

# Looking Back/Gazing Ahead



For nearly a fifth of the world's population, January 25, 2020, marked the New Year and is a time for celebration, reflection, and resolution. I want to wish you a Happy New Year and to share with you the accomplishments that we have achieved together this past year as well as goals for the upcoming year.

Upon reflection, one of our proudest achievements in the past year involves the Department Leadership Council. The Council consists of Dr. Daniel Guillaume (Vice-Chair of Clinical Affairs), Dr. Michael Park (Vice-Chair of Quality and Residency Director), Dr. Ramu Tummula (Vice-Chair of Professional Development), and myself. We meet regularly to review key

department matters and render decisions about initiatives and governance. It is my belief that the collective wisdom of this group will best facilitate the growth of our department and address the challenges that lie ahead. A key initiative in 2020 will be to invite members of each subspecialty team (tumor, vascular, functional, pediatric, spine, and trauma) to discuss how we can best support and elevate every member of our department, in the context of our Neuroscience Service Line.

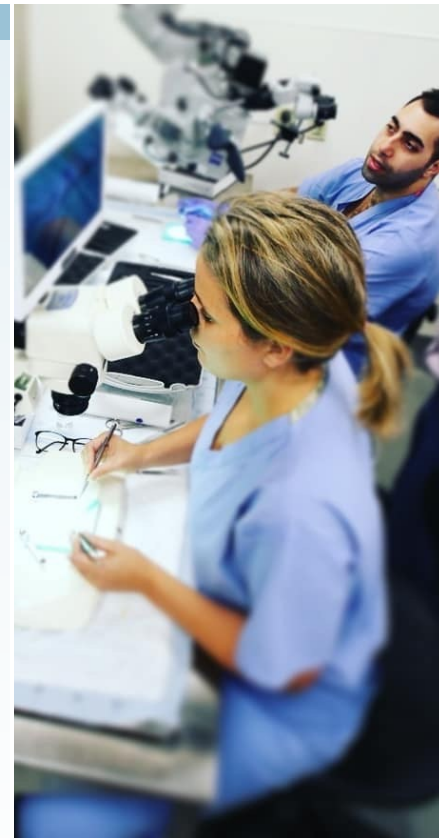
Over the past few years, we have undergone a tremendous amount of clinical growth, increasing our faculty to a total of 16. We successfully expanded our clinical services to Southdale Hospital and received approval for a deep brain stimulation program at the Veterans Medical Center in Minneapolis (see pg. 4). In 2020, we will continue to engage our colleagues in the Greater Minneapolis area to identify opportunities for leveraging our expertise and the resources uniquely available to the University and the M Health Fairview joint venture toward improving the care of our community.

As evidenced by the lists of grants and publications, beginning on pg. 6, our department continues to push the frontier of neurosurgical practice – providing hope for patients who are often failed by the standard of care. While the sheer number of academic contributions is impressive, what struck me as extraordinary is that each publication contributed toward reshaping the landscape of what we know to be neurosurgery. Moreover, notable resident contributions indicate to me that we continue to succeed in our mission of instilling the spirit of discovery within the next generation of neurosurgical practitioners. In addition, we were recently notified that the department received its first Blue Ridge ranking since 2006 (how medical school departments are ranked in terms of National Institutes of Health funding). We are 46th in the nation, which is just phenomenal and a testimony to the hard work being done by our neurosurgical scientists.

Looking ahead, I am optimistic and excited about the opportunities for our department to make a difference in our community, our country, and our world. Imbedded within these opportunities are uncertainties and challenges that we will overcome together. We will continue to strive toward cultivating all aspects of neurosurgery for all members of our department.

Warmly,

Clark



## Inside this issue

New T-suite premieres .....	2
2 marathons & \$7K later .....	2
Service Line/Vice Chair Update ...	3
Saying goodbye .....	3
DBS at the VA .....	4
Welcome, Therese & Emma .....	4
A mother's determination .....	5
Congrats, Baye! .....	5
Grants awarded in 2019 .....	6
Papers published in 2019 .....	7-10



*Observing one of the first surgeries in the new T-suite*

## State-of-the-art surgical suite a “giant leap forward”

The new T-suite at M Health Fairview University of Minnesota Medical Center is equipped with a powerful mobile magnetic resonance imaging (MRI) scanner that will guide neurosurgeons’ delicate work in real time.

Named for its shape, this new surgical suite at M Health Fairview University of Minnesota Medical Center will help redefine what’s possible in neurosurgery and brain cancer treatment.

That’s because the four-room T-suite is home to a powerful mobile MRI scanner, which can travel to each of the three operating theaters in the suite. Neurosurgeons and other experts will use it to view real-time images of the brain during surgery.

This capability will revolutionize outcomes for people under our care, according to Dr. Chen. “To see the real-time results of our surgery is a dream come true for surgeons and a giant leap forward in our ability to personalize surgery to meet the specific needs of the person,” he said.

The ability to conduct an MRI scan during surgery allows neurosurgeons to check their work immediately. For example, neurosurgeons removing a brain tumor can now use real-time imaging to see whether they have successfully eliminated all the cancerous tissue. If they spot additional tumor tissue left in the brain, they can take it out during the same procedure without the need for a second surgery.

*“To see the real-time results of our surgery is a dream come true for surgeons”*

### NeuroSafe 2020 Up and Running

The 5th annual national event showcases research and insights into improving neurosurgical safety and quality. It will be held July 23-24, 2020, at McNamara Alumni Center on campus. Course directors include Drs Hunt, Guillaume, Jones and Sandoval, nurse practitioner Suzie Shane, and department administrator Larry Gunderson, with able assistance from Executive Administrative Assistant Claire Graham. More information is available on the [department website](#).



## Two marathons, \$7K for brain aneurysm research. Whew!



Dr. Andy Grande (pictured with his kids in New York City) had quite a fall last year. First, he completed the Twin Cities Marathon in October and then the New York City Marathon in November. But that wasn’t all.

He was asked by his

NYC Marathon team to commit to two objectives:

1. Run the marathon in under six hours
2. Raise \$3,000 for the Brain Aneurysm Foundation.

He ended up raising almost \$7,000!

Dr. Grande doesn’t credit himself for that, though. About 80 people donated to the cause,” he said. “One of my patients donated \$1,000, another person I didn’t even know donated \$500. It was amazing how many people let me know that brain aneurysms had touched their lives in some way. A few of these people I’d known since high school and had no idea.”

## Service Line Lead/Vice Chair of Clinical Affairs Update: Dr. Daniel Guillaume

2020 is going to be a busy year for the Neuroscience Service Line. As you might recall, the Service Line is structured into 15 programs. For now, I lead the Pediatrics Program and am joined by:

- Ramu Tummala (Endovascular)
- Andrew Venteicher (co-lead, Skull Base/Pituitary)
- Ann Parr (Neurotrauma)
- Tony Bottini (Community Neurosurgery).



We expect further engagement from faculty as teams develop. One charge of the program teams is to standardize quality across the M Health Fairview system. We want to manage patients according to the same evidence-based standards of care. We are also responsible for Service Line growth and customer satisfaction.

Neuromodulation will be one of the biggest growth areas and we've identified several areas for improving efficiency. Our strategy is to significantly increase the number of DBS procedures for movement disorders. That effort is being led by Dr. Park and Dr. McGovern.

Over the next three years, the Service Line will roll out care maps (clinical protocols) to:

1. Improve quality of care delivery (achieve better outcomes)
2. Decrease length of stay, re-admissions, mortality
3. Reduce waste.

The first two roadmaps rolled out in 2020 will be in spine and stroke. From there, we will create two to four care pathways each year of the three years.

We are also striving to make Clinical documentation more efficient and to streamline the care we deliver. We're working with IT and the U's Quality Team to solve these problems.

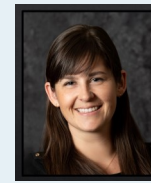
### Clinical Affairs Update

My role as Vice Chair for Clinical Affairs is concerned with how we deliver care in the department – how our advanced practice practitioners and neurosurgeons work, the structure within which they work, and to help find solutions to problems. It fits in well with helping implement Service Line goals.

For example, we're creating ways for practitioners who are UMP employees working in the community (e.g., Drs Hunt and Bottini) to be more associated with the department. With Adjunct Faculty appointments, they will be able to come here to teach, attend conferences, and be more a part of the team.

I'm also concerned about new hires and helping solve HR problems. We just hired two new APPs: Therese Maas recently joined us, and Mia Pham comes in March.

### Saying goodbye



We lost a beloved colleague on January 9. Following are excerpts from

Dr. Chen's email about her:

Molly was loved by all of us who knew her, her presence a Blessing. She was selfless and dedicated, an Atlas shouldering the world's weight with a smirk and a smile. Technically gifted and adorned with judgment beyond her years, she was masterful in her surgery and prudent in her deliberations. She was tireless in her pursuit of excellence, with research and clinical work that pushed the forefront of neurosurgery ... she was known to us for her kindness and scrupulous insistence on her mantra of "always doing the right thing."

We were fortunate to have her as part of our Residency team between 2012-2019. Her stellar trajectory led her to a Pediatric Neurosurgery Fellowship at Oregon Health & Science University. She so impressed the leadership there that she was offered a coveted faculty position that was reserved for the most exceptional.

Molly is someone who lived her life to the fullest, with quirky detours that defined her. Whenever help was needed, she was the first to offer, regardless of the strain. She had an indelible impact on our patients, program, our community, and all those whose lives she touched. The world has lost the great light of a beautiful soul, and we mourn in the gray shadow of her absence.

A memorial is being planned for Molly. More information will be shared soon.



## Welcome, Therese and Emma!

We added two new advanced practice practitioners to our staff.

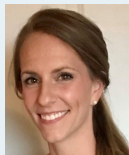


**Therese Maas,** holds a Doctorate of Nursing Practice degree from the

University of Minnesota and earned a Master of Arts in Nursing with an Adult Nurse Practitioner focus at what is now St. Catherine University in St. Paul. She also earned a BS in Nursing at Augsburg College in Minneapolis.

Therese's primary focus is on spinal conditions. "I enjoy interpreting and reviewing spine MRI imaging for patients to help them decipher the medical terms and language so they can develop a better understanding of their condition and determine the cause of their symptoms," she said.

**Emma Venteicher** joined the Pediatric Neurosurgery team late last year. Venteicher earned her MS as a Family Nurse Practitioner from Georgetown University in Washington, DC, which enables her to see adult patients.



Venteicher's energetic approach to her work extends beyond patient care. "I love education and providing quality, compassionate care for our patients and families," she said. "I also hope to get involved in clinical research to help continuously improve patient care and outcomes."

Think her last name sounds familiar? You're right! Emma is married to Dr. Andrew Venteicher.

## Minnesota veterans wanting DBS for movement disorders get some good news

Imagine that you're a veteran living in Minnesota. You have Parkinson's Disease and are a good candidate for deep brain stimulation (DBS), which will help you combat your symptoms. But you must fly to San Francisco – twice. Once for the pre-surgical exam and another time for the procedure. "The

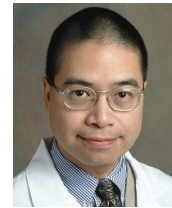


VA pays for them and a family member to do this, but it's not easy for Parkinson's patients to go on these flights," said neurosurgeon Robert McGovern, MD (pictured at left). "Their mobility is limited, making getting on and off the flight an ordeal. It's a testament to these patients – and to deep brain stimulation's ability to help them – that they are willing to do that."

On November 6, 2019, Minnesota veterans got some good news. The Department of Veterans Affairs approved a clinical restructuring request to implement a deep brain stimulation program at the Minneapolis VA Health Care System. McGovern, who joined the Neurosurgery Department in July of 2018, is specially trained to perform deep brain stimulation procedures. He splits his time between the U of M and the VA and was a key reason why the

VA approved this change.

"The Department of Veterans Affairs sent a panel of experts to our VA hospital to examine resources and expertise," noted Neurosurgery Department Head Clark C. Chen, MD, PhD. "The process was rigorous and challenging. The fact that we were able to demonstrate our capacity for doing DBS and Dr. McGovern's expertise is something to be celebrated."



Chief Neurosurgeon for the Minneapolis VA Health Care System, Cornelius Lam, MD, PhD (pictured at right), noted, "It's good for the VA because deep brain stimulation is no longer such an esoteric operation that it needs to be done at just a few centers in the nation. We do it frequently enough at the U that if we have the patient volume, we should set up a center here."

McGovern will work collaboratively with University and VA neurologists to ensure that these patients receive the best possible care. In addition to Parkinson's, the VA team will use DBS to treat other movement disorders, such as essential tremor and dystonia.

## New OR hats help improve safety

Resident Youssef Hamade brought an idea he learned about from another university to the U of M and introduced branded hats to the OR team. He said it helped them identify each other and patients could use them to easily recognize neurosurgery team members.



# Mother's determination leads to the U of M and her daughter's remarkable recovery

Thanks to determination and persistence, Autumn Lyons of Sturgis, SD, got the medical help that her nine-year-old daughter, Mallory, needed — and met Dr. Sandoval-Garcia and the pediatric neurosurgery team in the process.



*Mallory Lyon and Dr. Sandoval-Garcia*

handle her condition," said Autumn. "I looked at her and said, 'If this was your daughter, what would you do?' She said she'd take her to the University of Minnesota." Autumn and Mallory were air lifted to Minneapolis and into the care of Dr. Sandoval.

## Clot in a challenging area

Dr. Sandoval determined that Mallory had had an intracranial bleed after a cavernous mass – a tangle of small blood vessels – ruptured. The resulting clot was in a challenging area.

"It was deep in the middle of Mallory's brainstem on an area called the pons," Dr. Sandoval said. "It's a small, narrow region with several nucleus for vital functions. It's also where many fibers from the upper brain converge to go down to the lower brainstem and spinal cord. Numerous functions are controlled from there, which makes it a challenging area upon which to operate and as a result, the area cannot tolerate the sudden impact of a blood clot."

This condition is rare in adults and even more so for a pediatric patient.

## Consulting with a colleague

"To make sure we did the right thing," Dr. Sandoval consulted with Dr. Grande, who observed the procedure. "We went in through the back of the skull via a sub-occipital bony opening and performed a hemorrhage evacuation," Dr. Sandoval explained.

The April 4, 2019, surgery took five hours and went well.

After a stay in the ICU and intensive rehab, Mallory's improvement from day to day was amazing, according to Autumn. They returned home on May 1. "The last time I saw her, she was ambulating, had a great attitude and had participated actively in her therapies," said Dr. Sandoval. "She made an incredible recovery, given the location and size of her hemorrhage."

Mallory continued with both physical and occupational therapy up until the start of school in September. While fourth grade has been challenging for her, she is still making progress.

After having Mallory's symptoms dismissed or trivialized by her current provider, Autumn took her to see another pediatrician. The MRI he ordered showed a large mass in Mallory's brain and she was sent to the emergency room immediately.

"The ER doctor said we needed to get her to a facility that could handle

## Congrats, Baye!



Baye Diouf,  
Clinical  
Analyst  
with the  
Medical  
School's  
Finance

Department, is the 2019 recipient of the Neurosurgery Department's annual **Angie Balkcum Award**.

The award memorializes Balkcum, a long-term department employee who personified the principles of dedication, service, excellence, and good humor. As the recipient, Diouf will receive a monetary award and have his name engraved on a plaque displayed in the department.

## All about the patients

"It made me feel proud," he said.

"The work the department does is so important. It comes down to the patients and the care we provide. It's great to be part of that and it's even better when someone recognizes you as the department's employee of the year."

Diouf has worked with the Neurosurgery Department since he joined the U in 2012. "I support the department's strategic goals, providing most of the financial analysis regarding budgeting. I also help troubleshoot problems and get the department through situations that might have financial implications."

Winning the Angie Balkcum Award reminded Diouf about why he thinks the Neurosurgery Department is so important. "This recognition tells me that I need to build even more resilience and be looking out for the next thing," he said, adding, "How I can help everyone get ready, how I can support everyone as they face increasing change."



## Research Grants Awarded in 2019

Congratulations to department scientists whose work was recognized in 2019 as inherently valuable by numerous funding organizations, both local and national.

- Chen, Clark C., NIH 1R01 CA240953-01, "Development of Quantitative Deuterium MRS Imaging for Human Brain Tumor Application at Ultra-high Field," 2019-24
- Chen, Clark C., NIH 9R44GM128223-02, "High-throughput single-cell sorting and kinetic analysis of secreted particles," 2019-20
- Chen, Clark C., Ferris Foundation Research Fund, "Natural Killer (NK) cells as a platform for glioblastoma therapy," 2019-22
- Grande, Andrew, NIH STTR 1R41NS105263-01A1, "Novel Highly Regenerative and Scalable Progenitor Cell Exosomes for Treating Stroke," 2019-20
- Grande, Andrew, Minnesota Office of Higher Education, "Neuroinflammation associated with sequential TBI in a rodent model," 2019-21
- Low, Walter, NIH STTR 1R42NS112070-01, "Stem cells for treating acute stroke," 2019-20
- Low, Walter, NIH 5U01NS103569-03, "High density multielectrode arrays with spatially selective unidirectional and rotating fields for investigation of neuronal networks," 2019-20
- Low, Walter, Randy Shaver Cancer Research and Community Fund, "Enhancing zika virus-based therapy for treating malignant brain tumor," 2019-20
- Ning, Jianfang, Humor To Fight the Tumor Foundation, "Providing proof of principle for virus peptide-based glioblastoma therapy," 2020-21
- Park, Michael, NIH 1R21NS111214-01, "Evaluating and Understanding the Effects of Deep Brain Stimulation Using Novel Electrophysiology Technique and Device in Parkinson's Disease," 2019-20
- Parr, Ann, Minnesota Spinal Cord Injury and Traumatic Brain Injury Research Grant, "Bioprinted Spinal Neural Progenitor Cell (sNPC) Scaffolds Accelerate Functional Neuronal Network Formation both in vitro and in vivo after Spinal Cord Injury," 2019-21
- Sandoval-Garcia, Carolina, NIH SBIR 1R43NS113655-01, "Cerebral Spinal Fluid Shunt System with Dual Lumen Distal Catheter Redundancy to Minimize Revision Surgery," 2019 – 2020
- Sandoval-Garcia, Carolina, The Pediatric Device and Innovation Consortium, "Improving CSF Shunt Reliability with Dual Lumen Catheter for Redundancy," 2019
- Venteicher, Andrew, 6K12NS080223-07, Neurosurgeon Research Career Development Program (NRCDP), 2019-2021
- Venteicher, Andrew, Burroughs Wellcome Foundation Career Awards for Medical Scientists, "Uncovering drivers of immortality in human central nervous system tumors," 2019-2024.





## Papers published in 2019

- Alattar AA, Bartk J, Chiang VL, Sloan A, Ahluwalia A, Barnett G, **Chen CC**. Stereotactic Laser Ablation as Treatment for Brain Metastases Recurring after Stereotactic Radiosurgery: A Systematic Literature Review. *World Neurosurgery* 2019, S1878-8750 (19): 31195-7
- Ammirati M, Nahed BV, Andrews D, **Chen CC**, Olson JJ. Congress of Neurological Surgeons systematic review and evidence-based guidelines on treatment options for adults with multiple metastatic brain tumor. *Neurosurgery* 2019, 84(3): E180-2
- Arantes S, **Low WC**, Juhn S, Pauna HF, Auditory dysfunction in aging: Prospect for stem cell therapy, *Advances in Bioscience and Technology*, (in press, 2019)
- Bartek J, Alattar AA, Dhawan S, Ma J, **Koga T**, Nakaji P, Dusenbery KE, **Chen CC**. Receipt of brachytherapy is an independent predictor of survival in glioblastoma in the Surveillance, Epidemiology, and End Results database. *Journal of Neuro-Oncology* 2019, 145(1): 75-83
- Bartek J, Sjavik K, Dhawan S, Sagberg LS, Kristianson H, Sthal F, Forander P, **Chen CC**, Jkola AS. Clinical Course in Chronic Subdural Hematoma Patients Aged 18-49 Compared to Patients 50 Years and Above: A Multicenter Study and Meta-Analysis. *Frontiers in Neurology* 2019, 10:311
- Bartek J, Alattar A, Jensdottir M, **Chen CC**. Biopsy and ablation of an H3K27 glioma using the skull-mounted Smartframe® device: a technical case report. *World Neurosurgery* 2019, 127: 436-41
- Blackburn SL, Swisher CB, **Grande AW**, Rubi A, Verbick LZ, McCabe A, Lad SP. Novel Dual Lumen Catheter and Filtration Device for Removal of Subarachnoid Hemorrhage: First case report. *Oper Neurosurg*, 2019, May 1, 15(5) E148-E153. PMID 29873785. Cited: 2; Impact Factor: 1.470
- Blackburn Spiros; Swisher Christa B; **Grande Andrew W**; Rubi Alba; Verbick Laura Zitella; McCabe Aaron; Lad Shivanand P. Filtration of SAH via Spinal Catheter. *Operative Neurosurgery*. 2019 (in press) Cited: 0; Impact Factor: 1.47. Role: Data acquisition, experimental studies, manuscript editing, review
- Campbell CV, Majoie, CBLM, Albers GW, Menon BK, Yassi N, Sharma G, van Zwam WH, van Oostenbrugge RJ, Demchuk AM, Guillemin F, White P, Dávalos A, van der Lugt A, Butcher KS, Cherifi A, Marquering HA, Cloud G, Fernández JMM, Madigan J, Oppenheim C, Donnan GA, Roos YBWEM, Shankar J, Lingsma H, Bonafé A, Raoult H, Hernández-Pérez M, Bharatha A, Jahan R, Jansen O, Richard S, Levy EI, Berkhemer OA, Soudant M, Aja L, Davis SM, Krings T, Tisserand M, San Román LS, Tomasello A, Beumer D, Brown S, Liebeskind DS, Bracard S, Muir KW, Dippel DWJ, Goyal M, Saver JL, Jovin TG, Hill MD, Mitchell PJ, **Grande AW** (Hermes collaborators). Penumbra imaging and functional outcome in patients with anterior circulation ischaemic stroke treated with endovascular thrombectomy versus medical therapy: a meta-analysis of individual patient-level data. *The Lancet*, 2019; Jan 18:1, 46-55. PMID 30413385. Cited: 21; Impact Factor: 59.102
- Chahal KK, Li J, Kufareva I, Durden D, Wechsler-Reya R, **Chen CC**\*, Abagyan R\*. Nilotinib, an approved leukemia drug, inhibits Smoothened signaling in Hedgehog-dependent medulloblastoma. *PLoS One* 2019, 14(9): e0214901. \*\*Equal contribution as senior authors
- Chen CC**, Rennett R, Olson JJ. Congress of Neurological Surgeons systematic review and evidence-based guidelines on the role of prophylactic anticonvulsants in the treatment of Adults with metastatic brain tumors. *Neurosurgery* 2019; 84(3): 550-2
- Chowdhry S, Zanca C, Rajkumar U, **Koga T**, Diao Y, Raviram R, Liu F, Turner K, Yang H, Brunk E, Bi J, Furnari F, Bafna V, Ren B, Mischel PS. NAD metabolic dependency in cancer is shaped by gene amplification and enhancer remodelling. *Nature* 2019, 569(7757): 570-575
- Chrostek MR, Fellows EG, Crane AT, **Grande AW**, **Low WC**. Efficacy of Stem Cell-Based Therapies for Stroke. *Brain Research*. 2019; in press. Cited: 0; Impact Factor: NA
- Chrostek MR, Fellows EG, Guo WL, Swanson WJ, Crane AT, Cheeran MC, **Low WC**, **Grande AW**. Efficacy of Cell-Based Therapies for Traumatic Brain Injuries. *Brain Sciences*. 2019 9(270); doi.org/10.3390/brainsci9100270. Cited: 0; Impact Factor 2.786
- Cramer SW**, Pino IP, **Park MC**, **Darrow DP**. Cortical spreading depolarization after severe traumatic brain injury: a preliminary clinical trial protocol. *BMC Neurology*. Submitted 12/26/2019
- Crane A, Aravalli R, Asakura A, Krishnan Venkatramana, Carlson D, Cheeran M, Danczyk G, Dutton J, Hackett P, Hu W, Li L, Lu W, Miller Z, O'Brien T, Panoskaltis-Mortari A, **Parr AM**, Pearce C, Ruiz-Estevéz M, Shiao M, Sipe C, Toman N, Voth J, Xie H, Steer C, **Low W**. Interspecies Organogenesis for Human Transplantation, accepted to *Cell Transplantation*, August 2019. PMID: 31426664. IF: 2.885
- Crane AT, Voth JP, Shen FX, and **Low WC**, Human-animal chimeras: humanized animals or human cells in an animal, *Stem Cells*. doi: 10.1002/stem.2971 (2019)
- Darrow D**, Balser B, Krassioukov A, Phillips A, Netoff T, **Parr AM**\*, Samadani U\* (\*co-senior authors) Restoration of Supraspinal Control in Individuals with Chronic Spinal Injury, submitted after revision to *Journal of Neurotrauma*, August 2019. PMID: 30667299. IF: 5.002
- Darrow D**, Balser DY, Netoff T, Krassioukov AV, Phillips AA, **Parr AM**\*, and Samadani U\*. (\*co-senior authors). Epidural Spinal Cord Stimulation Facilitates Immediate Restoration of Dormant Motor and Autonomic Supraspinal Pathways after Chronic Neurologically Complete Spinal Cord Injury, *J Neurotrauma*, January 22, 2019. PMID: 30667299 IF: 5.19, Number of times cited: 0
- Das S, Abdel-Mageed AB, Adamidi C, P Adelson D, Akat KM, Alsop D, Ansel KM, Arango J, Aronin N, Avsaroglu SK, Azizi A, Balaj L, Ben-Dov IZ, Bertram K, Bitzer M, Blleloch R, Bogardus KA, Breakefield XO, Calin GA, Carter BS, Charest A, **Chen CC**, Chitnis T, Coffey JR, Courtright-Lim A, Datta A, DeHoff P, Diacovo TG, Erle DJ, Etheridge A, Ferrer M, Franklin JL, Freedman JE, Galas DJ, Galeev T, Gandhi R, Garcia A, Gerstein MB, Ghai V, Ghiran IC, Giraldez MD, Goga A, Gogakos T, Goilav B, Gould SJ, Guo P, Gupta M, Hochberg F, Huang B, Huentelman M, Hunter C, Hutchins E, Jackson AR, Kalani MYS, Kanlikilicer P, Karaszti RA, Keuren-Jensen KV, Khvorova A, Kim Y, Kim H, Kim TK, Kitchen R, Kraig RP, Krichevsky AM, Kwong RY, Laurent LC, Lee M, L'Etoile N, Levy SE, Li F, Li J, Li X, Lopez-Berestein G, Lucero R, Mateescu B, Matin A, Max KE, McManus MT, Mempel TR, Meyer C, Milosavljevic A, Mondal D, Mukamal KJ, Murillo OD, Muthukumar T, Nickerson DA, O'Donnell CJ, Patel DJ, Patel T, Patton JG, Paul A, Peskind ER, Phelps MA, Putterman C, Quesenberry PJ, Quinn JF, Raffai RL, Ranabothu S, Rao SJ, Rodriguez-Aguayo C, Rosenzweig A, Roth ME, Rozowsky J, Sabatine MS, Sakhanenko NA, Saugstad JA, Schmittgen TD, Shah N, Shah R, Shedden K, Shi J, Sood AK, Sopeyin A, Spengler RM, Spetzler R, Srinivasan S, Subramanian SL, Suthanthiran M, Tanriverdi K, Teng Y, Tewari M, Thistlethwaite W, Tuschl T, Urbanowicz KK, Vickers KC, Wang OVK, Weaver AM, Wei Z, Weiner HL, Weiss ZR, Williams Z, Wong DTW, Woodruff PG, Xiao X, Yan IK, Yeri A, Zhang B, Zhang H, Breakefield XO, Charest A, Gerstein MB, Saugstad JA. The Extracellular RNA Communication Consortium: Establishing Foundational Knowledge and Technologies for Extracellular RNA Research. *Cell* 2019, 177(2): 231-42

## Papers published in 2019, cont.

21. Dhawan S, He Yuyu, Bartek J, Alattar AA, **Chen CC**. Comparison of frame-based versus frameless intracranial stereotactic biopsy: systematic review and meta-analysis. *World Neurosurgery* 2019, 127:607-16
22. **Do, Truong H**; Miller, Catherine; **Low, Walter C**; **Haines SJ**. A Proof of Concept for Applying the Radicchi Index (hf) to Compare Academic Productivity and Scientific Impact Among Medical Specialties. *Neurosurgery*. 2019 Jun 24. pii: nyz207. doi: 10.1093/neuros/nyz207. [Epub ahead of print] doi: 10.1177/0963689719863784
23. El-Nashar A, Patel SK, Kurbanov A, Zvereva K, Keller JT, **Grande AW**. Comprehensive anatomy of the foramen ovale critical to percutaneous stereotactic radiofrequency rhizotomy: cadaveric study of dry skulls. *J Neurosurg*. 2019; April 19:1-9. doi: 10.3171/2019.1.JNS18899. PMID 31003215. Cited: 0; Impact Factor: 4.318
24. Eryaman Y, Kobayashi N, Moen S, Aman J, Grant A, Vaughan JT, Molnar G, **Park MC**, Vitek J, Adriany G, Ugurbil K, Harel N. A simple geometric analysis method for measuring and mitigating RF induced currents on deep brain stimulations leads. *NeuroImage* 2019 Jan 184:658-668
25. Goldschmidt E, **Venteicher AS**, Nunez M, Snyderman CH, Gardner PA. Endoscopic endonasal approach for brainstem cavernous malformation. Accepted, *Journal of Neurosurgery* 2019
26. Gu Y, Zhang AC, Han Y, Li J, **Chen CC**, Lo YH. Machine learning based real-time image-guided cell sorting and classification. *Cytometry: Part A*, 2019, 95(5): 499-509
27. **Haines, Stephen J**. Reasons to Believe: Biostatistics and Methodology for the Neurosurgeon, *Neurosurgery* 2019; 84:8-11 UI: 30551193
28. Higuchi F, Nagashima H, **Ning J**, Koerner MVA, Wakimoto H, Cahill DP. Restoration of Temozolomide Sensitivity by Poly(ADP-Ribose) Polymerase inhibitors in Mismatch Repair Deficient Glioblastoma is Independent of Base Excision Repair. *Clin Cancer Res*. 2020 Jan 3
29. Hubbard ME, Bin Zahid A, Vonderhaar D, **Freeman D**, Nygaard RM, Kiragu A, **Guillaume D**. Prediction of discharge destination after traumatic brain injury in children using the head abbreviated injury scale. *Brain Inj*. 16:1-6 (2019). PMID: 30663437
30. Ippen FM, Alvarez-Breckenridge CA, Kuter BM, Fink AL, Bihun IV, Lastrapes M, Penson T, Schmidt SP, Wojtkiewicz GR, **Ning J**, Subramanian M, Giobbie-Hurder A, Martinez-Lage M, Carter SL, Cahill DP, Wakimoto H, Brastianos PK. The Dual PI3K/mTOR Pathway Inhibitor GDC-0084 Achieves Antitumor Activity in PIK3CA-Mutant Breast Cancer Brain Metastases. *Clin Cancer Res*. 2019 Jun 1;25(11):3374-3383
31. **Jones KE, Hunt MA**, Martin CT, Polly DW. Controlled Pedicle Subtraction Osteotomy Site Closure Using Flexible Hinge-Powered Operating Table. *Oper Neurosurg (Hagerstown)*. 2019 Jan 23. doi: 10.1093/ons/opy397. [Epub ahead of print] PubMed PMID: 30690503
32. **Jones KE**, Polly DW. Cost-Effectiveness for Surgical Treatment of Degenerative Lumbar Spondylolisthesis. *Neurosurg Clin N Am*. 2019 Jul;30(3):365-372
33. Kim AH, Tatter S, Rao G, Prabhu S, **Chen CC**, Fecci P, Chiang V, Smith K, Williams B, Mohammadi AM, Judy K, Sloan A, Tovar-Spinoza Z, Baumgartner J, Hadjipanayis C, Leuthardt EC. Laser Ablation of Abnormal Neurological Tissue using Robotic NeuroBlate System (LAANTERN): 12-month Outcomes and Quality of Life after Brain Tumor Ablation. *Neurosurgery* 2019, in press
34. **Koga T**, Chaim IA, Benitez JA, Markmiller S, Parisian AD, Hevner RF, Turner KM, Hessenauer FM, D'antonio M, Nguyen ND, Saberi S, Ma J, Miki S, Boyer AD, Ravits J, Frazer KA, Bafina V, **Chen CC**, Mischel PS, Yeo GW, Furnari FB. Cancer avatars derived from genetically engineered pluripotent stem cells allow for longitudinal assessment of tumor development. *Nature Comm* 2019, in press
35. **Koga T, Chen CC**, Furnari F. When less is more: Gaining power through gene rearrangement of amplified EGFR. *Oncotarget* 2019, 10(22): 2116-7
36. Koueik J, **Sandoval-Garcia C**, Kestle J, Rocque B, Frim D, Grant G, Keating R, Muh C, Oakes W, Pollack I, Selden N, Tubbs RS, Tuite G, Warf B, Rajamanickam V, Broman A, Haughton V, Rebsamen S, George T, Iskandar, B. Outcomes in Children Undergoing Posterior Fossa Decompression and Duraplasty with and without Tonsillar Reduction for Chiari Type 1 Malformation and Syringomyelia: A Pilot Prospective Multi-Center Cohort Study. *J Neurosurg Pediatr*. 2019;1-9 [published online ahead of print, 2019 Oct 18]
37. Lehto LJ, Filip P, Laakso H, Sierra A, Slopsema J, Johnson MD, Eberly LE, Utecht L, **Low WC**, Grohn O, Taniila H, Mangia S, and Michaeli S. Tuning neuromodulation effects by orientation selective deep brain stimulation in the rat medial frontal cortex. *Frontiers in Neuroscience*, doi: 10.3389/fnins.00899. (2019)
38. Lews J, Alattar AA, Akers J, Carter BS, Heller M, **Chen CC**. A pilot proof-of-principle analysis demonstrating dielectrophoresis (DEP) as a glioblastoma biomarker platform. *Scientific Report* 2019, 9(1): 10279.
39. Lochte BC, Carroll KT, Hirshman B, Lanman T, Comptom JN, Schupper Aj, Carter BS, **Chen CC**. Smoking as a risk factor for post-craniotomy 30-day mortality. *World Neurosurgery* 2019, e400-406
40. Ma J, Benitez JA, Li J, Miki S, Ponte de Albuquerque C, Galatro T, Orellana L, Zanca C, Reed R, Boyer A, **Koga T**, Varki NM, Fenton TR, Nagahashi Marie SK, Lindahl E, Gahman TC, Shiau AK, Zhou H, DeGroot J, Sulman EP, Cavenee WK, Kolodner RD, **Chen CC**, Furnari FB. Inhibition of Nuclear PTEN Tyrosine Phosphorylation Enhances Glioma Radiation Sensitivity through Attenuated DNA Repair. *Cancer Cell* 2019; 35(3):504-18.
41. Male S, Mehta T, Tore H, **Quinn C, Grande AW, Tummala RP**, Jagadeesan BD. Gadolinium to the rescue for mechanical thrombectomy in acute ischemic stroke. *Interv Neuroradiol*. 2019; Jun 25(3), 201-204. ec 19:1591019918815298. PMID 30567455. Cited: 0; Impact Factor: 1.450
42. McDowell MM, **Venteicher AS**, Goldschmidt E, Nunez M, Okonkwo DO, Gardner PA. Vertebral artery mobilization for C1-C2 reduction and fixation. Accepted, *Neurosurgical Focus* 2019



## Papers published in 2019, cont.

43. **McGovern RA**, N V Moosa A, Jehi L, Busch R, Ferguson L, Gupta A, Gonzalez-Martinez J, Wyllie E, Najm I, Bingaman WE. Hemispherectomy in adults and adolescents: Seizure and functional outcomes in 47 patients. *Epilepsia*. 2019 Dec;60(12):2416-2427. doi: 10.1111/epi.16378. Epub 2019 Nov 2
44. **McGovern RA**, Nelp TB, Kelly KM, Chan AK, Mazzoni P, Sheth SA, Honig LS, Teich AF, McKhann GM. Predicting Cognitive Improvement in Normal Pressure Hydrocephalus Patients Using Preoperative Neuropsychological Testing and Cerebrospinal Fluid Biomarkers. *Neurosurgery*. 2019 Oct 1;85(4):E662-E669. doi: 10.1093/neuros/nyz102
45. **McGovern RA**, Ruggieri P, Bulacio J, Najm I, Bingaman WE, Gonzalez-Martinez JA. Risk analysis of hemorrhage in stereo-electroencephalography procedures. *Epilepsia*. 2019 Mar;60(3):571-580. doi: 10.1111/epi.14668. Epub 2019 Feb 12
46. Mehta T, Male S, **Quinn C**, Kallmes DF, Siddiqui AH, Turk A, **Grande AW**, **Tummala RP**, Jagadeesan BD. Institutional and provider variations for mechanical thrombectomy in the treatment of acute ischemic stroke: a survey analysis. *J Neurointerv Surg*. 2019. In press. PMID 30760625
47. Mehta T, Patel S, Male S, Zhang A, Khan A, Narwal P, **Grande A**, **Tummala R**, Jagadeesan B. Readmission Trends Related to Unruptured Intracranial Aneurysm Treatment. *Stroke*. 2019 February. 50. 10.1161/str.50.suppl\_1.WP120
48. Niederer J, Patriat R, **Darrow D**, **Park MC**, Schrock L, Eberly LE, Harel N. Deep brain stimulation factors influencing electrode position and bending of the proximal lead: a longitudinal high-resolution postoperative computed tomography study. *Stereotactic and Functional Neurosurgery*. Submitted 6/30/2019
49. **Ning JF**, Stanciu M, Humphrey MR, Gorham J, Wakimoto H, Nishihara R, Lees J, Zou L, Martuza RL, Wakimoto H, Rabkin SD. Myc targeted CDK18 promotes ATR and homologous recombination to mediate PARP inhibitor resistance in glioblastoma. *Nat Commun*. 2019 Jul 2;10(1):2910
50. Olin M, Ampudia-Mesias E, Pennell C, Sarver A, **Chen CC**, Moertel C, **Hunt M**, Pluhar GE. Treatment combining CD200 immune checkpoint inhibitor and tumor-lysate vaccination after surgery for pet dogs with high-grade glioma. *Cancers* 2019; 11(2): E137
51. Ormond, D. Ryan; Abozeid, Mohab; Kurpad, Shekar; **Haines, Stephen J**. For the further training of individuals in neurosurgery II: the academic legacy of the William P. Van Wagenen Fellowship. *Journal of J Neurosurg*. 2019 Nov 29:1-10. doi: 10.3171/2019.9.JNS191998. [Epub ahead of print]
52. **Quinn C**, **Tummala R**, Anderson J, Dahlheimer T, Nascene D, Jagadeesan B. Effectiveness of alternative routes of intra-arterial chemotherapy administration for retinoblastoma: Potential for response and complications. *Interv Neuroradiol*. 2019. In press. PMID 30931673. Impact Factor: 1.021
53. R Banik, **Chen CC**. Spinal epidural hematoma following interlaminar epidural steroid injection. *Anesthesiology* 2019; 131(6): 1342-3
54. Rennert RC, Tringale K, Steinberg JA, Warnke P, Konety I, Sand LA, Karanjia N, Tummala R, **Chen CC**. Surgical management of spontaneous intracerebral hemorrhage: insights from randomized controlled trials. *Neurosurgery Review* 2019, Epub
55. Ricard JA, **Cramer S**, Charles R, Tommee CG, Le A, Bell WR, **Chen CC**, Flanagan ME. Infratentorial glioblastoma metastasis to bone. *World Neurosurgery* 2019, 131:90-4
56. Rosato PC, Wijeyesinghe SP, Stolley JM, Nelson C, Davis RL, Manlove LS, Pennell CA, Blazer BR, **Chen CC**, Geller M, Vezys V, Masopust D. Virus-specific memory T cells populate tumors and can be repurposed as a tumor immunotherapy. *Nat Comm* 2019; 10(1): 567
57. Sathe AG, Tuite P, **Chen C**, Ma YW, Chen W, Cloyd J, **Low WC**, Steer CJ, Lee BY, Zhu XH, and Coles LD. Pharmacokinetics, safety and tolerability of orally administered ursodeoxycholic acid in patients with Parkinson's disease – A pilot study. *Journal of Clinical Pharmacology*, (in press, 2019)
58. Schmidt, Tyler M.; DeAndrea-Lazarus, Ian A.; Kimmell, Kristopher T.; Vates GH, **Haines SJ**, Pilcher WH. For the further training of individuals in neurosurgery: a history of the William P. Van Wagenen Fellowship. *Journal of Neurosurgery* 2019;130: 649-653 UI: 29701542
59. Shiao ML, Yuan C, Crane AT, Voth JP, Juliano M, Hocum-Stone LL, Nan Z, Zhang Y, Kuzman-Nichols N, Sanberg PR, **Grande AW**, and **Low WC**. Immunomodulation with human umbilical cord blood stem cells ameliorates ischemic brain injury – A brain transcriptome profiling analysis. *Cell Transplantation*. doi: 10.1177/0963689719836763. (2019)
60. Steevens AR, Glatzer JC, Kellogg CC, **Low WC**, Santi P, and Kiernan AE. SOX2 is required for inner ear growth and nonsensory formation prior to sensory development. *Development*. doi: 10.1242/dev.170522. (2019).
61. Strahle JM, Taiwo R, Averill C, Torner J, Shannon CN, Bonfield CM, Tuite GF, Bethel-Anderson T, Rutlin J, Brockmeyer DL, Wellons JC, Leonard JR, Mangano FT, Johnston JM, Shah MN, Iskandar BJ, Tyler-Kabara EC, Daniels DJ, Jackson EM, Grant GA, Couture DE, Adelson PD, Alden TD, Aldana PR, Anderson RCE, Selden NR, Baird LC, Bierbrauer K, Chern JJ, Whitehead WE, Ellenbogen RG, Fuchs HE, **Guillaume DJ**, Hankinson TC, Iantosca MR, Oakes WJ, Keating RF, Khan NR, Muhlbauer MS, McComb JG, Menezes AH, Ragheb J, Smith JL, Maher CO, Greene S, Kelly M, O'Neill BR, Krieger MD, Tamber M, Durham SR, Olavarria G, Stone SSD, Kaufman BA, Heuer GG, Bauer DF, Albert G, Greenfield JP, Wait SD, Van Poppel MD, Eskandari R, Mapstone T, Shimony JS, Dacey RG, Smyth MD, Park TS, Limbrick DD. Radiological and clinical predictors of scoliosis in patients with Chiari malformation type I and spinal cord syrinx from the Park-Reeves Syringomyelia Research Consortium. *J Neurosurg Pediatr*. 2019 Aug 16:1-8. doi: 10.3171/2019.5.PEDS18527

## Papers published in 2019, cont.

62. Sude A, Nixdorf DR, **Grande AW**. Human papillomavirus – positive oropharyngeal squamous cell carcinoma manifesting as glossopharyngeal neuralgia. *Journal of the American Dental Association*. 2019 150(12) 1059-1061. Cited: 0; Impact Factor NA
63. Sverak, Pavlina; Adams, Meredith E.; **Haines, Stephen J.**; Levine SC; Nascene D; Sommer K; Dusenbery K; Huang TC; Moertel C. Bevacizumab for Hearing Preservation in Neurofibromatosis Type 2: Emphasis on Patient-Reported Outcomes and Toxicities. *Otolaryngology-Head and Neck Surgery* 2019; 160:526-532
64. Toman, N, **Grande AW**, and **Low WC**. Neural repair in stroke, *Cell Transplantation*
65. Vasquez C, Moen S, Juliano M, Jagadeesan B, Pluhar E, **Chen CC, Grande AW**. A novel canine stroke model: skull base approach with transient middle cerebral artery occlusion. *World Neurosurgery* 2019, e251-60
66. Vasquez CA, Moen S, Juliano M, Jagadeesan B, Pluhar E, **Chen C, Grande, AW**. Development of a Novel Canine Model of Ischemic Stroke: Skull Base Approach with Transient Middle Cerebral Artery Occlusion. *World Neurosurgery*. 2019; March 19. DOI: 10.1016/j.wneu.2019.03.082. PMID 30898757. Cited: 0; Impact Factor: 6.046
67. **Venteicher AS\***, Goldschmidt E\*, McDowell MM, Wang EW, Snyderman CH, Gardner PA. Endoscopic endonasal transodontoid approach for degenerative pseudotumor of the craniocervical junction. *Skull Base* 2019 Dec; 80 (Suppl 4): S368-S369. PMID 31750065
68. **Venteicher AS\***, Quddusi A\*, Coumans JV. Anterolateral approach for a cervical nerve root compression syndrome due to an ectatic vertebral artery. *Operative Neurosurgery* 2019 Jul 1; doi: 10.1093/ons/opy282. PMID 30535126. \*Co-first author.
69. **Venteicher AS**, Goldschmidt E, Gardner PA. Far lateral approach (transcondylar, transtuberular) for bypass and trapping of a ruptured dissecting PICA aneurysm. Accepted, *Skull Base* 2019
70. **Venteicher AS**, McDowell MM, Goldschmidt E, Wang, EW, Snyderman CH, Gardner PA. A preoperative risk classifier predicts tumor progression in patients with cranial base chondrosarcoma. Accepted, *Journal of Neurosurgery* 2019
71. **Venteicher AS**, Mukherjee D, Fernandez-Miranda JC, Wang EW, Snyderman CH, Gardner PA. Endoscopic endonasal approach for resection of a suprasellar meningioma. Congress of Neurological Surgeons NEXUS Online Resource, [www.cns.org/nexus](http://www.cns.org/nexus), May 2019
72. Vitek JL, Jain R, Chen L, Tröster AI, Schrock LE, House PA, Giroux ML, Hebb AO, Farris SM, Whiting DM, Leichliter TA, Ostrem JL, San Luciano M, Galifianakis N, Verhagen Metman L, Sani S, Karl JA, Siddiqui MS, Tatter SB, ul Haq I, Machado AG, Gostkowski M, Tagliati M, Mamelak AN, Okun MS, Foote KD, Moguel-Cobos G, Ponce FA, Pahwa R, Nazzaro JM, Buetefisch CM, Gross RE, Luca CC, Jagid JR, Revuelta GJ, Takacs I, Pourfar MH, Mogilner AY, Duker AP, Mandybur GT, Rosenow JM, Cooper SE, **Park MC**, Khandhar SM, Sedrak M, Phibbs FT, Pilitis JG, Uitti RJ, Starr PA. Double-blinded randomized sham-controlled trial of STN DBS for Parkinson's disease using a multiple independent constant current-controlled system. *The Lancet Neurology*. Submitted 11/22/2019
73. Wang B, Wu ZH, Lou PY, Chai C, Han SY, **Ning JF, Li M**. Human bone marrow-derived mesenchymal stem cell-secreted exosomes overexpressing microRNA-34a ameliorate glioblastoma development via down-regulating MYCN. *Cell Oncol (Dordr)*. 2019 Dec;42(6):783-799
74. Wang J, C Huang, OH Escheagaray, Amirfakhri S, Blair SL, Trogler WC, Kummel AC, **Chen CC**. Microshell Enhanced Acoustic Adjuvants for Immunotherapy in Glioblastoma. *Advanced Therapeutics* 2019, Epub
75. Wang L, **Ning J**, Wakimoto H, Wu S, Wu CL, Humphrey MR, Rabkin SD, Martuza RL. Oncolytic Herpes Simplex Virus and PI3K Inhibitor BKM120 Synergize to Promote Killing of Prostate Cancer Stem-like Cells. *Mol Ther Oncolytics*. 2019 Mar 29;13:58-66
76. Yang JC\*, **Venteicher AS\***, Koch MJ, Stapleton CJ, Friedman GN, Venteicher EM, Shin JH. Myopericytoma at the craniocervical junction: Clinicopathological report and review of a rare perivascular neoplasm. *Neurosurgery*. 2019 Aug 1; doi: 10.1093/neuros/nyy262. PMID 29889275. \*Co-first author.
77. Yu SY, Yu XT, Sun LL, Zheng YW, Jin J, **Chen CC, Li M**. GBP2 promotes glioblastoma invasion through Stat3/FN1 pathway. *Oncogene*, under revision.
78. Zhang J, Wang J, Marzese DM, Wnag X, Yang Z, Li C, Zhang H, Zhang J, **Chen CC**, Kelly DF, Hua W, Hoon DSB, Mao Y. B7H3 regulates differentiation and serves as a potential biomarker and theranostic target for human glioblastoma. *Laboratory Investigation* 2019, 99:1117-29
79. Zhu Z, Mesci P, Bernatchez JA, Gimple RC, Wang X, Schafer ST, Wettersten HI, Beck S, Clark AE, Wu Q, Prager BC, Kim LJY, Dhanwani R, Sharma S, Garancher A, Weis SM, Mack SC, Negraes PD, Trujillo CA, Penalva LO, Feng J, Lan Z, Zhang R, Wessel AW, Diamond MS, **Chen CC**, Dhawan S, Wechsler-Reya RJ, Gage FH, Hu H, Siqueira-Neto JL, Muotri AR, Cheres DA, Rich JN. Zika Virus Targets Glioblastoma Stem Cells through a SOX2-Integrin  $\alpha\beta 5$  Axis. *Cancer Stem Cell* 2019, in press.