

UNIVERSITY OF PENNSYLVANIA – SCHOOL OF MEDICINE
Curriculum Vitae

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CONNOR A WATHEN

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Education:

09/2009– 05/2013	BS	University of Notre Dame
07/2013 – 05/2018	MD	Cleveland Clinic Lerner College of Medicine of Case Western Reserve University

Postgraduate Training and Fellowship Appointments:

06/2018 – 06/2019	Intern in Neurological Surgery, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania
06/2019 – 06/2025	Resident in Neurological Surgery, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania
07/2023 –01/2024	Enfolded Complex Spine Fellowship, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania
02/2024 – 06/2024	Senior Registrar in Neurosurgery, Wellington Regional Hospital, Wellington, New Zealand
07/2025 – 06/2026	Complex Spine Fellowship, Brown University, Providence, Rhode Island

Licensure:

Pennsylvania Graduate Medical Training License
Pennsylvania MD License
Rhode Island MD License

Awards, Honors and Membership in Honorary Societies:

2015	Medical Student Award, Cleveland Clinic Neurological Institute Research Day
2016	Best Abstract Award, International Neuromodulation Society
2018	Excellence in Neuroscience, Cleveland Clinic Lerner College of Medicine
2025	Resident Clinical Achievement Award

Memberships in Professional and Scientific Societies:

National Societies:

- Society for Neuroscience
- American Association of Neurological Surgeons
- Congress of Neurological Surgeons
- AO Spine

Bibliography:

Original papers:

Davison CA, Durbin SM, Thau MR, Zellmer VR, Chapman SE, Diener J, Wathen C*, Leevy WM, Schafer ZT. "Antioxidant enzymes mediate survival of breast cancer cells deprived of extracellular matrix.". *Cancer Research*, 2013; 73(12), 3704-15. PMID: 23771908

Wathen CA, Foje N, van Avermaete T, Miramontes B, Chapaman SE, Sasser TA, Kannan R, Gerstler S, Leevy WM. "In vivo X-ray computed tomographic imaging of soft tissue with native, intravenous, or oral contrast.". *Sensors*, 2013; 13(6), 6957-80. PMID: 23711461

Doney E, Krumdick LA, Diener JM, Wathen CA, Chapman SE, Stamile B, Scott JE, Ravosa MJ, Van Avermaete T, Leevy WM. "3D printing of preclinical X-ray computed tomographic data sets.". *Journal of Visualized Experimentation*, 2013; 73, e50250. PMID: 23542702

Davison CA, Chapman SE, Sasser TA, Wathen C, Diener J, Schafer ZT, Leevy WM. "Multimodal optical, X-ray CT, and SPECT imaging of a mouse model of breast cancer lung metastasis.". *Current Molecular Medicine*, 2013; 13(3), 368-76. PMID: 23331009

Wathen CA, Caldwell C, Zambre A, Upendran A, Chanda N, Afrasiabi Z, Chapaman SE, Archer W, Leevy WM, Kannan R. "Selective X-ray Contrast Enhancement of the Spleen of Living Mice Mediated by Gold Nanorods ". *Contrast Media and Molecular Imaging*, 2014, 1617. PMID: 25169942

Cooperrider J, Gale JT, Gopalakrishnan R, Chan HH, Wathen C, Park HJ, Baker KB, Shaikh AG, Machado AG. "Differential frequency modulation of neural activity in the lateral cerebellar nucleus in failed and successful grasps". *Experimental Neurology*, 2016; 277, 27-34. PMID: 26698925

Wathen C, Kshetry V, Krishnaney A, Gordon SM, Fraser T, Benzel EC, Modic MT, Butler S, Machado AG. "The Association Between Operating Room Personnel and Turnover With Surgical Site Infection in More Than 12000 Neurosurgical Cases". *Neurosurgery*, 2016; 79(6), 889-94. PMID: 27465846.
<http://www.ncbi.nlm.nih.gov/pubmed/27465846>

Hugh H Chan, Jessica Cooperrider, Hyun-Joo Park, Connor A Wathen, John T Gale, Kenneth B Baker, Andre Machado. "Crossed cerebellar atrophy of the lateral cerebellar nucleus in an endothelin-1-induced, rodent model of ischemic stroke ". *Frontiers in Aging Neuroscience*, 2017; 9, 10. PMID: 28261086

Chan HH, Wathen CA, Ni M, Zhuo S. "Stem cell therapies for ischemic stroke: current animal models, clinical trials and biomaterials". *RSC Advances*, 2017; 7(30), 18668-80.
<http://pubs.rsc.org/en/content/articlelanding/2017/RA/c7ra00336f#!divAbstract>

Frizon L, Houge O, Wathen C, Yamamoto E, Sabharwal N, Jones J, Volovetz J, Maldonado A, Lobel D, Machado A, Nagel S. "Subsequent Pulse Generator Replacement Surgery Does Not Increase the Infection Rate in Patients with Deep Brain Stimulator Systems: A Review of 1537 Unique Implants at a Single Center". *Neuromodulation*, 2017; 20(5), 444-9. PMID: 28466562

Floden D, Matias C, Wathen C, Ozinga G, Machado A. "Contact location and neuropsychological outcomes in subthalamic deep brain stimulation". *Neurosurgery*, 2017; In Press, 10. PMID: 29048606

Chan H, Cooperrider J, Chen Z, Gale J, Baker K, Wathen C, Modic C, Park HJ, Machado A. "Lateral cerebellar nucleus stimulation has selective effects on glutamatergic and GABAergic perilesional neurogenesis after cortical ischemia in the rodent model". *Neurosurgery*, 2017, 10. PMID: 29029200

de Souza JPSAS, Mullin J, Wathen C, Bulacio J, Chauvel P, Jehi L, Gonzalez-Martinez J. "The usefulness of stereo-electroencephalography (SEEG) in the surgical management of focal epilepsy associated with "hidden" temporal pole encephalocoele: a case report and literature review.". *Neurosurgical Review*, 2018; 41(1), 347-354. PMID: 29039074.

Chan H, Wathen C, Mathews N, Hogue O, Modic J, Kundalia R, Wyant C, Park H, Najm I, Trapp B, Machado A, Baker K. "Lateral Cerebellar Nucleus Stimulation Promotes Motor Recovery and Suppresses Neuroinflammation in a Fluid Percussion Injury Rodent Model." *Brain Stimulation*, 2018, 11(6): 1356-1367. PMID: 30061053

Wathen C, Frizon L, Maiti T, Baker K, Machado A. "Deep Brain Stimulation of the Cerebellum for Poststroke Motor Rehabilitation: from Laboratory to Clinical Trial." *Neurosurgical Focus*, 2018; 45(2). PMID: 30064319

Alban T, Alvarado A, Sorensen M, Bayik D, Volovetz J, Serbinowski E, Mulkearns-Hubert E, Sinyuk M, Hale J, Onzi G, McGraw M, Huang P, Grabowski M, Wathen C, Ahluwalia M, Radivoyevitch T, Kornblum H, Kristensen B, Vogelbaum M, Lathia J. "Global immune fingerprinting in glioblastoma patient peripheral blood reveals immune-suppression signatures associated with prognosis." *JCI Insight*, 2018, 3(21). PMID: 30385717

Blue, R., Yang, A. I., Zhou, C., De Ravin, E., Teng, C. W., Arguelles, G. R., Huang, V., Wathen, C., Miranda, S. P., Marcotte, P., Malhotra, N. R., Welch, W. C., & Lee, J. Telemedicine in the Era of Coronavirus Disease 2019 (COVID-19): A Neurosurgical Perspective. *World Neurosurg.* 2020;139:549-557. PMID: 32426065

Miranda SP, Glauser G, Wathen C, et al. Letter to the Editor "Incorporating Telehealth to Improve Neurosurgical Training During the COVID-19 Pandemic". *World Neurosurg.* 2020;139:728-731. PMID: 32426069

Glauser G, Wathen C, Miranda SP, et al. Letter to the Editor Regarding "Implementation and Workflow of a Telehealth Clinic in Neurosurgery During the COVID-19 Pandemic". *World Neurosurg.* 2020;139:373-375. PMID: 32426067

Wathen C, Yang AI, Hitti FL, Henry L, Chaibainou H, Baltuch GH. Feasibility of Magnetic Resonance-Guided Focused Ultrasound Thalamotomy for Essential Tremor in the Setting of Prior Craniotomy. *Oper Neurosurg.* 2022 Feb 1;22(2):61-65. PMID: 35007218

Yang AI, Mensah-Brown KG, Shekhtman EF, Kvint S, Wathen CA, Hitti FL, Alonso-Basanta M, Avery SM, Dorsey JF, Y K Lee J. Gamma Knife radiosurgery for trigeminal neuralgia provides greater pain relief at higher dose rates. *J Radiosurg SBRT.* 2022;8(2):117-125. PMID: 36275137

Wathen C, Ghenbot Y, Chauhan D, Schuster J, Petrov D. Management of Traumatic Atlantooccipital Dissociation at a Level 1 Trauma Center, A Retrospective Case Series. *World Neurosurg.* 2023 Feb;170:e264-e270. Epub 2022 Nov 4. PMID: 36336270

Ghenbot Y, Arena JD, Howard S, Wathen C, Kumar MA, Schuster JM. Anticoagulation Holiday: Resumption of Direct Oral Anticoagulants for Atrial Fibrillation in Patients with Index Traumatic Intracranial Hemorrhage. *World Neurosurg X.* 2023;17:100148. PMID: 36407782

Albayer A, Spadola M, Blue R, Saylany A, Dagli M, Santangelo G, Wathen C, Ghenbot Y, Macaluso D, Ali Z, Ozturk A, Welch W. Incidental Durotomy Repair in Lumbar Spine Surgery: Institutional Experience and Review of Literature. *Global Spine Journal. Global Spine J.* 2024 May;14(4):1316-1327. Epub 2022 Nov 25. PMID: 36426799

Dagli MM, Narang S, Malhotra K, Santangelo G, Wathen C, Ghenbot YG, Macaluso D, Albayer A, Ozturk AK, Welch WC. The Differences Between Same-Day and Staged (Circumferential) Fusion Surgery in Adult Spinal Deformity: Protocol for a Systematic Review. *JMIR Res Protoc.* 2022 Nov 28;11(11):e42331. doi: 10.2196/42331. PMID: 36441570

Blue R, Gutierrez A, Ahmad H, Alexis M, Kumar R, Spadola M, Wathen C, Weinstein M, Petrov D. Intra-Operative Hypotension is Not Correlated with Acute Kidney Injury During Spinal Fusion Surgery. *Int J Spine Surg.* 2022 Dec;16(6):1061-1067. PMID: 36543389

Petrov D, Miranda SP, Balu R, Wathen C, Vaz A, Mohan V, Colon C, Diaz-Arrastia R. Prediction of intracranial pressure crises after severe traumatic brain injury using machine learning algorithms. *J Neurosurg.* 2023 Jan 27;1-8. PMID: 36708534.

Turlip R, Ahmad HS, Ghenbot YG, Wathen C, Chauhan D, McCloskey K, Yoon JW. Characterizing and Improving Nomenclature for Reporting Lumbar Interbody Fusion Techniques. *World Neurosurg.* 2023 Mar 14:S1878-8750(23)00361-3. PMID: 36921714.

Santangelo G, Wathen C, Macaluso D, Dagli MM, Ali ZS, Malhotra NR, Casper DS, Spadola M, Ghenbot Y, Thakkar K, Maze G, Welch WC, Ozturk AK. Comparison of Single-Level Posterior Cervical Foraminotomy to Anterior Cervical Discectomy and Fusion for Radiculopathy. *Int J Spine Surg.* 2023 Mar 24:8447. PMID: 36963811

Malhotra K, Dagli MM, Santangelo G, Wathen C, Ghenbot Y, Goyal K, Bawa A, Ozturk AK, Welch WC. The Digital Impact of Neurosurgery Awareness Month: Retrospective Infodemiology Study. *JMIR Form Res.* 2023 May 8;7:e44754. PMID: 37155226

Wathen CA, Gallagher RS, Borja AJ, Malhotra EG, Collier T, Na J, McClintock SD, Yoon JW, Ozturk AK, Schuster JM, Welch WC, Marcotte PJ, Malhotra NR. Relationship Between Comorbidity Burden and Short-Term Outcomes Across 4680 Consecutive Spinal Fusions. *World Neurosurg.* 2023 Dec;180:e84-e90. Epub 2023 Aug 18. PMID: 37597658

Albayer A, Santangelo G, Spadola M, Macaluso D, Ali ZS, Saifi C, Heintz J, Han X, Bilker W, Malhotra N, Welch WC, Wathen C, Dagli MM, Ghenbot Y, Yoon J, Arlet V, Ozturk AK. Comparison of Staged vs Same-

Day Circumferential Spinal Fusions for Adult Spinal Deformity. *Int J Spine Surg*. 2023 Dec 26;17(6):843-855. PMID: 37827708

Mannam SS, Subtirelu R, Chauhan D, Ahmad HS, Matache IM, Bryan K, Chitta SVK, Bathula SC, Turlip R, Wathen C, Ghenbot Y, Ajmera S, Blue R, Chen HI, Ali ZS, Malhotra N, Srinivasan V, Ozturk AK, Yoon JW. Large Language Model-Based Neurosurgical Evaluation Matrix: A Novel Scoring Criteria to Assess the Efficacy of ChatGPT as an Educational Tool for Neurosurgery Board Preparation. *World Neurosurg*. 2023 Dec Epub 2023 Oct 14. PMID: 37839567

Ghenbot Y, Arena J, Howard S, Wathen C, Dagli MM, Zadnik P, Nasrallah IM, Nelson E, Pruitt A, Zager E. Isolated Lymphomatoid Granulomatosis of the Central Nervous System Mimicking Trigeminal Neuropathy, Bell's Palsy, and Glioblastoma in an Epstein-Barr-Negative Immunocompetent Host: A Case Report. *Cureus*. 2023 Sep 15;15(9):e45309.. PMID: 37846229

Ghenbot Y, Ahmad HS, Chauhan D, Wathen C, Arena J, Turlip R, Parr R, Gibby W, Yoon JW. Effects of Augmented Reality on Thoracolumbar Pedicle Screw Instrumentation Across Different Levels of Surgical Experience. *World Neurosurg*. 2024 Feb;182:e284-e291. Epub 2023 Nov 24. PMID: 38008167

Chauhan D, Ahmad HS, Hamade A, Yang AI, Wathen C, Ghenbot Y, Mannam S, Subtirelu R, Bashti M, Wang MY, Basil G, Yoon JW. Determining Differences in Perioperative Functional Mobility Patterns in Lumbar Decompression Versus Fusion Patients Using Smartphone Activity Data. *Neurosurgery*. 2024 Jan 3. PMID: 38169310

Ghenbot Y, Arena J, Wathen C, Ahmad HS, Chauhan D, Bryan K, Paik C, Yoon JW. Endoscopic-Assisted Evacuation of Lumbar Epidural Abscess: 2-Dimensional Operative Video. *Oper Neurosurg (Hagerstown)*. 2024 Jan 8. PMID: 38189458

Arena JD, Sinha S, Wathen C, Ghenbot Y, Zhang PJ, Welch WC. Primary intradural extraosseous Ewing's sarcoma of the L3 nerve root: illustrative case. *J Neurosurg Case Lessons*. 2024 Jan 15;7(3):CASE23459.. PMID: 38224583

Malhotra K, Dagli MM, Gujral J, Santangelo G, Goyal K, Wathen C, Ozturk AK, Welch WC. Global and Gender Equity in Oligodendroglioma Research: A Comprehensive Bibliometric Analysis Following the COVID-19 Pandemic. *Cureus*. 2023 Dec 27;15(12):e51161.. PMID: 38283488

Punchak MA, Bond KM, Wathen CA, Hollawell ML, Zhao C, Sarris C, Flanders TM, Madsen PJ, Tucker AM, Heuer GG. Use of a machine learning algorithm with a focus on spinopelvic parameters to predict development of symptomatic tethered cord after initial untethering surgery. *J Neurosurg Pediatr*. 2024 Mar 1;33(5):405-410. PMID: 38428005

Wathen CA, Punchak M, Madsen P, Vaughan K, Buch V, Marcotte PJ. Navigated peel-away sheath assisted placement of fully pre-assembled Ommaya reservoir systems: Technical note. *World Neurosurg X*. 2024 Mar 3;23:100295.. PMID: 38497062

Santangelo G, Wathen C, Pieters T, George DD, Worley L, Macaluso D, Dagli MM, Catanzaro S, Gu B, Welch WC, Petrov D, Vates GE, Ozturk AK, Schuster J, Stone JJ. Multi-institutional review of characteristics and management of gunshot wounds to the spine. *Spine J*. 2024 May 11:S1529-9430(24)00216-X. PMID: 38740190

Wathen C, Santangelo G, Muhammad N, Ellens N, Catanzaro S, Singh A, Dagli MM, Petrov D, Ozturk AK, Bender M, Stone JJ, Schuster J. Management and outcomes of cerebrovascular injuries after gunshot wounds to the cervical spine. *Clin Neurol Neurosurg*. 2024 Aug;243:108376. Epub 2024 Jun 7. PMID: 38865803

Vaz A, Wathen C, Miranda S, Thomas R, Darlington T, Jabarkheel R, Tomlinson S, Arena J, Bond K, Salwi S, Ajmera S, Bachschmid-Romano L, Gugger J, Sandsmark D, Diaz-Arrastia R, Schuster J, Ramayya AG, Cajigas I, Pesaran B, Chen HI, Petrov D. Return of intracranial beta oscillations and traveling waves with recovery from traumatic brain injury. *bioRxiv [Preprint]*. 2024 Jul 23:2024.07.19.604293. PMID: 39091808

Wathen CA, Jacob AT, Bohorquez D, Mannikarottu C, Marcotte P. Treatment strategies for cervical spondylotic myelopathy-is laminectomy alone a safe and effective option? *J Spine Surg*. 2024 Sep 23;10(3):344-353. Epub 2024 Jul 22. PMID: 39399067

Wathen C, Dagli MM, Santangelo G, Ghenbot Y, Spadola M, Macaluso D, Welch WC, Arlet V, Ozturk AK. Blood loss during three column osteotomies: influence on outcomes and mitigation strategies. *J Spine Surg*. 2024 Sep 23;10(3):395-402. Epub 2024 Sep 13. PMID: 39399082

Gallagher RS, Wathen CA, Karsalia R, Borja AJ, Collier T, Na J, McClintock S, Marcotte PJ, Schuster JM, Welch WC, Malhotra NR. Diabetes and heart disease do not affect short-term lumbar fusion outcomes

accounting for other risk factors in a matched cohort analysis. *World Neurosurg* X. 2024 Sep 23;24:100410. PMID: 39399350

Dagli MM, Wathen CA, Golubovsky JL, Ghenbot Y, Arena JD, Santangelo G, Heintz J, Ali ZS, Welch WC, Yoon JW, Arlet V, Ozturk AK. Preoperative Anemia is Associated with Increased Length of Stay in Adult Spinal Deformity Surgery: Evaluation of a Large Single-Center Patient Cohort and Future Suggestions for Patient Optimization. *Spine Deform*. 2024 Nov 7. PMID: 39509012

Dagli MM, Wathen CA, Golubovsky JL, Ghenbot Y, Arena JD, Heintz J, Macaluso D, Santangelo G, Ali ZS, Malhotra N, Yoon JW, Welch WC, Arlet V, Ozturk AK. Intravenous tranexamic acid and reduction in blood loss and perioperative transfusion requirements in adult spinal deformity: a multicenter propensity-scored observational study. *J Neurosurg Spine*. 2025 Feb 7:1-9. PMID: 39919281.

Arena JD, Ghenbot Y, Wathen CA, Santangelo G, Dagli MM, Golubovsky JL, Gu BJ, Macaluso D, Malhotra NR, Ali ZS, Yoon JW, Welch WC, Arlet V, Ozturk AK. Upper instrumented vertebra pedicle screw loosening following adult spinal deformity surgery: incidence and outcome analysis. *J Neurosurg Spine*. 2024 Nov 15:1-9. PMID: 39546785

Arena JD, Ghenbot Y, Tomlinson SB, Wathen CA, Schneider ALC, Chen HI, Ali ZS, Schuster JM, Petrov D. Navigated Osteosynthesis for Unstable Atlas Fractures: Technical Note and Case Series. *World Neurosurg*. 2024 Nov 26:S1878-8750(24)01971-5. PMID: 39608489

Gallagher RS, Karsalia R, Xu E, Wathen CA, Borja AJ, Na J, Collier T, McClintock S, Malhotra NR. Lumbar Spinal Fusion Outcomes in Patients With Cancer Compared to Matched Peers Without Cancer. *Global Spine J*. 2024 Dec 5:21925682241307631. PMID: 39639447

Ghenbot Y, Golubovsky J, Ahmad HS, Arena JD, Santangelo G, Wathen C, Ghenbot R, Dagli MM, Chauhan D, Ling-Lin Pai E, Yoon JW. Technical Feasibility and Safety of Transpedicular Thoracic Partial Corpectomy Using Biportal Endoscopic Technique: A Novel Approach for Separation Surgery in Spinal Metastatic Disease. *World Neurosurg*. 2025 Jan 9;194:123582. PMID: 39709094.

Golubovsky JL, Spadola M, Wathen C, Malhotra NR, Welch WC, Marcotte P. Durotomy During Outpatient Lumbar Discectomy Should Not Preclude Same-Day Discharge: A Case Series. *Neurosurg Pract*. 2024 Sep 10;5(4):e00112. PMID: 39959537

Dagli MM, Turlip RW, Oetl FC, Emara M, Gujral J, Chauhan D, Ahmad HS, Santangelo G, Wathen C, Ghenbot Y, Arena JD, Golubovsky JL, Gu BJ, Shin JH, Yoon JW, Ozturk AK, Welch WC. Comparison of Outcomes Between Staged and Same-Day Circumferential Spinal Fusion for Adult Spinal Deformity: Systematic Review and Meta-Analysis. *Interact J Med Res*. 2025 Mar 6;14:e67290. PMID: 40053742

Ghenbot Y, Arena JD, Dagli MM, Macaluso D, Ghenbot S, Wathen C, Khela H, Ahmad HS, Santangelo G, Golubovsky J, Wright J, Heintz J, Ali ZS, Malhotra NR, Welch WC, Yoon JW, Arlet V, Ozturk AK. The influence of the magnitude of sagittal correction and local junctional factors on proximal junctional kyphosis and failure following correction of adult spinal deformity: an inverse probability weighted analysis. *J Neurosurg Spine*. 2025 Mar 28:1-10. Epub ahead of print. PMID: 40153849.

Editorials, Reviews, Chapters:

Brennan C, Achey R, Wathen C, Janigro D. "Imaging as Means to Study Cerebrovascular Pathophysiology". Toga AW, Poldrack RA (editors), *Brain Mapping: An Encyclopedic Reference*, Elsevier, 2015

Mullin JP, Wathen CA, Walsh KM, Kim DH, Vaccaro AR, Henderson FC, Benzel EC. "Neural Injury at the Molecular Level". Benzel EC (editors), *Spine Surgery: Techniques, Complication Avoidance, and Management*, 4th edition, Elsevier, 2015

Mullin JP, Wathen C, Chan A, Benzel E. "Neurosurgical procedures in patients with cirrhosis and acute liver failure: Indications, safety, and feasibility of intracranial pressure monitor devices". Eghtesad B, Fung J (editors), *Surgical Procedures in Cirrhotic Patients*, 1st edition, Springer, 2017

Wathen C, Baker K, Machado A. "Invasive Neurostimulation for Post Stroke Motor Recovery". Krames E, Peckham PH, Rezai A (editors), *Neuromodulation*, 2nd edition, Elsevier, 2017

Wathen C, Mullin J, Chan A, Benzel E. "Lumbar Spine Disease". Ellenbogen R, Sekhar L, Kitchens D (editors), *Principles of Neurological Surgery*, 4th edition, Saunders, 2017

Chan A, Mullin J, Wathen C, Benzel E. "Degenerative Spinal Disease (Cervical)". Ellenbogen R, Sekhar L, Kitchens D (editors), *Principles of Neurological Surgery*, 4th edition, Saunders, 2017

Wathen C, Janigro D. "IL-1 β associations with posttraumatic epilepsy development: A genetics and biomarker cohort study.". *Epilepsia*, 2014; 55(8), 1313. PMID: 25099305

Wathen CA, Ghenbot YG, Ozturk AK, Cullen DK, O'Donnell JC, Petrov D. Porcine Models of Spinal Cord Injury. *Biomedicines*. 2023 Aug 4;11(8):2202. PMID: 37626699