1080/17581966.2026.2635332

Smesseim I, Perez P, Fernandez-Bussy S, Stermann DH. The Role of Pulsed Electric Field Therapy in Non-Small Cell Lung Cancer: A Narrative Review of a Novel Minimally Invasive Intervention. *J Thoracic Disease*. 2026; 18(4):414. doi: 10.21037/jtd-2025-aw-2417.

Fernandez-Bussy S, Yu Lee-Mateus A, Murillo-Torres RM, Gutierrez-Gallegos P, Husta B, Vu LH, Kern RM, Mullon J, Thomas JM, Fleissner ZJ, Robertson KS, Hazelett BN, Love E, Abia-Trujillo D. Bronchoscopic Pulsed-Electric Field Ablation for Carcinoid Tumor: Robotic-Assisted and Non-Robotic Approach. *Lung Cancer*. 2026; 214. doi: 10.1016/j.lungcan.2026.109333

Liu Y, De La Garza-Ramos C, Gabriel E, Nassar A, Toskich B, Thompson EA, Chumsri S. Case Report: Durable Response to Pulsed Electric Field Ablation in Combination with Immune Checkpoint Inhibitors in HER2-low Breast Cancer Through Activation of Interferon Signaling. *Frontiers in Oncology*. 2026;16:1681010. doi: 10.3389/fonc.2026.1681010.

Gad S, Mohnasky M, Schrank Z, Sorah JD, Myhre J, Harris B, Wang H, Gholami B, Afrasiabi A, Kokabi N. Case Report: Pulsed Electric Field Treatment of Metastatic Liver Disease Demonstrating a Possible Abscopal Response. *Frontiers in Immunology*. 2026;17:1592656. doi: 10.3389/fimmu.2026.1592656.

Roperia V, Thomas J. Pulsed Electric Field Ablation for Advanced Lung and Oligometastatic Disease: A Retrospective Study of 32 Consecutive Patients in a Community Hospital Setting. *Cancers*. 2026; 18(9):1459. doi: 10.3390/cancers18091459.

Moreno-Gonzalez A, Nafie EHO, Pastori C, Mammarappallil J, Sessaiah P, Plentl MB, Hatton BA, Neal RE II, Pritchett MA, Reisenauer JS. Six-Month Local Control Rates and Immune Responses After Pulsed Electric Field Ablation in Metastatic Cancer. *Cancers*. 2025; 17(21):3495. doi: 10.3390/cancers17213495

Pritchett M, Reisenauer J, Fernandez-Bussy S, DiBardino D, Hunt S, Ma K, Pua B, Shostak E, Hatton B, Moreno-Gonzalez A, Sessaiah P, Krinsky W. The Safety of Pulsed Electric Field Ablation Before Standard of Care Treatment for Patients With Metastatic Cancer. *Journal of Bronchology & Interventional Pulmonology*. 2025; 32(4):e01027. doi: 10.1097/LBR.0000000000001027

## Clinical Experience

Gómez AM, Enrique IB, Vives EC. Bronchoscopic Pulsed Electric Field for Ablation and Immunomodulation in Early-Stage Non-Small Lung Cancer. *Open Respiratory Archives*. 2025. doi: 10.1016/j.opresp.2025.100457

Hunter DW, Krinsky W, Meyerhoff RR, Mammarappallil JG, Kaviani R, Stoffregen WC, Reisenauer J. Pulsed Electric Field Ablation Safety and Characterization Near Sensitive Structures in Lung: A Preclinical and Clinical Case Series Study. *J Thorac Dis*. 2025. doi: 10.21037/jtd-2024-1976

Moore W, Silk M, Bhattacharji P, Pua B, Mammarappallil J, Sterman D, Chachoua A. Early Experience with Pulsed Electric Field in Recalcitrant Stage IV Lung Cancer. *Lung Cancer*. 2025. doi: 10.1016/j.lungcan.2025.108575

Lattanzio K, Alkhatib K, Guzzo T, Lee D, Pierorazio P, Bivalacqua T, Schurhamer B. Case Study: Pulsed Electric Field Ablation for Salvage Prostate Cancer ablation. *Urology Case Reports*. 2025. doi: 10.1016/j.eucr.2025.103023

Moore WH, Silk M, Bhattacharji P, Pua BB, Mammarappallil J, Meyerhoff RR, Kessler J, Tasse J, Gulizia D. Safety and Feasibility of Percutaneous Pulsed Electrical Field Ablation in Multiple Organs: A Multi-Center Retrospective Study. *European Journal of Radiology*. 2025. doi: 10.1016/j.ejrad.2025.112078

Jimenez M, Flandes J, van der Heijden EHFM, Ng CSH, Iding JS, Garcia-Hierro JF, Recalde-Zamacona B, Verhoeven RLJ, Lau RWH, Moreno-Gonzalez A, Hatton BA, Seshiah P, Plentl MB, and Krinsky WS. Safety and Feasibility of Pulsed Electric Field Ablation for Early-Stage Non-Small Cell Lung Cancer Prior to Surgical Resection. *Journal of Surgical Oncology*. 2025. doi:10.1002/jso.28110

Jimenez M, Fernandez J, Krinsky W. Hybridizing the “Hybrid” OR: A Case Report Using Pulsed Electric Field Delivery in Early Stage, Non-Small Cell Lung Cancer, Treat and Resect Study “INCITE ES”. *Authorea*. 2023. doi: 10.22541/au.168310035.54864880/v1

Knight D, Hillard H, Handran C, Kuhlman P. Pulsed Electric Field (PEF) Treatment of Refractory Vulvar Melanoma Concurrently Treated with Immune Checkpoint Blockade Demonstrating an Abscopal Response: A Case Report. *Gynecologic Oncology Reports*. 2025. doi: 10.1016/j.gore.2024.101671

Arciga BM, Walters DM, Kimchi ET, Staveley-O'Carroll KF, Li G, Teixeira E, Rachagani S, Kaifi JT. Pulsed Electric Field Ablation as a Candidate to Enhance the Anti-Tumor Immune Response to Immune Checkpoint Inhibitors. *Cancer Lett*. 2025; 609:217361. doi: 10.1016/j.canlet.2024.217361

Rouhezamin MR, Fintelmann FJ, Huang AJ, Arellano RS, Smolinski-Zhao S, Patel DM, Wehrenberg-Klee EP, Uppot RN. Limited Effectiveness in Early Human Clinical Experience with Pulsed Electrical Field Ablation. *Journal of Vascular and Interventional Radiology*. 2024. doi: 10.1016/j.jvir.2024.10.033

Kim, DH, Suh RD, Chiang J, Hao F, Lu DSK, Raman SS. Technical Feasibility and Safety of Image-Guided Biphasic Monopolar Pulsed Electric Field Ablation of Metastatic and Primary Malignancies. *Journal of Vascular and Interventional Radiology*. 2024; 35(11):1644-54.. doi: 10.1016/j.jvir.2024.08.003

Jimenez M, Fernandez JM, Krinsky WS. Pulsed Electric Field (PEF) Treatment of Progressive Non-Small Cell Lung Cancer Concurrently Treated with Immune Checkpoint Blockade: A Case Report. *Respir Med Case Rep*. 2024; 49:102018. doi: 10.1016/j.rmcr.2024.102018

## Clinical Experience

### Abstracts

Pritchett M, et al. Focal Treatment of Metastatic Lung Cancer Using Pulsed Electric Fields: 30-Day Safety and Initial Efficacy Results from the AFFINITY Study. AABIP 2025. Austin, TX

Roperia V, et al. Early Pulsed Electric Field (PEF) Experience Treating Metastatic Lung Disease. AABIP 2025. Austin, TX

Al Chami F, et al. Novel Use of Endobronchial Pulse Electrical Field Therapy Delivered via EBUS Bronchoscope for Obstructing NSCLC: A Case Report. AABIP 2025. Austin, TX

Al Chami F, et al. Pathologically Confirmed Response to Pulse Electrical Field Therapy via Robotic Navigational Bronchoscopy in Squamous Cell Lung Cancer: A Case Report. AABIP 2025. Austin, TX

Fu T, et al. A Single Institutional Experience with Pulsed Electric Field Ablation in the Treatment of Patients with Localized and Metastatic Cancer. *Journal of Vascular and Interventional Radiology*. 2025. doi: 10.1016/j.jvir.2024.12.269

Morshedi M, et al. Single Center Experience Utilizing Pulse Electrical Field Ablation With and Without Concurrent Immunotherapy as Salvage Therapy. *Journal of Vascular and Interventional Radiology*. 2025. doi: 10.1016/j.jvir.2024.12.278

Hunt S, et al. Pulse Electrical Field Ablation Data in Lungs and Soft Tissue. SIR 2025. Nashville, TN

Arellano R, et al. Is There a Role for PEF in Liver and Kidneys? SIR 2025. Nashville, TN

Nafie EHO, et al. Increases in Circulating Antibodies Specific to Tumor Biopsy Samples Following Intrathoracic Aliya PEF Ablation of Lung Metastases. *Journal of Vascular and Interventional Radiology*. 2025

Tappuni S, et al. Safety and Treatment Response of Pulsed Electric Field (PEF) Ablation Therapy for Recurrent Malignant Pleural Mesothelioma (MPM). *Journal of Vascular and Interventional Radiology*. 2025

Meyerhoff R, et al. Safety of CT-Guided Pulsed Electrical Field Ablation Adjacent to Sensitive Intrathoracic Structures for Treatment of Intrathoracic Malignancies. *Journal of Vascular and Interventional Radiology*. 2025

Harris JP, et al. A Single-Arm Pilot Study of Combined SBRT and Electric Ablation for Lung Tumors. *International Journal of Radiation Oncology*. 2024; 120(Suppl 2):e24-e25.

Pritchett M, Reisenauer J, Pua B, and Krinsky WS. Abstract NO. 100. Focal Treatment of Metastatic Lung Cancer Using Pulsed Electric Fields: Safety and 30-Day Results from the AFFINITY Study. AABIP 2024. Charlotte, NC

Reisenauer J, Dibardino D, Criner GJ, Callstrom M, Hunt S, Panero J, and Krinsky WS. Neoadjuvant Soft Tissue Ablation Utilizing Aliya™ Pulsed Electric Fields with Systemic Therapy in Early-Stage Resectable Non-small Cell Lung Cancer (NSCLC) - VIGOR Study. *Am J Respir Crit Care Med*. 2024; 209:A6883

Kim D, et al. Abstract No. 363 Image-Guided Pulsed Wlectric Dield Ablation for Widely Metastatic Multihistology Cancer. *Journal of Vascular and Interventional Radiology*. 2024; 35(3). doi: 10.1016/j.jvir.2023.12.411

## Clinical Experience

Bhanot S, et al. Abstract No. 354 Early Experience of Novel Pulsed Electric Field Ablation in Patients with Metastatic Cancer. *Journal of Vascular and Interventional Radiology*. 2024; 35(3). doi: 10.1016/j.jvir.2023.12.402

Meyerhoff R, et al. Safety and Feasibility of CT-Guided Percutaneous Irreversible Electroporation of Intrathoracic Malignancies Under Moderate Sedation Using a Single-Probe System. *Journal of Vascular and Interventional Radiology*. 2024; 35(Suppl 3):S35-S36

Tella J, Klobuka A. Abstract No. 362 Ablation of Focal Liver Masses Near Critical Structures Using Pulsed Electrical Field Therapy (PEF) with the Aliya System: A Safety and Efficacy Case Series. *Journal of Vascular and Interventional Radiology*. 2024; 35(3). doi: 10.1016/j.jvir.2023.12.410

Cramer P, et al. Abstract No. 356 Safety and Short-Term Efficacy of Pulsed Electric Field Ablation. *Journal of Vascular and Interventional Radiology*. 2024; 35(3). doi: 10.1016/j.jvir.2023.12.404

Moore W, et al. Abstract No. 549 Early Experience Using Pulsed Electric Fields (PEF) in Metastatic Disease to the Lung. *Journal of Vascular and Interventional Radiology*. 2024; 35(3). doi: 10.1016/j.jvir.2023.12.506

Emmons E, et al. Abstract No. 556 Pulsed Electric Field Ablation in Patients with Metastatic Soft Tissue Sarcoma: Early Results. *Journal of Vascular and Interventional Radiology*. 2024;35(3). doi: 10.1016/j.jvir.2023.12.513

Moore W, Taslakian B. Early Experience with PEF in the Setting of Diffuse Metastatic Disease. SIO 2024. Long Beach, CA

Jimenez M, et al. Pulsed Electric Fields Induces a Stepwise Activation of Host Anti-Tumor Immunity in Patients with Early-Stage Non-Small Cell Lung Cancer (NSCLC). *Journal for ImmunoTherapy of Cancer*. 2023; 11. doi: 10.1136/jitc-2023-SITC2023.0697

Jimenez M, et al. Tertiary Lymphoid Structures (TLS) and Immune Changes in the Tumor Microenvironment (TME) in Patients with Early-Stage Non-Small Cell Lung Cancer (NSCLC) Treated with Pulsed Electric Fields (PEF). Keystone 2023

Jimenez M, et al. Single-Needle Delivery of Pulsed Electric Fields (PEF) Energy to Early-Stage Non-Small Cell Lung Cancer (NSCLC): Feasibility and Safety Near Sensitive Structures in the INCITE ES Study. *Journal of Vascular and Interventional Radiology*. 2023; 34(Suppl 3):S71-72

Iding J, et al. Tertiary Lymphoid Structures (TLS) Observed in Non-Small Cell Lung Cancer (NSCLC) Tumors Treated with Pulsed Electric Fields. *Journal for ImmunoTherapy of Cancer*. 2022; 10(Suppl 2): A1–A1595

Jimenez M, et al. Focal Treatment of Early Stage NSCLC Using Pulsed Electric Fields: INCITE ES Study. SIR 2022. Boston, MA

Jimenez M. Focal Treatment of Early Stage NSCLC Using Pulsed Electric Fields: Safety and 30-Day Results from the INCITE ES Study. SIO 2022. San Francisco, CA

## Preclinical Experience

### Publications

Nafie EHO, Pastori C, and Neal II RE. Evaluating the Immune Response in a Murine Cancer Model Between Irreversible Electroporation and an Advanced Biphasic Pulsed Electric Field Technology. *Frontiers in Oncology*. 15. doi: 10.3389/fonc.2025.1592610

Nafie E, Pastori C, Acharya R, Kaviani R, Hunter D, Shalaby W, Krinsky WS, Neal RE 2nd. Understanding the Aliya Pulsed Electric Field Dose-Response Relationship: Implications for Ablation Size, Thermal Load, and Immune Response in an Orthotopic Murine Breast Cancer Model. *PLoS One*. 2025; 20(2): e0318440. doi: 10.1371/journal.pone.0318440

Kaviani R, Neal RE, Hunter DW, Krinsky WS. Tissue Radiologic and Pathologic Response to Biphasic Pulsed Electric Field Technology in a Porcine Model. *Journal of Vascular and Interventional Radiology*. 2024. doi: 10.1016/j.jvir.2024.08.015

Pastori C, Nafie E, Wagh MS, Mammarappallil J, Neal R. Pulsed Electric Field Ablation Versus Radiofrequency Thermal Ablation in Murine Breast Cancer Models: Anticancer Immune Stimulation, Tumor Response, and Abscopal Effects. *Journal Vascular and Interventional Radiology*. 2023; S1051-0443(23)00857-6. doi: 10.1016/j.jvir.2023.11.021

Pastori C, Nafie E, Wagh MS, Hunt SJ, Neal RE 2nd. Neoadjuvant Chemo-Immunotherapy is Improved with a Novel Pulsed Electric Field Technology in an Immune-Cold Murine Model. *PLoS One*. 2024; 19(3):e0299499. doi: 10.1371/journal.pone.0299499

Pastori C, Nafie E, Wagh MS, Mammarappallil JG, Neal RE 2nd. Pulsed Electric Field Ablation Versus Radiofrequency Thermal Ablation in Murine Breast Cancer Models: Anticancer Immune Stimulation, Tumor Response, and Abscopal Effects. *Journal of Vascular and Interventional Radiology*. 2024; 35(3):442-451.e7. doi: 10.1016/j.jvir.2023.11.021

– Awarded at SIR 2025 with the “Outstanding Laboratory Investigation Award” among papers published on JVIR in 2024

### Abstracts

Pastori C, et al. Analysis of Long-Lasting Tumor-Specific Antibodies from Murine Tumors Treated with Aliya Pulsed Electric Fields. ASCO 2024, *JCO* 42:e14543-e14543(2024). doi: 10.1200/JCO.2024.42.16\_suppl.e14543

Nafie E, et al. Abstract No. 330 Featured Abstract: Advanced Biphasic Pulsed Electric Field (PEF) Stimulates a More Favorable Immune Response Profile Versus Irreversible Electroporation (IRE) Upon Ablation of Murine Breast Cancer. *Journal of Vascular and Interventional Radiology*. 2024; 35(3). doi: 10.1016/j.jvir.2023.12.375

Nafie E, et al. Pulsed Electrical Field Therapy Addition to Systemic Paradigms Increases Circulating Tumor Immunity and Improves Outcomes in Drug-Resistant Murine Solid Tumors. *Journal for ImmunoTherapy of Cancer*. 2023; 11(Suppl 1):A893. doi: 10.1136/jitc-2023-SITC2023.0794

Nafie E, et al. Pulsed Electric Field Therapy Increases Immune Response and Improves Murine 4T1 Breast Tumor Local and Metastatic Outcomes Relative to Radiofrequency Ablation. *Journal for ImmunoTherapy of Cancer*. 2023; 11(Suppl 1):A15-A17. doi: 10.1136/jitc-2023-SITC2023.0015

## Preclinical Experience

Nafie E, et al. Pulsed Electric Field Therapy Enhances Survival in Murine Breast Cancer Models Relative to Thermal Ablation. CIO 2023

Nafie E, et al. Pulsed Electrical Fields in Combination with Anti-PD1 Significantly Prolongs Survival of Mice with TNBC (EMT6) Murine Breast Tumor. *Journal of Clinical Oncology*. 2023; 41(Suppl 16):540-540

Pastori C, et al. Combination of Pulsed Electric Field, Immunotherapy and Cisplatin Significantly Prolongs Survival in an Orthotopic Breast Cancer Mouse Model. *Cancer Res*. 2023; 83 (Suppl 7):6392

Pastori C, et al. Pulsed Electric Fields Combined with Anti-PD1 Prolongs Survival and Triggers an Adaptive Immune Response in an IO-Non-Responsive Orthotopic Mouse Model. *Cancer Res*. 2023; 83 (Suppl 7):6638

Pastori C, et al. Pulsed Electric Field (PEF) Ablation Invokes Stronger Immune Cytokine Profile and Tumor Response than Radiofrequency Thermal Ablation for Matched Ablation Volumes. *Journal of Vascular and Interventional Radiology*. 2023; 34(Suppl 3):S5

Pastori C, et al. Inclusion of Pulsed Electric Field (PEF) to Checkpoint Blockade and Platinum-Based Chemotherapy Prolongs Survival in a Metastatic Immunotherapy Resistant Tumor Mouse Model. SIO 2023 Washington, DC

Silvestrini M, et al. Synergy of Local Treatment with Pulsed Electric Fields and Anti-PD1 Checkpoint Blockade. *Journal of Thoracic Oncology*. 2022; 17(Suppl 9):S232

Pastori C, et al. Primary and Secondary Tumor Response to Combined Delivery of PEF and aPD-1 within 4T-1 and EMT-6 Orthotopic Tumor Models. SIO 2022. San Francisco, CA

Silvestrini M, et al. Immunogenicity of Pulsed Electric Fields is Enhanced with the Inclusion of Checkpoint Inhibitor Therapy. SIO 2022. San Francisco, CA

## Disclaimers

The Aliya® PEF System, Aliya® EX Generator, and the INUMI™ Flex needle are 510(k) cleared in the United States for the surgical ablation of soft tissue. They are not currently commercially available in any other geography.

Galvanize Therapeutics® does not promote the off-label use of its products and nothing herein is intended to promote an off-label use of Aliya. Aliya is a tool for the surgical ablation of soft tissues, and is not intended to treat, cure, prevent or mitigate any specific disease or condition.

This consists of all relevant scientific information Galvanize is aware of as it relates to the use of its devices. It was last updated June 2026 and is updated on a regular basis to incorporate any additional relevant scientific information. Some articles and authors have been financially and materially supported by Galvanize; however, any statements and conclusions represent the opinions of the authors.

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