

# AMERICAN SOCIETY FOR PERIPHERAL NERVE

## Newsletter



Spring 2007

### President's Message

**Dear Colleagues,**

Wow what a year! Recently in Puerto Rico, ASPN had a successful meeting along with ASRM and AAHS. The program was a phenomenal success and we thank Raj for his extraordinary work for the society over this last year. The meeting demonstrated the largest turnout for any meeting over the last 5 years. The program included a variety of topics and lectures and created a vibrant interaction between the participants and presenters.

ASPEN continues to expand. We are at point where membership is at a high and our continued participation within the annual meeting continues to expand. The upcoming meeting in Los Angeles has been expanded to include the additional demand from membership. We have partnered with ASRM and AASH to share additional revenue from the meeting. Of course this also means an increase in financial responsibility; however our expansion indicates that this direction is warranted.

In addition to the expansion of our meeting, we have had interest from companies to support educational opportunities within ASPEN. Currently we are evaluating how and in which way our research can interact with these companies to increase the potential for influence.

Further we have expanded our role within ASPEN Governance. Currently, ASPEN offers an auditor seat within the ASPEN/PSEF



Board. This is a vital position to interact with other organizations and have a seat at the table. In addition, we have had several members be selected for leadership training through ASPEN. This program allows leaders to be trained in the art of organizational structure and assume future responsibilities within our organization and the interaction with ASPEN.

The future is bright.

We look forward to an exciting year and a superb meeting under the direction of Dr Winograd. ASPEN continues to grow and we have to adjust the organization along with this growth. I am excited about the future.

**Gregory Evans, MD**  
President

### From The Editor's Desk

The ASPEN council, in its meeting during the annual meeting in Puerto Rico in January, adopted a resolution to allow the ASPEN newsletter to be available not only to the ASPEN members but to everyone who is interested in peripheral nerve surgery. This is the first edition of the newsletter that will be published on our web site and is available to a wider readership. This gives us an opportunity to reach out to our colleagues who have an interest in peripheral nerve research and surgery. The online publication allows us unlimited potential. We are just at the beginning of that endeavor. We have the ability to include slide presentations and movies. Therefore, it behooves us to double our effort to enhance the newsletter to achieve the standard of excellence that we strive for. This is YOUR newsletter. I would encourage everyone, members and nonmembers, to participate in the newsletter either by review articles, abstracts, news, and conference summaries...etc.

Again, my sincere thanks are extended to my co-editors; Chris Novak, PT, MS and Bob Spinner, MD. I am very grateful to Alice Romano for her excellent help in the preparation for this newsletter.

**Nash Naam, MD**  
[drnaam@handdocs.com](mailto:drnaam@handdocs.com)

## Meeting Wrap-UP – January 2007

### Puerto Rico

The 16<sup>th</sup> annual ASPN meeting was held at the Westin Rio Mar Beach Resort in Rio Grande, Puerto Rico on January 13<sup>th</sup> and 14<sup>th</sup>, 2007. There were 136 registrants in 2007 (up from 118 in 2006 and 106 in 2005). Despite the beautiful surroundings and weather, the scientific sessions were well-attended and the discussions were lively.

Joint sessions were held with the AAHS and ASRM on Saturday and Sunday mornings. Richard Gelberman (St Louis, MO) delivered the Presidents Invited Lecture. ASPN invited international speakers included: Xavier Navarro Acebes (Spain), Jianguang Xu (China), Rolfe Birch (United Kingdom) and Tessa Gordon (Canada). A variety of instructional courses and controversial panels complemented the excellent clinical and basic science papers.

The luxurious hotel setting was a lovely setting for the scientific and social programs. The Welcome Reception was popular and informal interactions abounded at various venues – including the conference center but also the golf course, pool, beach, spa, and restaurants.

All in all, this meeting was a success in all respects. I look forward to the 2008 meeting.

**Robert J. Spinner, M.D.**  
ASPN 2007 Program Chair



*Dr. Midha congratulates Dr. Spinner, program chair, on a successful meeting.*



*ASPN President Dr. Evans presents the outgoing president Dr. Midha with presidential plaque*



*Dr. Maria Siemionow and her husband at the meeting reception*



*Evening of music and fun!!*



## BEST RESIDENT/FELLOW RESEARCH AWARDS

During the 2007 Annual Meeting in Puerto Rico, the Program Committee awarded two awards for the Best Resident/Fellow Basic Science Paper Presentation and the Best Resident/Fellow Clinical Paper Presentation. The ASPN would like to extend their congratulations to the following winners:

**Best Resident/Fellow BASIC SCIENCE Paper**  
**Arash Moradzadeh, MD**, Washington University School of Medicine, St. Louis, Missouri  
*“Induction of Regional Collateral Sprouting Following Muscle Denervation”*

**Best Resident/Fellow CLINICAL Paper**  
**Nicholas M. Desy, BSc**, McGill University School of Medicine, St-Lazare, Quebec  
*“The Cystic Transverse Limb of the Articular Branch: A Pathognomonic Sign for Peroneal Intra-neural Ganglion Cysts at the Superior Tibiofibular Joint”*

**The ASPN Council and the 2007 Annual Meeting Program and Technical Exhibits Committees would like to extend their thanks to the 2007 Exhibitors for their support and participation**

American Society of Plastic Surgeons  
Angiotech  
Anatomy Gifts Registry  
ASSI/Accurate Surgical

Cook Medical  
Med Link  
Micrins Surgical  
Microsurgery Instruments  
NDI Medical

Smith & Nephew  
Stryker Orthopaedics  
Synovis MCA  
Thieme Publishing

**A special thank you to the following sponsors:**

Integra *\*\*Proud sponsor of the ASPN invited speakers*  
Kinetikos Medical Inc./KMI *\*\*Proud sponsor of the cyber cafe*  
Synovis MCA *\*\*Proud sponsor of the ASPN Website*

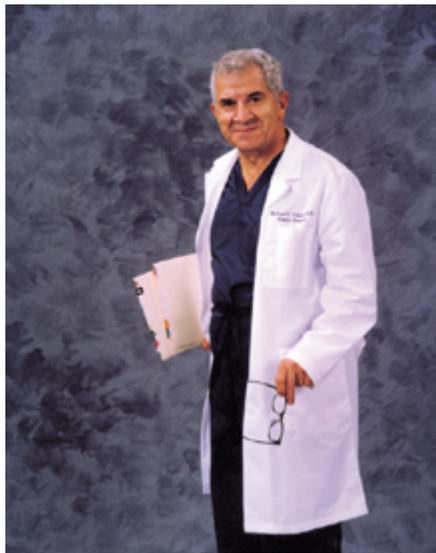
**Congratulations**

**Dr. Michael E. Jabaley** was chosen by the Southeastern Society of Plastic and Reconstructive Surgeons as the 2006 recipient of the prestigious Pickrell Award at the Society's annual meeting in Sea Island, Georgia. The Pickrell Award "is presented to the person who most closely exemplifies, in his commitment to plastic surgery education, the characteristics of the late Dr. Kenneth L. Pickrell. This award is not necessarily given every year."

Dr. Pickrell was a renowned surgeon and teacher who served for many years as the chairman of the division of Plastic Surgery at Duke University.

Dr. Jabaley has taught two generations of surgeons-in medical school, residency and as a guest lecturer in many medical centers. He served as professor and chairman of the division of plastic surgery at the University of Mississippi Medical Center from 1971 to 1979. He has

continued to teach, serving as Clinical Professor of Plastic and Orthopedic Surgery at UMC for the last 27 years. He has been a visiting professor at medical schools around the world, including UCLA, Harvard, Columbia, Vanderbilt, Walter Reed, LSU, Stanford, Emory, as well as in Sweden,



Switzerland, South Africa, Thailand and Japan. He has written dozens of medical papers, and book chapters, and has co-authored a book on Hand Surgery.

Dr. Jabaley has served as President of the American Association of Plastic Surgeons, American Society for Surgery of the Hand, Sunderland Society, Mississippi Chapter of the American College of Surgeons, and Jackson Surgical Society.

**Dr. A. Lee Dellon** received a PhD for his basic science and clinical research into the surgical treatment of compressed nerves in the patient with diabetic neuropathy. He received his PhD from the University of Utrecht in the Netherlands on March 6, 2007.



**Dr Dellon is led to the ancient hall of tradition in Utrecht University, where the Treaty of Utrecht was signed in 1597. He is accompanied by his "seconds" in the traditional Dutch Doctoral Ceremony, his wife, Luiann Olivia Greer, and a former research colleague and fellow Plastic Surgeon, Henk Coert, MD, PhD.**

## ASPEN 2007 Council

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Gregory R. D. Evans, MD, FACS

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### **PAST PRESIDENT**

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Christine Novak, PT, MS

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Gregory R. D. Evans, MD, FACS, Ex-Officio

Robert C. Russell, MD  
Maria Siemionow, MD, PhD, D.SC  
Robert Spinner, MD

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Howard M. Clarke, MD, Chairperson  
Paul S. Cederna, MD, Chairperson  
Ivica Ducic, MD PhD  
Gregory R. D. Evans, MD, FACS  
Loree K. Kalliainen, MD  
Rajiv Midha, MD  
David T. J. Netscher, MD  
Gedge D. Rosson, MD

### Web Site and Technical Exhibits

Paul S. Cederna, MD, Chairperson  
William Kuzon, Jr, MD  
Rajiv Midha, MD  
Gregory R. D. Evans, MD, FACS, Ex-officio

## Welcome New Members as of January, 2007

Gary Y. Chen, MD  
Stephen Colbert, MD  
Tessa Gordon, MD  
David A. Houlden, PhD  
Jonathan E. Isaacs, MD  
Michael W. Neumeister, MD  
Tuna Ozyurekoglu, MD  
Roberto P. Segura, MD

Mario G. Siqueira, MD  
Chau Tai, MD  
Huan Wang, MD, PhD  
Jianguang Xu, MD, PhD

The contact information for these new members can be found on the "members only" section of the ASPN website [www.peripheralnerve.org](http://www.peripheralnerve.org).

## Recruit a Member

Do you know anybody who wants to join a growing society and contribute to the clinical and research development in the area of peripheral nerve surgery? Recruit and sponsor an associate to become a member of the American Society for Peripheral Nerve. Applications are available online at [www.peripheralnerve.org](http://www.peripheralnerve.org).

The submission deadline for applications is October 1, 2007

## CPT Update

Good news, the AAHS CPT/RUC committee, working together with the related committees from the ASPS and ASSH, successfully navigated the CPT/RUC process to produce two (2) new nerve codes for the coding of nerve repair utilizing vein grafts or synthetic conduits.

64910 Nerve repair; with synthetic conduit or vein allograft (eg: nerve tube), each nerve

64911 Nerve repair; with autologous vein graft (includes harvest of vein graft), each nerve

If multiple fascicles are clustered into a single graft, then use 64910 or 64911 only once. If, however, more than one graft is used to repair multiple fascicles of the same nerve (eg: 2 conduit repairs of ulnar nerve), then use the appropriate conduit code for each graft used. Append the -59 modifier to each subsequent graft code to indicate that each conduit was a distinct individual procedure. Note that 64911 includes harvesting of the vein graft and this may not be coded separately.

**Keith Brandt, MD**

Call for Abstracts  
2008 Annual Meeting

January 11 - 13, 2008  
Hyatt Regency Century Plaza  
Beverly Hills, CA



## ASPEN CALL FOR ABSTRACTS DEADLINE June 15, 2007

VISIT [WWW.PERIPHERALNERVE.ORG](http://WWW.PERIPHERALNERVE.ORG) TO SUBMIT YOUR ABSTRACT TODAY!!  
DEADLINE FOR SUBMISSION IS  
**JUNE 15, 2007**. PLEASE SPREAD THE WORD AND ENCOURAGE YOUR  
COLLEAGUES TO SUBMIT AN ABSTRACT.

### ASPEN Future Meetings

#### 2008 Annual Meeting

January 11 – 13, 2008  
The Hyatt Regency Century  
Plaza Hotel and Spa  
Beverly Hills, California

#### 2009 Annual Meeting

January 10 – 11, 2009  
Grand Wailea Resort  
Hotel & Club  
Maui, Hawaii

#### 2010 Annual Meeting

January 9 – 10, 2010  
Boca Raton Resort and Spa  
Boca Raton, Florida

### Society News

#### [WWW.PERIPHERALNERVE.ORG](http://WWW.PERIPHERALNERVE.ORG) – A GREAT RESOURCE

We have some new features and updates to our web site. It is user friendly and the most effective way to pay your dues, register for meetings, locate a member and make housing arrangements. Please see more information below.

**DUES** can now be paid online. If you have not yet paid your 2007 dues, please do so by visiting [www.peripheralnerve.org](http://www.peripheralnerve.org) today. PLEASE NOTE: If paying by credit card, be advised that the charge on your statement will show up as “SignMeUp.com.”

You must provide an email address to receive a receipt. In order to maintain access to the members’ only section of the web site, society dues must be paid and up to date.

**FIND A PERIPHERAL NERVE SURGEON** is a new resource that has been added to our web site. This list is available to the general public to locate a peripheral nerve surgeon in a specific area. Member participation in this is optional. To be included in this database search, please email your approval and contact information to [contact@peripheralnerve.org](mailto:contact@peripheralnerve.org).

# What's New in Peripheral Nerve Surgery and Research

## The Use of Confocal Microscopy to Characterize Temporal Axonal Changes at the Neuromuscular Junction Following Peripheral Nerve Crush Injury

Alice Tong, MS, Christina Kenney, M.D., Arash Moradzadeh, M.D., Terence M. Myckatyn, M.D., Ayato Hayashi, M.D., Susan E. Mackinnon, M.D.

### Introduction

The use of confocal laser scanning microscopy has opened up the possibility of imaging fine details and spatial relationships between nerve terminals, Schwann Cells (SCs) and acetylcholine receptors in thick fixed specimens. The imaging of transgenic murine models that constitutively express chromophores in their axons or Schwann cells, has enabled a new paradigm to emerge in the study of nerves and nerve injury. *The dynamic changes that occur at the neuromuscular junction (NMJ) following injury and axonal regrowth can be directly studied using confocal microscopic imaging.*

The morphology of NMJs has been extensively studied using various methods. Here we examine temporal changes in axonal endplates following a sciatic nerve crush injury in thy1-YFP (16) mice. By imaging animals at specific time points, we capture the recovery of axonal support at the neuromuscular synapse in comparison to uninjured control animals. Double transgenic lines, such as S100-GFP/thy1-CFP also allow for the concomitant visualization of axons and SCs. We believe that transgenic murine models and emerging imaging techniques will continue to improve our understanding of the dynamic process of peripheral nerve injury and subsequent recovery.

### Methods

Adult mice were anesthetized and the sciatic nerve was exposed. This was then crushed 5 mm proximal to its trifurcation with No.5 Jeweler's forceps for 30 seconds (figure 1). At pre-set time points (one week, two weeks, four weeks, and six weeks) following nerve injury, animals underwent intracardiac perfusion with 4% paraformaldehyde. The tibialis anterior muscles were then removed, and stained in Alexa-Fluor-594-conjugated- $\alpha$ -bungarotoxin (BTX) to label motor endplates.

Whole mounts were then evaluated with the laser scanning confocal microscope (Olympus Flouview FV1000).

### Results

NMJs in a thy1-YFP control mouse (uninjured) show perfect apposition of pre- and postsynaptic specializations indicates that YFP completely filled the nerve terminal (figure 2). At one week after sciatic nerve crush, nerve debris is seen on confocal images with fluorescing material lacking identifiable structural components. NMJs are disorganized and without discernable axonal contact. By two weeks following nerve injury, deinnervated NMJs are still seen, with some organization of axons emerging. A significant increase in NMJ innervation and arborization of axons was observed in animals 4 weeks after sciatic crush injury when compared to controls. By six weeks, no significant difference was present compared to controls, with axonal stranding seen between adjacent nerve terminals (Figure 3). NMJs in uninjured double transgenic S100-GFP/thy1-CFP mouse demonstrate the relationship between terminal Schwann cells (SCs) and axon. (Figure 4).

### Discussion

*Temporal confocal images obtained after nerve injury revealed marked debris at one week, remaining deinnervated NMJs at two weeks, some hyperinnervation at four weeks, and a return to singular innervation with improved axonal organization at six weeks.* The noninjured (control) mice, NMJs in thy1-YFP animals show all AChR-rich postsynaptic sites are apposed by YFP-positive nerve terminals (in a 1:1 ratio) and no denervation or hyperinnervation. The images of uninjured S100-GFP/thy1 CFP double transgenic mice show not only axon and nerve terminals, but numbers of Schwann cells adjacent to NMJs and their relationships.

The purpose of this study is to directly visualize the time course of muscle reinnervation after crush injury with respect to both axons and SCs and to establish baseline data for the commonly used sciatic crush traumatic nerve injury paradigm. Direct visualization enables us to study the rate of motor endplate reinnervation over time, the number of terminal branches contacting a given motor

endplate, the number of terminal SCs (TSCs) expression before and after injury. We propose that adaptation of imaging techniques designed to study the development of the peripheral nervous system will also have significant utility for testing any new neuroregenerative therapies after traumatic nerve injury.

## Figures and figure text

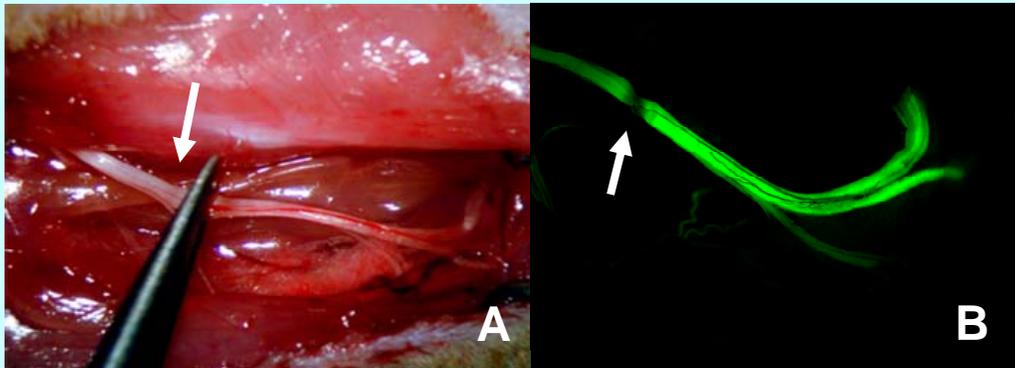


Figure 1: (A) An in vivo image of the sciatic nerve is shown, with the white arrow indicating the proximal side of a crush being performed. (B) In a

thyl-YFP adult mouse, a fluorescent microscope allows for visualization of the sciatic nerve. The crush injury appears black (white arrow), and the rest of the nerve appears a bright green

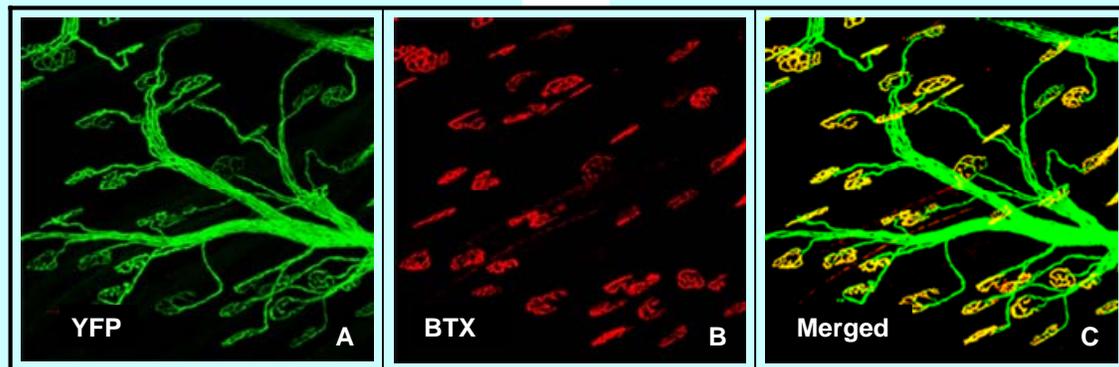


Figure 2. NMJs and axons are shown in an adult thyl-YFP **Control (Uninjured), homozygous (H)** mouse (A-C). (A) YFP (yellow fluoresce protein) labels the branches of the motor axon and motor nerve terminals were imaged with a 488 nm laser.

(B) Same field, postsynaptic AChRs are labeled red with BTX, and viewed with rhodamine optics. (C) In this merged image, nerve terminals overlying AChRs at the NMJs appear yellow, no denervation

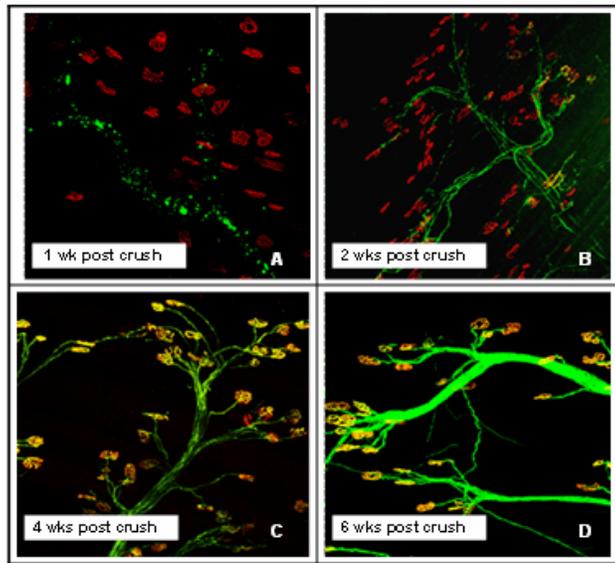


Figure 3. The adult thy1-YFP mice show the course of the tibialis muscle reinnervation after sciatic nerve crush injury. At one week (A), disorganized fluorescence is seen with no clearly demonstrated axon-NMJ relationships. By two weeks (B), more axonal structure (green) is apparent as reinnervation leads to contact with NMJs (red); some denervated NMJs are still seen. At four weeks (C), arborization of axons is well demonstrated, in addition to some hyperinnervation. At six weeks (D), axons are robust and well organized, with image closely resembling controls.

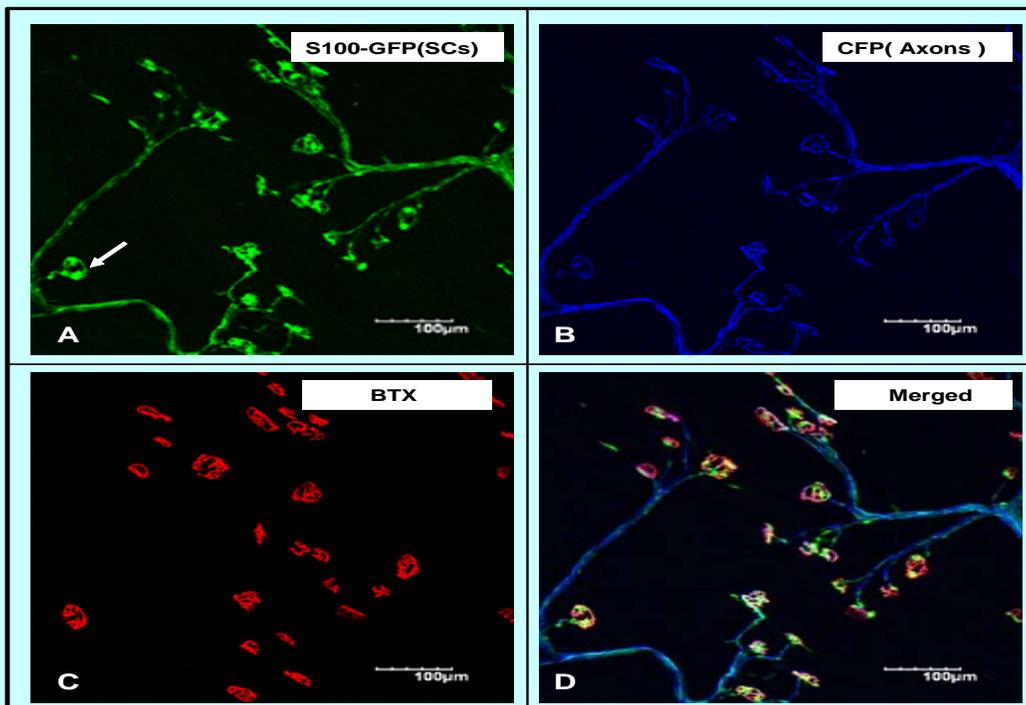


Figure 4. Confocal image of tibialis anterior muscle in double transgenic S100-GFP/thy1-CFP normal mice shows axon and Schwann cells (SCs) superstructure.

(A) Green fluorescent protein (GFP) located in the Schwann cells (SCs). (B) The blue Cyan fluorescent protein (CFP) located in the axons. (C) Acetylcholine receptors (AChR) are shown in red (BTX) following staining with Alexa-Flour 594. (D) A merged image demonstrates the terminal Schwann cells, axons and acetylcholine receptor.