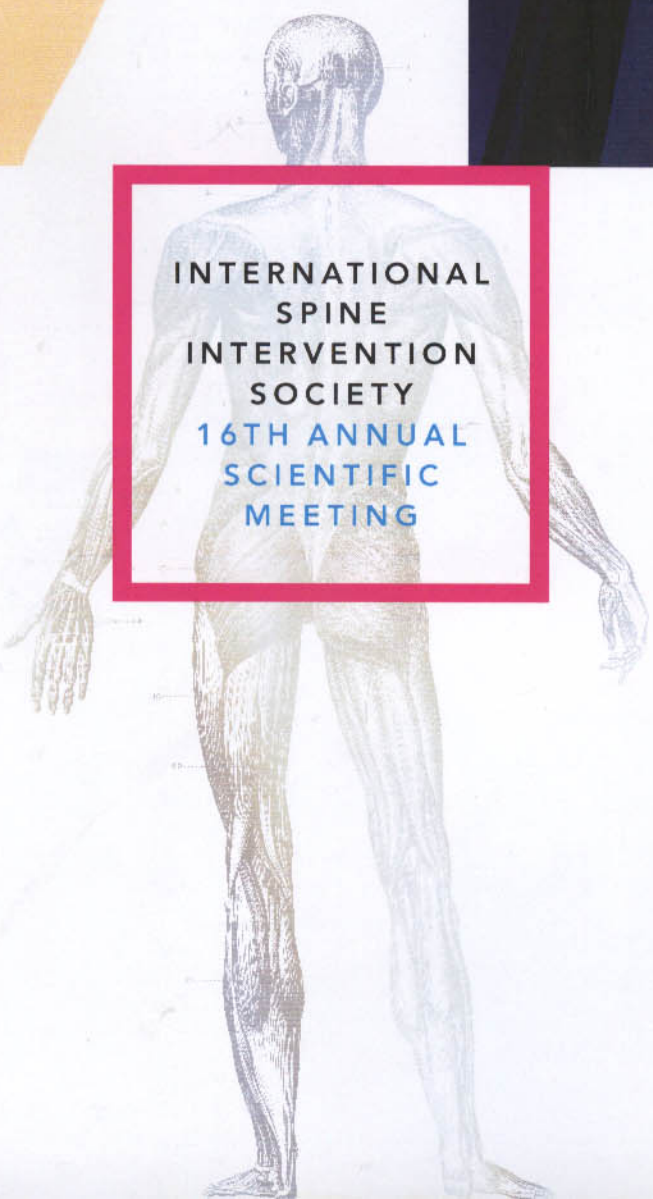
ANSWERS TO THE OPPOSITION

JULY 23–26, 2008
LAS VEGAS, NEVADA

RIO ALL-SUITE
HOTEL & CASINO

INTERNATIONAL SPINE INTERVENTION SOCIETY

16TH ANNUAL SCIENTIFIC MEETING



INTERNATIONAL SPINE INTERVENTION SOCIETY
ISIS

David Weber MD

Dr. David Weber is current medical director at Lake Cumberland Pain Center in Somerset, Kentucky. He has three office locations in Kentucky-Somerset, Bowling Green and Louisville. He is board certified by the American Board of Anesthesiology in both anesthesia and pain management. He has been an Assistant Clinical Professor of Anesthesiology at the University of Louisville.

He originally graduated from the University of Kentucky in 1981 with a degree in Civil Engineering. He returned to medical school in 1995 at University of Louisville. He completed a residency in anesthesia at the University of Louisville in June of 2005, serving as Chief Resident during his last year. He completed his pain fellowship at Massachusetts General Hospital in June 2006.

He resides in Louisville, Kentucky with his wife–Dr. Glenna Major, a child and adolescent psychiatrist, and his daughter Olivia.

Michael Whitworth MD

M L Whitworth is in private practice in Indiana performing advanced endoscopic disc and foraminal decompression procedures and annulus fibrosis modification procedures. He is active in physician education and pain research, and is a board member of ISIS.

Christopher Zarembinski MD

Christopher Zarembinski MD is an attending physician at the Pain Center at Cedars-Sinai Medical Center in Los Angeles. Specializing in anesthesiology, Dr. Zarembinski is board certified and holder of additional training certificates in pain management. He has practiced at Cedars-Sinai Medical Center for the past 17 years practicing exclusively in pain management, and is one of the original founders of the Pain Center. The Pain Center has become a model program for the hospital with respect to comprehensive management.

Dr. Zarembinski previously served as Assistant Clinical Professor of Anesthesiology at the University of California, Los Angeles (UCLA) Pain Management Center and at the University of Southern California (USC) Department of Anesthesiology. He was also a staff anesthesiology at the Huntington Memorial Hospital in Pasadena. Dr. Zarembinski received his medical degree from the University of Arizona School of Medicine. He completed his internship at St. Joseph's Hospital in Phoenix and his anesthesiology residency at Washington University in St. Louis. He also completed a fellowship in pain management at UCLA's Anesthesiology Department. Areas of interest include stem cell research as applied to spine and joint pain, telemedicine, and education.

Time / Place	Event	Speaker	
12:00 **Brasilia 2, 6**	LUNCH-Presentation: Spinal cord stimulation papers Sponsored by a grant from: Boston Scientific	Moderator: Harries Weber	Page 142
	TECHNOLOGY UPDATE	Moderator: Whitworth	
1:20	Lysis of Adhesions	Hammer	Page 144
1:40	Vertebroplasty	Whitworth	Page 156
2:00	Pulsed RF	Gorback	Page 160
2:20	Cryotherapy	Trescott	Page 161
2:35	Advanced Disc Therapies	Kapural	Page 162
2:50	Discussion		
3:00 **Amazon A-F Exhibit Hall**	Break in Exhibit Hall		
	RESEARCH	Moderator: Dreyfuss	
3:40	Transforaminal Etanercept ***Best Clinical Paper***	Cohen	Page 170
3:47	Adult Stem Cell ***Best Basic Science Paper***	Zarembinski	Page 172
3:54	Does Discographypredict treatment response?	Cooper	Page 174
4:01	Infection present with modic changes	Aprill	Page 180
4:08	Biaculoplasty	Bogduk	Page 184
4:15	Medial Branch Blocks	Verrills	Page 186
4:22	Discussion		
	TECHNOLOGY UPDATE: An Engineering Update	Moderator: Baker	
5:30	Pulsed RF	Rittman	Page 178
5:45	Cooled RF	Harrison	Page 179
6:00	Spinal Cord Stimulation 1	Bradley	Page 182
6:15	Spinal Cord Stimulation 2	Cameron	N.S.
6:30	Spinal Cord Stimulation 3	Deyo	N.S.
6:45	Discussion		

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Saturday, July 26

Time / Place	Event	Speaker	
7:00 **Amazon A-F Exhibit Hall**	Continental Breakfast - Exhibit Hall		
7:55 **Amazon GH**	Announcements – General Session		
	RESEARCH	Moderator: Dreyfuss	
8:00	Spineology	Depalma	Page 195
8:07	Contrast Flow	Furman	Page 197
8:14	Hylan	Depalma	Page 199
8:21	Pain Vertebral Fracture	Bogduk	Page 201
8:28	Peripheral Stimulation	Verrills	Page 203
8:49	Functional Restoration	Bogduk	Page 205
8:42	Ganglion Block	Zarembinski	Page 207
8:49	Sacral Lateral Branch Blocks	Dreyfuss	Page 209
9:00	Discussion		

Friday July 25
3:47

Injectable Adult Stem Cells as a Novel Therapeutic Platform for Anterior and Posterior Spinal Fusion

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Introduction

Spinal fusion has become a popular surgical technique used to provide segmental fixation of the spine. We have previously shown that stem cell-based therapy using safe, non-virally genetically engineered adult stem cells (ASCs), that express bone morphogenetic protein (BMP) genes, could induce bone formation in vivo. Therefore, we hypothesized that primary adult stem cells, nucleofected with human BMP-6 gene, directly injected into the intervertebral disc (IVD) or its vicinity could induce posterior or anterior spinal fusion.

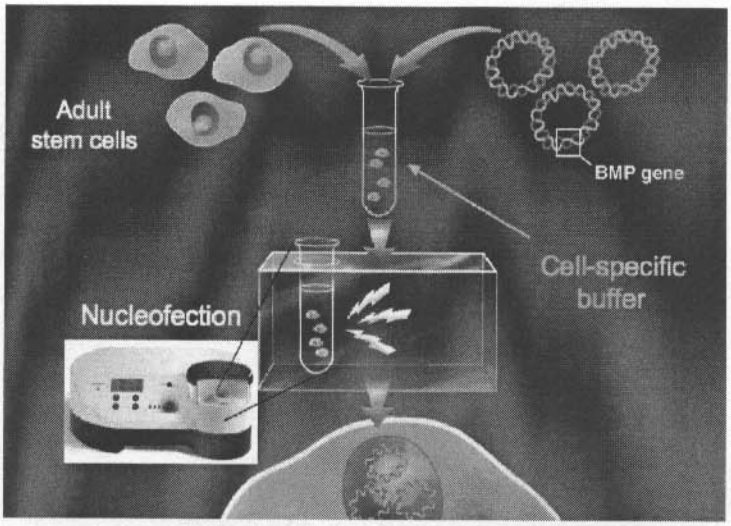
Methods

Porcine ASCs were isolated from freshly harvested adipose tissue. Overexpression of hBMP-6 was achieved using nucleofection, an electroporation-based technique (Fig. 1). Engineered ASCs were labelled with luciferase or GFP marker genes prior to injection. 24 hours post nucleofection the cells were injected into the caudal intervertebral disc of immunodeficient rats or into the lumbar paraspinal muscle of immunodeficient mice. Spinal fusion was monitored using real time, non-invasive micro-CT, in vivo. Cell survival was monitored on tissue level using a non-invasive, quantitative, bioluminescence imaging system (Fig. 2A), and on cellular level using a novel in vivo fibered confocal microscope (Fig. 2B).

Results

ASCs survived at least 2 weeks in vivo as demonstrated by quantitative bioluminescence and fluorescence imaging. Quantitative uCT analyses demonstrated extensive bone formation in the paraspinal sites (Fig. 2E) and in the disc region, leading to interbody fusion (Fig. 2C).

Fig.1 Nucleofection of adult stem cells ex vivo. Porcine adipose tissue-derived ASCs, nucleofected with hBMP-6 encoding plasmid DNA.

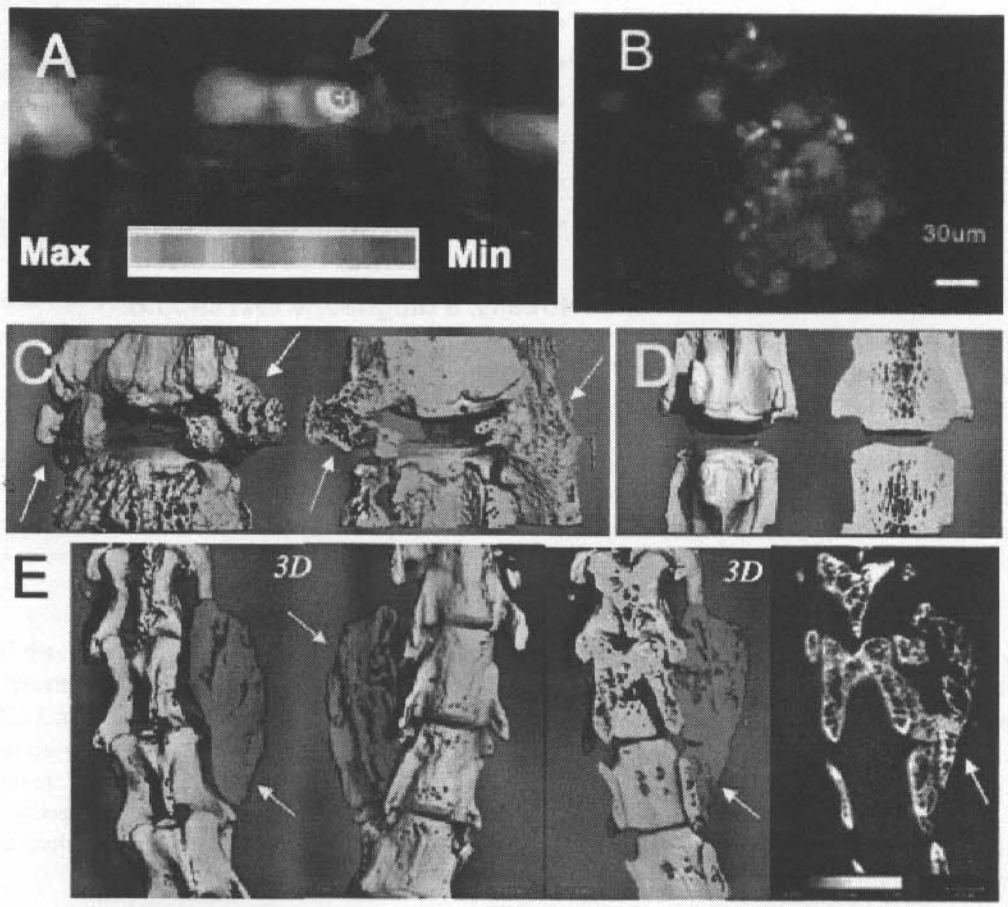


Conclusions

We report here a novel, safe, injectable and well-monitored system for the induction of posterior and anterior spinal fusion using engineered primary ASCs. These results may provide a novel biological therapeutic platform for spinal fusion.

At the completion of the session or demonstration, participants should be able to understand how stem cell-based injectable systems can be used for the treatment of spinal disorders and the use of cutting edge imaging systems in stem cell therapy approaches.

Fig. 2 Anterior and Posterior stem cell-based spinal fusion. In vivo, non-invasive, bioluminescence imaging of the injected cells in the IVD (A). In vivo fibered confocal microscopy imaging of GFP labeled cells in the IVD (B). Micro-CT scans demonstrating interbody fusion evaluation following the injection of engineered ASCs(C). No fusion achieved with non-engineered ASCs (D). Micro-CT scans of posterior spinal fusion (E). Arrows indicate new bone formation.



Sphenopalatine Ganglion Block compared with Stellate Ganglion Block in patients with Traumatic Trigeminal Neuralgia

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Objectives
Neuropathic trigeminal pain has responded to sympathetic blockade. Long term response to stellate ganglion block is inconsistent. Sphenopalatine ganglion block may offer a better outcome in neuropathic trigeminal pain because of the proximity to the face and because of the parasympathetic fibers and sensory fibers that can be targeted.

Methods
Patients diagnosed with traumatic trigeminal neuralgia were treated with stellate ganglion block. If they responded, a second block was performed. Response was determined as positive if the reduction in pain on visual analogue scale was greater than 60%. If they did not have long term relief greater than four months, they were given a sphenopalatine ganglion block. The sphenopalatine ganglion block was repeated if response was greater than 60% pain reduction.

Results
Twenty-six patients fulfilled the criteria for traumatic trigeminal neuralgia, which was defined as continuous pain localized to the distribution of injury, altered sensation, and the presence of allodynia or hyperalgesia. There were 17 females (65.3%) and 9 males (34.6%). The average duration of pain prior to evaluation

was 7.8 years. Pain was localized to V1 in 42.3%, V2 in 42.3%, and V3 in 42.3%. Pain was in one division of the fifth cranial nerve in 61.5% of patients. Seventeen patients had stellate ganglion blocks, which were performed under fluoroscopic guidance. Twelve out of these 17 patients (70.5%) responded to the first block and 12/17 (70.5%) responded to the second block. The longest duration of relief was 4 months. Average duration of relief was 36 hours. Sphenopalatine ganglion blocks were performed fluoroscopically on the 12 that responded to stellate ganglion blocks and 14 additional patients. All 12 patients who responded to stellate blocks also responded to two sphenopalatine ganglion blocks, and 8 of the additional 14 responded as well, with a total of 20 out of 26 responding (76.9%) to sphenopalatine ganglion blocks.

Conclusion

Sphenopalatine ganglion block provides as much relief, if not better, for traumatic trigeminal neuralgia as compared to stellate ganglion block. The advantage of sphenopalatine ganglion block may be to offer a permanent treatment option with gamma knife radiation targeting the sphenopalatine ganglion, which can not be performed with the stellate ganglion.