Final Progress Report for Research Projects Funded by Health Research Grants

Instructions: Please complete all of the items as instructed. Do not delete instructions. Do not leave any items blank; responses must be provided for all items. If your response to an item is "None", please specify "None" as your response. "Not applicable" is not an acceptable response for any of the items. There is no limit to the length of your response to any question. Responses should be single-spaced, no smaller than 12-point type. The report **must be completed using MS Word**. Submitted reports must be Word documents; they should not be converted to pdf format.

1. **Grantee Institution:** Drexel University

2. **Reporting Period (start and end date of grant award period):** 1/1/2010-12/31/2013

3. **Grant Contact Person (First Name, M.I., Last Name, Degrees):** Anne Martella

4. **Grant Contact Person's Telephone Number:** (215) 895-6471

5. **Grant SAP Number:** 4100050893

6. **Project Number and Title of Research Project**: 4 - *Role of Septins in Growth Cone Guidance*

7. **Start and End Date of Research Project:** 1/1/2010 - 6/30/2011

8. **Name of Principal Investigator for the Research Project:** Gianluca Gallo, PhD

9. **Research Project Expenses**.

   9(A) Please provide the total amount of health research grant funds spent on this project for the entire duration of the grant, including indirect costs and any interest earned that was spent:

   $ 142,624.

   9(B) Provide the last names (include first initial if multiple individuals with the same last name are listed) of **all** persons who worked on this research project and were supported with health research funds. Include position titles (Principal Investigator, Graduate Assistant, Post-doctoral Fellow, etc.), percent of effort on project and total health research funds expended for the position. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name, First Name	Position Title	% of Effort on Project	Cost
Gianluca Gallo	PI	5%	4,725
Elias Spiliotis	CoI	6%	4,096
Jianli Hu	Graduate student	100%	29,212

9(C) Provide the names of **all** persons who worked on this research project, but who *were not* supported with health research funds. Include position titles (Research Assistant, Administrative Assistant, etc.) and percent of effort on project. For multiple year projects, if percent of effort varied from year to year, report in the % of Effort column the effort by year 1, 2, 3, etc. of the project (x% Yr 1; z% Yr 2-3).

Last Name, First Name	Position Title	% of Effort on Project
None		

9(D) Provide a list of **all** scientific equipment purchased as part of this research grant, a short description of the value (benefit) derived by the institution from this equipment, and the cost of the equipment.

Type of Scientific Equipment	Value Derived	Cost
Ovo Electroporation system	* See below	$14,100

*The equipment provided multiple benefits. First, the ability to perform in ovo experiments using the chicken embryo allowed us to generate in vivo preliminary data for the NIH R01 grants listed in section 11. Second, the equipment allowed us to perform crucial experiments for additional publications (J Neurosci. 2013 Feb 20;33(8):3311-22; J Neurosci. 2012 Dec 5;32(49):17671-89; Dev Neurobiol. 2011 Sep;71(9):747-58). Third, the equipment can also be used for delivering expression plasmids to non-avian systems, and it is being used by additional laboratories at Drexel University to perform these experiments.

10. Co-funding of Research Project during Health Research Grant Award Period. Did this research project receive funding from any other source during the project period when it was supported by the health research grant?

Yes_____ No____X_____

If yes, please indicate the source and amount of other funds:

11. Leveraging of Additional Funds

11(A) As a result of the health research funds provided for this research project, were you able to apply for and/or obtain funding from other sources to continue or expand the research?

Yes_____X____ No_____

If yes, please list the applications submitted (column A), the funding agency (National Institutes of Health—NIH, or other source in column B), the month and year when the application was submitted (column C), and the amount of funds requested (column D). If you have received a notice that the grant will be funded, please indicate the amount of funds to be awarded (column E). If the grant was not funded, insert "not funded" in column E.

Do not include funding from your own institution or from CURE (tobacco settlement funds). Do not include grants submitted prior to the start date of the grant as shown in Question 2. If you list grants submitted within 1-6 months of the start date of this grant, add a statement below the table indicating how the data/results from this project were used to secure that grant.

A. Title of research project on grant application	B. Funding agency (check those that apply)	C. Month and Year Submitted	D. Amount of funds requested:	E. Amount of funds to be awarded:
1. Mechanisms of growth cone guidance (1R01NS072126-01)	☒NIH ☐ Other federal (specify:_____) ☐ Nonfederal source (specify:_)	02/01/10	$ 1.25 million	Not Awarded
2. Localized translation of cytoskeletal proteins in axonal morphogenesis (1R01NS078030-01A1)	☒NIH ☐ Other federal (specify:_____) ☐ Nonfederal source (specify:_)	11/02/12	$1.25 million	$1.25 million Awarded

Regarding non-awarded Grant #1 above, the support allowed us to generate last minute preliminary data on immunocytochemical staining of axons and growth cones and generate new septin constructs for experimentation. The support promoted the successfully awarded Grant #2 above by (1) allowing for the publishing of the main results (see item 20A) and (2) providing the preliminary data for proposing to investigate the axonal translation of septins in NGF-induced axon branching.

11(B) Are you planning to apply for additional funding in the future to continue or expand the research?

Yes____X_____ No_____

If yes, please describe your plans:

I plan on returning to the issue of septins and growth cone dynamics and axon extension. The initial NIH proposal (section 11A, #1) was not awarded but reviewers had multiple suggestions which will be considered in the future submission.

12. Future of Research Project. What are the future plans for this research project?

I am currently initiating a collaboration to investigate the role of septins in axon branching in the context of spinal cord injury

13. New Investigator Training and Development. Did students participate in project supported internships or graduate or post-graduate training for at least one semester or one summer?

Yes____X_____ No_____

If yes, how many students? Please specify in the tables below:

	Undergraduate	Masters	Pre-doc	Post-doc
Male				
Female			1	
Unknown				
Total			**1**	

	Undergraduate	Masters	Pre-doc	Post-doc
Hispanic				
Non-Hispanic			1	
Unknown				
Total			**1**	

	Undergraduate	Masters	Pre-doc	Post-doc
White				
Black				
Asian			1	
Other				
Unknown				
Total			**1**	

14. Recruitment of Out-of–State Researchers. Did you bring researchers into Pennsylvania to carry out this research project?

Yes_____ No_____X____

If yes, please list the name and degree of each researcher and his/her previous affiliation:

15. Impact on Research Capacity and Quality. Did the health research project enhance the quality and/or capacity of research at your institution?

Yes_____X____ No_____

If yes, describe how improvements in infrastructure, the addition of new investigators, and other resources have led to more and better research.

The project supported the completion of Jianli Hu's PhD degree at Drexel University College of Medicine. New reagents were generated from the project which are in use in the co-investigator's laboratory (Dr. E. Spiliotis, Drexel University).

16. Collaboration, business and community involvement.

16(A) Did the health research funds lead to collaboration with research partners outside of your institution (e.g., entire university, entire hospital system)?

Yes____X_____ No_____

If yes, please describe the collaborations:

We collaborated with Dr. Tanya Svitkina at the University of Pennsylvania. Dr. Svitkina and her postdoc Dr. F. Korobova were also authors on the publication supported by this award (see section 20A)

16(B) Did the research project result in commercial development of any research products?

Yes_____ No____X_____

If yes, please describe commercial development activities that resulted from the research project:

16(C) Did the research lead to new involvement with the community?

Yes_____ No_____X_____

If yes, please describe involvement with community groups that resulted from the research project:

17. Progress in Achieving Research Goals, Objectives and Aims.
List the project goals, objectives and specific aims (as contained in the grant agreement). Summarize the progress made in achieving these goals, objectives and aims for the period that the project was funded (i.e., from project start date through end date). Indicate whether

or not each goal/objective/aim was achieved; if something was not achieved, note the reasons why. Describe the methods used. If changes were made to the research goals/objectives/aims, methods, design or timeline since the original grant application was submitted, please describe the changes. Provide detailed results of the project. Include evidence of the data that was generated and analyzed, and provide tables, graphs, and figures of the data. List published abstracts, poster presentations and scientific meeting presentations at the end of the summary of progress; peer-reviewed publications should be listed under item 20.

This response should be a DETAILED report of the methods and findings. It is not sufficient to state that the work was completed. Insufficient information may result in an unfavorable performance review, which may jeopardize future funding. If research findings are pending publication you must still include enough detail for the expert peer reviewers to evaluate the progress during the course of the project.

Health research grants funded under the Tobacco Settlement Act will be evaluated via a performance review by an expert panel of researchers and clinicians who will assess project work using this Final Progress Report, all project Annual Reports and the project's strategic plan. After the final performance review of each project is complete, approximately 12-16 months after the end of the grant, this Final Progress Report, as well as the Final Performance Review Report containing the comments of the expert review panel, and the grantee's written response to the Final Performance Review Report, will be posted on the CURE Web site.

There is no limit to the length of your response. Responses must be single-spaced below, no smaller than 12-point type. If you cut and paste text from a publication, be sure symbols print properly, e.g., the Greek symbol for alpha (α) and beta (ß) should not print as boxes (□) and include the appropriate citation(s). DO NOT DELETE THESE INSTRUCTIONS.

The broad objective of the project is to determine if septin 6 and 7 are involved in growth cone guidance using in vitro model systems and in vivo analysis of growth cone extension and guidance. The project has two main Aims: (1) Analysis of the spatiotemporal dynamics of septins during guidance, and (2) Elucidation of the functions of septin 6 and 7 in axon extension and guidance. The unpublished data presented below were generated to support the submission of an NIH R01 (Section 11, grant #1). Additional data obtained using support by the CURE award on septins in axon extension and branching is also available in the publication listed in section 20A and not reproduced below, but a PDF of the main article and supplemental information was provided with this report.

Septin expression and localization in chicken dorsal root ganglia (DRG) growth cones**.** We have used septin-specific antibodies to probe for the expression and localization of SEPT2, 6 & 7 in chicken DRGs. Specificity and reactivity of the antibodies with chicken DRG septins was confirmed by western blotting of DRG extracts compared to MDCK and HeLa cells (not shown). By immunofluorescence microscopy (Fig 1), SEPT2 localizes throughout the C-domain of growth cones and in parts of the P-domain. SEPT6 localizes throughout the growth cone and is

prominent along filopodia shafts. SEPT7 was targeted largely to the base of filopodia with minimal localization to filopodia shafts.

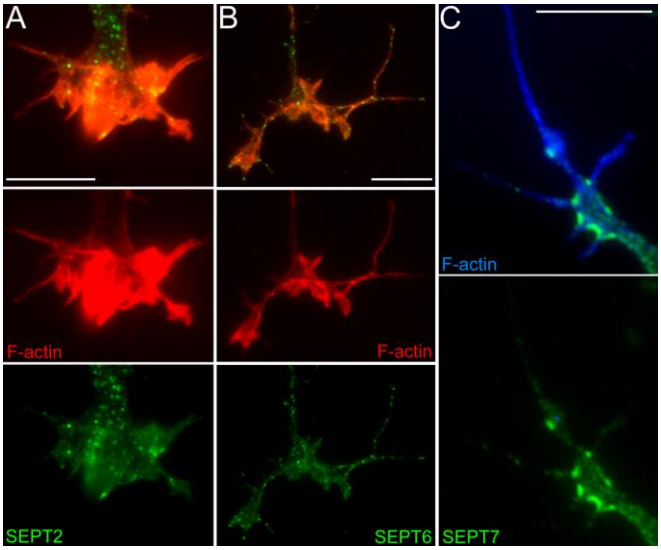

Fig 1. Examples of SEPT2 **(A),** SEPT6 **(B)** and SEPT7 **(C)** staining in growth cones. Bar=10 μm

Perturbation of septin dynamics and SEPT2 expression alter growth cone morphology. The function of septins requires dynamic oligomerization and assembly into high order complexes. Forchlorfenuron (FCF) is a small molecule inhibitor that dampens septin dynamics without affecting MTs and F-actin, and thereby interferes directly with septin functions. FCF treatment of DRGs cultured on laminin and in the continuous presence of nerve growth factor (NGF) results in loss of growth cone lamellipodia and increased numbers of filopodia (Fig 2A-C). Therefore, septin assembly and dynamics appear to be critical for the regulation of growth cone morphology. Because FCF affects all septins, we tested for the involvement of individual septin proteins in growth cone morphology. Over-expression of GFP-SEPT2 resulted in expression level-dependent decreases in growth cone surface area, number of filopodia (Fig 2D) and overall growth cone dynamics (Fig 2E). Overexpression of SEPT6 and SEPT7 did not affect growth cone surface area (Fig 3).

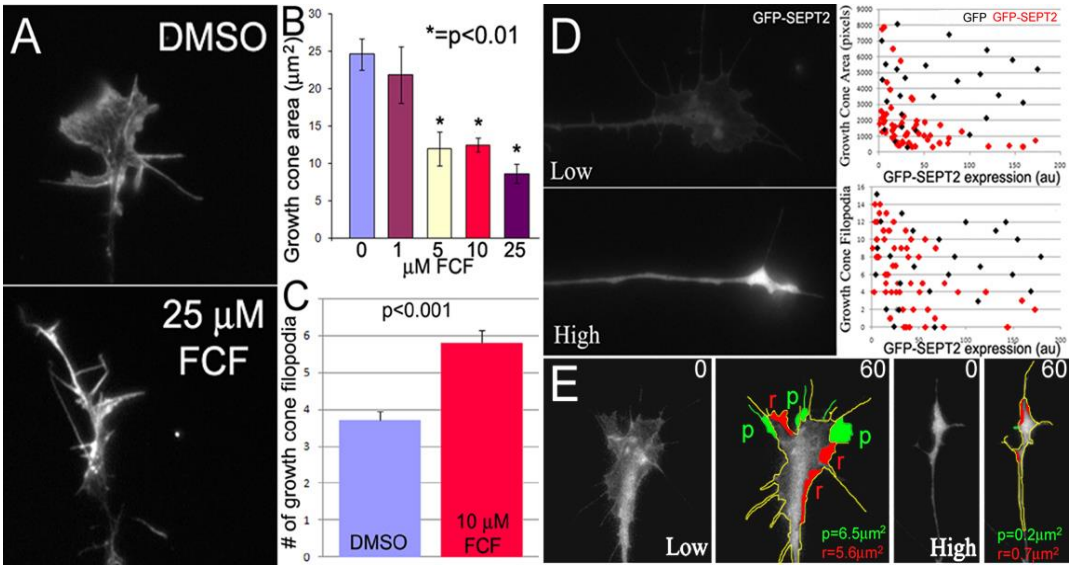

Fig 2. (A) Effects of FCF on growth cones (F-actin shown). **(B)** FCF decreases growth cone area in a dose-dependent manner. **(C)** FCF increases the number of growth cone filopodia. **(D)** Samples of growth cones expressing SEPT2 at low and high levels. Graphs show quantification of growth cone size and number of filopodia as a function of GFP-SEPT2 and GFP expression levels measured in axons. **(E)** High levels of SEPT2 expression (right panels) decrease growth cone dynamics relative to low levels of expression (left panels). Note that image intensity is adjusted for visibility. Images are shown at a 0-60 sec interval. Difference Image analysis: The outline (yellow) of the growth cone at t=0 is overlaid with that at t=60 and areas of protrusion (p; green) and retraction (r; red) are shown. Changes in the surface area protruded (p) and retracted (r) are shown in the t=60 panels.

<u>The SEPT6 GTPase mutant G78T alters growth cone size.</u> Although little is known about the functional significance of the septin GTPase activity, it is thought to control the oligomeric assembly of septins into higher order structures, which in turn serve as spatial localizers (scaffolds and barriers) of protein-protein interactions. In contrast to SEPT2 and SEPT7, the GTPase domain of SEPT6 lacks a highly conserved Thr residue which is critical for GTP hydrolysis; indeed, SEPT6 appears to be constitutively bound to GTP. To probe for the functional significance of the GTPase domain of septins in growth cone dynamics, we have generated a SEPT6-G78T mutant. Overexpression of SEPT6-G78T, but not wild type SEPT6 or SEPT7, increased growth cone size (Fig 3). These data demonstrate for the first time that altering the GTPase activity of SEPT6 has cellular effects.

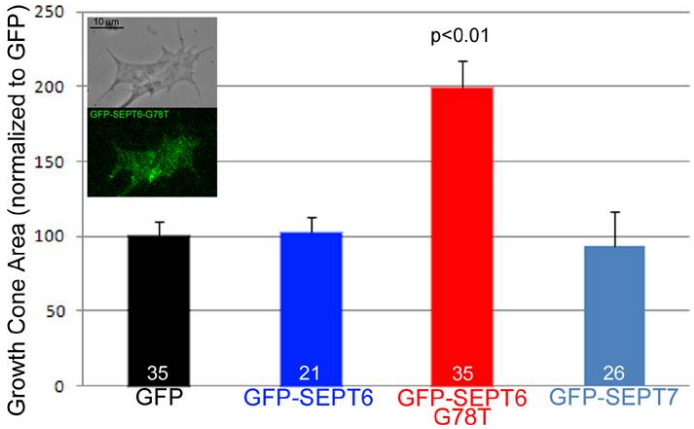

Fig 3. Quantification of growth cone area as a function of GFP and GFP-septin expression. Inset shows example of GFP-SEPT6-G78T-expressing growth cone. n: growth cones sampled, shown in bars.

<u>The septin-stabilizing drug FCF inhibits the NGF-induced increase of growth cone size.</u> Treatment of NGF-naïve (i.e., cultured in NGF-free media) neurons with NGF increases growth cone size through promotion of P-domain lamellipodia. The experiments in Fig 2A-B addressed the effects of FCF on growth cones of neurons cultured in NGF. To determine whether FCF affects NGF-dependent changes in growth cone size, NGF-naïve DRGs were treated with FCF prior to addition of NGF. FCF blocked the NGF-induced increase in growth cone size (Fig 4). FCF had no effect on the growth cone size of NGF-naïve neurons (Fig 4).

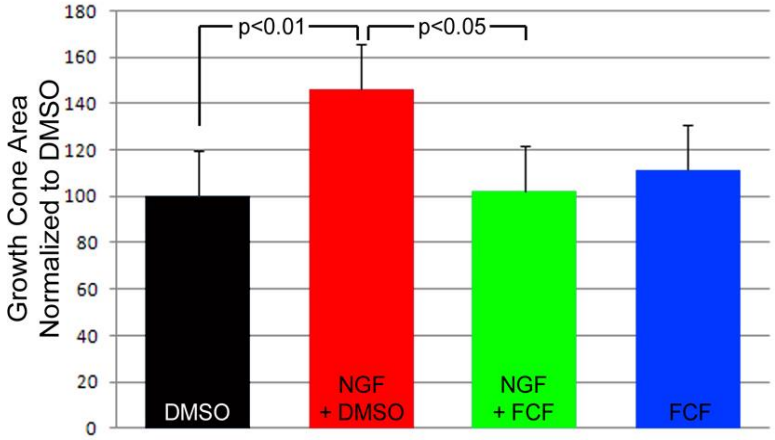

Fig. 4. Pre-treatment with FCF (25 μM) blocks the increase in growth cone area induced by NGF. n≥46/group. Welch t-test.

<u>SEPT7 promotes microtubule (MT) targeting to filopodia.</u> Growth cones grow in a relatively straight trajectory. However, occasionally growth cones make spontaneous turns during which MTs are polarized toward the new direction of growth. Because SEPT7 localizes at the base of growth cone filopodia (Fig 1C), we analyzed the distribution of SEPT7 with respect to MTs in growth cones that exhibited strong asymmetric MT distributions (as previously reported by us). SEPT7 was concentrated in the region of the growth cone with greatest MT content, and appeared to "coral" MTs in the new direction of growth (Fig. 5A). Quantification of SEPT7 immunostaining showed that it was enriched in the direction of MT asymmetry (Fig 5B). Interestingly, SEPT7 is also prominent at the base of axonal filopodia (Fig 5C inset) and overexpression of SEPT7, but not SEPT6, promotes the targeting of MTs to axonal filopodia (Fig 5C). Because over-expression of both SEPT6 and SEPT7 increases filopodial lifespan (Fig 6), the increased presence of MTs in axonal filopodia by SEPT7 is not due to increased filopodial lifespans.

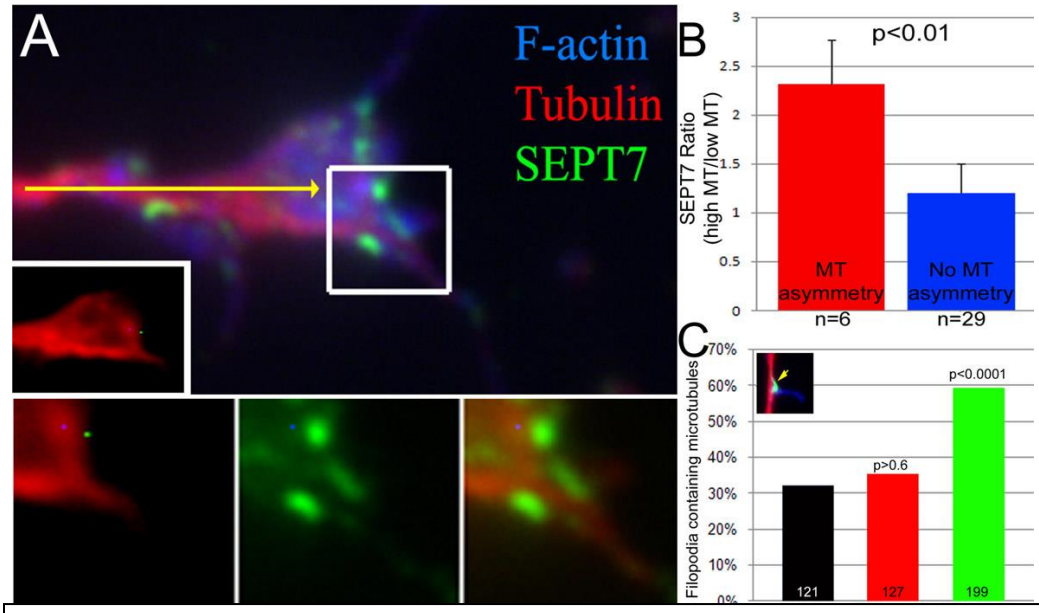

Fig 5. **(A)** Triple labeled growth cone showing F-actin, tubulin and SEPT7. The arrow indicates the axis of the axon. The box shows the region of highest microtubule (MT) content. Lower panels show tubulin and SEPT7 channels in box. **(B)** Quantification of the ratio of total SEPT7 intensity on the side of growth cone containing the highest amount of tubulin to the opposite side (MT asymmetry). In growth cones with no MT asymmetry the "right" side of the growth cone was used as denominator. **(C)** SEPT7 is targeted to the base of axonal filopodia (inset, arrow). Overexpression of SEPT7 but not SEPT6 increases the % of filopodia containing microtubules. n=numbers of filopodia. X^2 analysis on raw data. # in bars = filopodia sampled

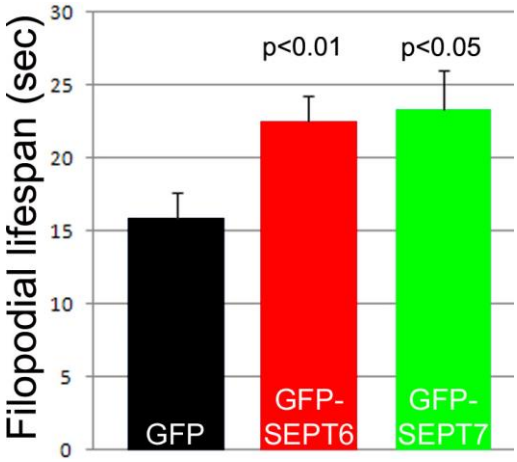

Fig 6. Over-expression of SEPT6 and SEPT7 increases the life spans of axonal filopodia.

<u>SEPT6 and SEPT7 over-expression stabilizes axonal filopodia.</u> We analyzed axonal filopodia because they emerge from the shaft and their base remains static without interference from changes in lamellipodial shape which can obfuscate the true life span of a filopodium imaged using phase contrast . SEPT6 is prominent in the shafts of growth cone (Fig 1B) and axonal filopodia (not shown). Overexpression of either GFP-SEPT6 or GFP-SEPT7 stabilized filopodia as mirrored by their increased lifespans (Fig 6). Neither septin affected the length of filopodia (not shown). These data suggest that SEPT6 and SEPT7 may both function in the stabilization or

destablization of filopodia during growth cone guidance toward attractant and repellent guidance signals, respectively.

<u>In ovo electroporation:</u> We propose to use in ovo electroporation to deliver plasmid vectors for the over-expression, knock-down and expression of mutant septins in DRG neurons *in vivo* and *in vitro*. Using this method, we can specifically delivery plasmid DNA into the caudal DRGs of chicken embryos with only a few additional cells transfected in the surrounding environment of the spinal cord (Fig 7A). This method provides us with the following advantages: (1) axon growth and/or guidance can be studied *in vivo*; all phenotypes would be directly attributable to manipulation of septins in DRG neurons and not their environment; (2) high transfection efficiencies; >50% of NGF-responsive DRG neurons are transfected; (3) transfected DRG explants can be studied *ex vivo* (Fig 7B-D); moreover, cultured explants serve as an excellent source of transfected neurons for single cell imaging.

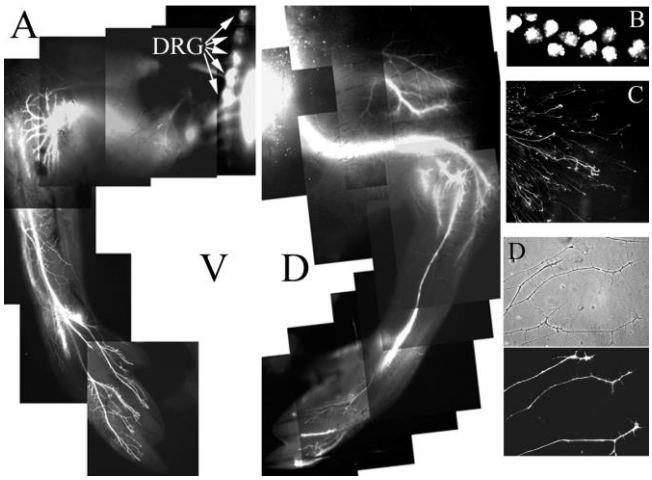

Fig 7. (A) Stage 36 (E10) embryo transfected with GFP. Collage was made from 10x images of the embryo immediately after extraction from its egg. V=ventral, D=dorsal. **(B)** GFP positive DRG explants shown immediately after culturing. **(C)** GFP positive axons 24 hrs later. **(D)** Phase and GFP imaging of axons.

18. Extent of Clinical Activities Initiated and Completed. Items 18(A) and 18(B) should be completed for all research projects. If the project was restricted to secondary analysis of clinical data or data analysis of clinical research, then responses to 18(A) and 18(B) should be "No."

18(A) Did you initiate a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
____X_No

18(B) Did you complete a study that involved the testing of treatment, prevention or diagnostic procedures on human subjects?

_____Yes
____X_No

If "Yes" to either 18(A) or 18(B), items 18(C) – (F) must also be completed. (Do NOT complete 18(C-F) if 18(A) and 18(B) are both "No.")

18(C) How many hospital and health care professionals were involved in the research project?

_____Number of hospital and health care professionals involved in the research project

18(D) How many subjects were included in the study compared to targeted goals?

_____Number of subjects originally targeted to be included in the study
_____Number of subjects enrolled in the study

Note: Studies that fall dramatically short on recruitment are encouraged to provide the details of their recruitment efforts in Item 17, Progress in Achieving Research Goals, Objectives and Aims. For example, the number of eligible subjects approached, the number that refused to participate and the reasons for refusal. Without this information it is difficult to discern whether eligibility criteria were too restrictive or the study simply did not appeal to subjects.

18(E) How many subjects were enrolled in the study by gender, ethnicity and race?

Gender:
_____Males
_____Females
_____Unknown

Ethnicity:
_____Latinos or Hispanics
_____Not Latinos or Hispanics
_____Unknown

Race:
_____American Indian or Alaska Native
_____Asian
_____Blacks or African American
_____Native Hawaiian or Other Pacific Islander
_____White
_____Other, specify:_____
_____Unknown

18(F) Where was the research study conducted? (List the county where the research study was conducted. If the treatment, prevention and diagnostic tests were offered in more than one county, list all of the counties where the research study was conducted.)

19. Human Embryonic Stem Cell Research. Item 19(A) should be completed for all research projects. If the research project involved human embryonic stem cells, items 19(B) and 19(C) must also be completed.

19(A) Did this project involve, in any capacity, human embryonic stem cells?
_____Yes
____X_No

19(B) Were these stem cell lines NIH-approved lines that were derived outside of Pennsylvania?
_____Yes
_____ No

19(C) Please describe how this project involved human embryonic stem cells:

20. Articles Submitted to Peer-Reviewed Publications.

20(A) Identify all publications that resulted from the research performed during the funding period and that have been submitted to peer-reviewed publications. Do not list journal abstracts or presentations at professional meetings; abstract and meeting presentations should be listed at the end of item 17. **Include only those publications that acknowledge the Pennsylvania Department of Health as a funding source** (as required in the grant agreement). List the title of the journal article, the authors, the name of the peer-reviewed publication, the month and year when it was submitted, and the status of publication (submitted for publication, accepted for publication or published.). Submit an electronic copy of each publication or paper submitted for publication, listed in the table, in a PDF version 5.0.5 (or greater) format, 1,200 dpi. Filenames for each publication should include the number of the research project, the last name of the PI, and an abbreviated title of the publication. For example, if you submit two publications for Smith (PI for Project 01), one publication for Zhang (PI for Project 03), and one publication for Bates (PI for Project 04), the filenames would be:

Project 01 – Smith – Three cases of isolated
Project 01 – Smith – Investigation of NEB1 deletions
Project 03 – Zhang – Molecular profiling of aromatase
Project 04 – Bates – Neonatal intensive care

If the publication is not available electronically, provide 5 paper copies of the publication.

Note: The grant agreement requires that recipients acknowledge the Pennsylvania Department of Health funding in all publications. Please ensure that all publications listed acknowledge the Department of Health funding. If a publication does not acknowledge the funding from the Commonwealth, do not list the publication.

Title of Journal Article:	Authors:	Name of Peer-reviewed Publication:	Month and Year Submitted:	Publication Status (check appropriate box below):
1. Septin-driven coordination of actin and microtubule remodeling regulates the collateral branching of axons	Hu J, Bai X, Bowen JR, Dolat L, Korobova F, Yu W, Baas PW, Svitkina T, Gallo G, Spiliotis ET.	Current Biology	June 2011	☐Submitted ☐Accepted ☒Published

20(B) Based on this project, are you planning to submit articles to peer-reviewed publications in the future?

Yes_____X____ No_____

If yes, please describe your plans:

I plan on submitting an article on the effects of FCF on axon extension, growth cones, and branching based on the data shown in section 17.

21. Changes in Outcome, Impact and Effectiveness Attributable to the Research Project. Describe the outcome, impact, and effectiveness of the research project by summarizing its impact on the incidence of disease, death from disease, stage of disease at time of diagnosis, or other relevant measures of outcome, impact or effectiveness of the research project. If there were no changes, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

None

22. Major Discoveries, New Drugs, and New Approaches for Prevention Diagnosis and Treatment. Describe major discoveries, new drugs, and new approaches for prevention, diagnosis and treatment that are attributable to the completed research project. If there were no major discoveries, drugs or approaches, insert "None"; do not use "Not applicable." Responses must be single-spaced below, and no smaller than 12-point type. DO NOT DELETE THESE INSTRUCTIONS. There is no limit to the length of your response.

The major discovery of this project was that septins 6 and 7 mediate aspects of axon branching. This discovery was recently confirmed in 2013 by a research group from Japan (Nat Commun. 4:2532). Thus, the discovery of the role of septins in axon branching has had an impact of the field. Since its publication in June 2012 our article has received 6 references as determined by Web of Science citation tracking.

23. Inventions, Patents and Commercial Development Opportunities.

23(A) Were any inventions, which may be patentable or otherwise protectable under Title 35 of the United States Code, conceived or first actually reduced to practice in the performance of work under this health research grant? Yes_____ No____X_____

If "Yes" to 23(A), complete items a – g below for each invention. (Do NOT complete items a - g if 23(A) is "No.")

a. Title of Invention:

b. Name of Inventor(s):

c. Technical Description of Invention (describe nature, purpose, operation and physical, chemical, biological or electrical characteristics of the invention):

d. Was a patent filed for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No____

If yes, indicate date patent was filed:

e. Was a patent issued for the invention conceived or first actually reduced to practice in the performance of work under this health research grant?
Yes_____ No____
If yes, indicate number of patent, title and date issued:
Patent number:
Title of patent:
Date issued:

f. Were any licenses granted for the patent obtained as a result of work performed under this health research grant? Yes_____ No____

If yes, how many licenses were granted?_____

g. Were any commercial development activities taken to develop the invention into a commercial product or service for manufacture or sale? Yes___ No____

If yes, describe the commercial development activities:

23(B) Based on the results of this project, are you planning to file for any licenses or patents, or undertake any commercial development opportunities in the future?

Yes_____ No_____X_____

If yes, please describe your plans:

24. Key Investigator Qualifications. Briefly describe the education, research interests and experience and professional commitments of the Principal Investigator and all other key investigators. In place of narrative you may insert the NIH biosketch form here; however, please limit each biosketch to 1-2 pages.

BIOGRAPHICAL SKETCH (2 page)

Provide the following information for the Senior/key personnel and other significant contributors..

NAME Gianluca Gallo	POSITION TITLE Associate professor
eRA COMMONS USER NAME (credential, e.g., agency login)	

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Hampshire College, Amherst MA	BA	1986-90	Biology and Cognitive Science
University of Illinois at Chicago, Department of Biology, Chicago IL	PhD	1990-96	Biological Sciences
University of Minnesota, School of medicine, Minneapolis MN (Mentor: Dr. P.C. Letourneau)	PostDoc	1996-1999	Neuroscience

A. Positions and Honors

Employment

1999 - 2002, Research Associate, University of Minnesota, Minneapolis MN, Department of Neuroscience 2002-2007, Assistant Professor, Drexel University College of Medicine, Philadelphia PA, Department of Neurobiology and Anatomy

2008 - 2012, Associate Professor, Drexel University College of Medicine, Philadelphia PA, Department of Neurobiology and Anatomy

2012 - present Associate Professor, Anatomy and Cell Biology, Temple University and Associate Professor, Shriners Hospitals Pediatric Research Center

B. Publications

Recent Medically Related Publications, selected

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19086029. Francisco H, Kollins K, Varghis N, Vocadlo D, Vosseller K, Gallo G, O-GLcNAc post-translational modifications regulate the entry of neurons into an axon branching program. Dev Neurobiol 69:2-3(162-73)2009 Feb 1-15

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BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
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NAME	POSITION TITLE
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eRA COMMONS USER NAME (credential, e.g., agency login) SPILIOTIS1	

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Boston College (Chestnut Hill, MA)	BS	05/96	Biology
The Johns Hopkins University (Baltimore, MD)	PhD	05/02	Cell Biology/Immunology
Stanford University (Stanford, CA)	Post-doc	06/08	Cell Biology

Positions and Honors

Positions and Employment

2007-2008 Research Associate, Department of Biology, Stanford University, Stanford, CA

2008- Assistant Professor, Department of Biology, Drexel University, Phila, PA

2008- Assistant Professor (joint appointment), Department of Neurobiology & Anatomy, Drexel University College of Medicine, Philadelphia, PA

Publications

Bai X, Bowen JR, Knox TK, Zhou K, Pendziwiat M, Kuhlenbäumer G, Sindelar CV, Spiliotis ET. Novel septin 9 repeat motifs altered in neuralgic amyotrophy bind and bundle microtubules. *J. Cell Biol. 2013 Dec 16 Vol. 203 No. 6 895–905*

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Spiliotis ET, Nelson WJ. Here come the septins: novel polymers that coordinate intracellular functions and organization. *J Cell Sci. 2006 Jan 1;119(Pt 1):4-10. Review.*

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