

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. Questions? Contact Health Research Program staff at 717-783-2548.

1. **Grantee Institution: Hepatitis B Foundation**
2. **Reporting Period (start and end date of grant award period): 1/1/10-12/31/10**
3. **Grant Contact Person (First Name, M.I., Last Name, Degrees): Chari Cohen, MPH**
4. **Grant Contact Person’s Telephone Number: 215-489-4930**
5. **Grant SAP Number: 4100050897**
6. **Project Number and Title of Research Project: 01 - Identifying Novel Antiviral Agents against Hepatitis B Virus**
7. **Start and End Date of Research Project: 1/1/10-12/31/10**
8. **Name of Principal Investigator for the Research Project: Chari Cohen, MPH**
9. **Research Project Expenses.**

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

\$ 1,077.40

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	Position Title	% of Effort on Project	Cost
Hess, Daniella	Summer Intern	100%	\$500
Gou, Haitao	Faculty/Research Advisor	1%	\$300

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	Position Title	% of Effort on Project
Cohen, Chari A.	Principal Investigator	5%
Norton, Pamela	Research Director	5%

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
Laboratory reagents and consumable plastics	Purchase of reagents and consumable plastics enabled researchers to successfully perform dose response analysis used to screen 29 compounds for regulatory effects on HBV replication.	\$98.40

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 X No _____

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

An educational grant from Merck pharmaceutical in the amount of \$5,000 partially supported this project, and also supported an additional summer intern at HBF.

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 _____ No X _____

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:
	<input type="checkbox"/> NIH <input type="checkbox"/> Other federal (specify: _____) <input type="checkbox"/> Nonfederal source (specify: _____)		\$	\$

	<input type="checkbox"/> NIH <input type="checkbox"/> Other federal (specify: _____) <input type="checkbox"/> Nonfederal source (specify: _____)		\$	\$
	<input type="checkbox"/> NIH <input type="checkbox"/> Other federal (specify: _____) <input type="checkbox"/> Nonfederal source (specify: _____)		\$	\$

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

Yes No _____

If yes, please describe your plans:

Additional federal grant proposals are currently being written for submission to the National Institutes of Health, with expected submission dates of June 1, 2011 and October 1, 2011.

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

The compounds with the most potent anti-HBV activity, especially Ancitabine, are being studied further to clarify their antiviral properties and study toxicity. Additionally, with the exciting finding that Ancitabine, a currently used anti-cancer drug, had anti-HBV activity, we will begin the process of screening a variety of antineoplastic drugs to potentially identify additional compounds for anti-HBV activity. This is a new direction for our research, and can be promising in discovering new families of drugs to treat and/or cure chronic hepatitis B.

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 No _____

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

	Undergraduate	Masters	Pre-doc	Post-doc
Male	6			
Female	7			
Unknown				
Total	13			

	Undergraduate	Masters	Pre-doc	Post-doc
Hispanic				
Non-Hispanic	13			
Unknown				
Total	13			

	Undergraduate	Masters	Pre-doc	Post-doc
White	10			
Black				
Asian	3			
Other				
Unknown				
Total	13			

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

Yes _____ No _____

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 _____ No _____

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

The training of 8 undergraduate students during the summer of 2010 allowed us to expand our research, and offered valuable training/leadership experience for the HBF research faculty and post-doctorates.

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 No

If yes, please describe the collaborations:

This work involved collaboration between the Hepatitis B Foundation (HBF), its research institute the Institute for Hepatitis and Virus Research (IHVR), Drexel University School of Medicine, and the Drexel Institute for Biomedical and Virological Research (DIBVR). All research took place at the home of HBF and IHVR, the Pennsylvania Biotechnology Center of Bucks County (PABIO).

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

Yes No

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

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

The research project allowed us to actively reach out to and build relationships with colleges and universities both locally in Southeastern PA and throughout Pennsylvania. Working with colleges and universities to recruit students for this summer internship program has helped us to initiate, expand and strengthening our collegiate partnerships.

17. Progress in Achieving Research Goals, Objectives and Aims.

List the project goals, objectives and specific aims (as contained in the grant application's strategic plan). Summarize the progress made in achieving these goals, objectives and aims for the entire grant award period. 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.

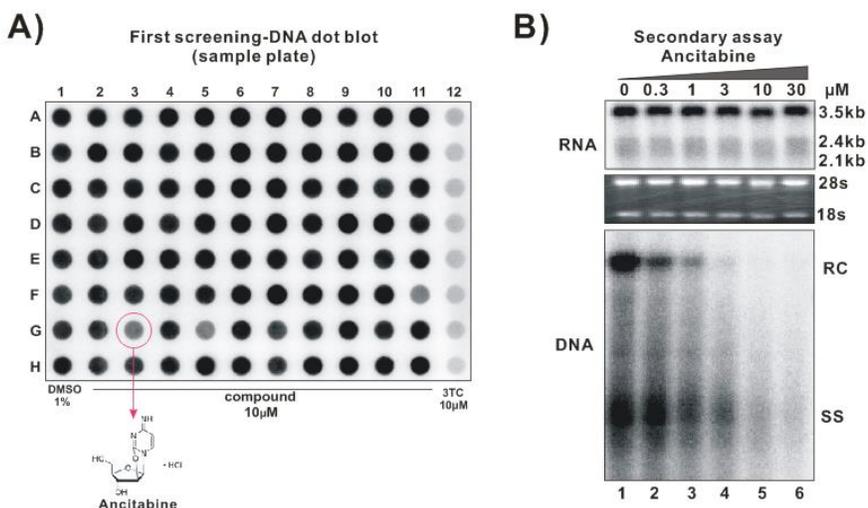
There is no limit to the length of your response. Responses must be single-spaced below, no smaller than 12-point type. If you cut and paste text from a publication, be sure symbols print properly, e.g., the Greek symbol for alpha (α) and beta (β) should not print as boxes (\square) and include the appropriate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

Objective 1: To reduce the burden of chronic hepatitis B and its associated liver disease, including liver cancer, through the identification and development of successful treatment methods.

Specific Aim 1A: To screen compounds regulating HBV replication from the Library of Pharmacologically Active Compounds-1280.

The summer project goal was to screen compounds from the Library of Pharmacologically Active Compounds-1280 (LOPAC) for potential in regulating HBV replication. A total of 29 compounds were successfully screened by a designated summer undergraduate intern, under the tutelage of an experienced principal investigator, and a Ph.D student in the PI's lab. All 29 compounds screened showed promise in preliminary studies via simple dot blot measurement of total HBV DNA present in infected cells that had been treated with the LOPAC compounds, followed by Southern blot analysis measuring HBV DNA that had been packaged into the viral capsid (representing true replication intermediates).

In the secondary assay, compounds were purchased from the commercial vendors, and dose-response analysis of the 29 compounds was completed, across the range 0.3-30 μ M. The toxicity profile of those



compounds has been determined, and their antiviral activity against viral RNA transcription and DNA replication has been analyzed by Northern and Southern blot assay, respectively. The ultimate goal of the study was to determine which of the 29 compounds would result in a 50% reduction (IC_{50}) in viral replication, and to determine if at least one of the compounds would result in a 90% reduction (IC_{90}) in HBV DNA. After withdrawal of compounds with CC_{50} less than $10\ \mu\text{M}$, 4 compounds were identified as secondary hits with IC_{50} less than $10\ \mu\text{M}$. The most potent compound among those hits, namely Ancitabine hydrochloride, displayed an IC_{90} about $1\ \mu\text{M}$, and IC_{50} less than $0.3\ \mu\text{M}$. Chemically, Ancitabine belongs to a category of cyclocytidine nucleoside analogues, it inhibits HBV reverse transcription and DNA replication by blocking the viral polymerase activity, which is the same antiviral mechanism of FDA approved nucleoside analogues for treatment of chronic hepatitis B, such as Lamivudine and Entecavir. Interestingly, the current clinic application of Ancitabine is anti-cancer chemotherapy, considering HBV reactivation is not uncommon during chemotherapy of cancer patients who have inactive or even resolved HBV infection, presumably due to the suppression of host immune system and/or alteration of intracellular restriction environment that limiting HBV replication, Ancitabine may be recommended to treat those patients under this concern. The above study thus encourages us to further extend our effort to screen a large list of antineoplastic drugs for their antiviral activity against HBV, which may ultimately provide information to guide the prescription of chemotherapy for the group of cancer patients carrying HBV.

Ms. Hess presented her findings to over 100 scientists and entrepreneurs at a special seminar, held at the Pennsylvania Biotechnology Center of Bucks County (PABIO).

Objective 2: To expand and diversify the future pool of biomedical researchers in Pennsylvania.

Specific Aim 2A: To train and encourage young investigators, with an intensive 10-week summer internship, to pursue careers in biomedical research focusing on the prevention and treatment of viral hepatitis and liver cancer.

The 2010 Hepatitis B Foundation (HBF) summer research internship was successfully completed. A total of 13 undergraduate students completed 100% of their summer 2010 internship. This was the largest summer intern group that the HBF has ever hosted. The student representation was 46% female (6/13); 77% Pennsylvanian residents (10/13) and 77% attend Pennsylvania colleges or universities (10/13).

All thirteen summer interns spent 70% of their time conducting laboratory research with their appointed laboratory mentors. Each student also attended and presented at 10 weekly journal clubs, 10 laboratory “lunch and learn” seminars, and 7 weekly seminars by visiting scientists and biotechnology experts. Special Seminar topics included “Choosing Biotechnology as a Career Path,” “Introduction to Public Health and Health Disparities,” “Patenting Biotechnology Inventions,” and “Building for a Cure.” The students attended weekly educational seminars given by Hepatitis B Foundation public health and outreach staff, to enhance their understanding of the public health impact of hepatitis B on a local, national, and global level. The students also learned about the Pennsylvania Keystone Innovation Zone program, and an emphasis has been on informing the students about the many biotechnology opportunities there are in Pennsylvania.

Upon completion of their summer research projects, all students presented their findings to over 100 scientists and entrepreneurs at a special seminar, held at the Pennsylvania Biotechnology Center of Bucks County (PABIO).

Faculty members and mentors evaluated each intern, and all 13 interns achieved high scores for their research skills, as well as for their presentations and journal club sessions. Each intern successfully met the goals and objectives of their summer research plan.

Student feedback was collected at the end of the internship, focusing on their experience at HBF and ideas for future internship programs. All students felt that the summer internship program was a valuable experience, and they all responded that they would highly recommend this program to other students. The structure of the internship program was particularly appreciated, as each undergraduate student was mentored by a senior scientist and also had the opportunity to interact with graduate students at different levels of study. While students expressed an interest in spending more time in the lab, the lectures, science lunches, seminars and journal clubs were well received, as well. The fact that students were able to concretely see their data at the end of the summer was very appreciated by all students. Many of the students plan to continue exploring the possibility of choosing biomedical/biotechnology research as a career. Follow up will continue with the student interns through college graduation and future plans to enter a career in biomedical research.

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
 No

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

Yes
 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

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, listed in the table, in a PDF version 5.0.5 format, 1,200 dpi. Filenames for each publication should include the number of the research project, the last name of the PI, the number of the publication and an abbreviated research project title. For example, if you submit two publications for PI Smith for the “Cognition and MRI in Older Adults” research project (Project 1), and two publications for PI Zhang for the “Lung Cancer” research project (Project 3), the filenames should be:

- Project 1 – Smith – Publication 1 – Cognition and MRI
- Project 1 – Smith – Publication 2 – Cognition and MRI
- Project 3 – Zhang – Publication 1 – Lung Cancer
- Project 3 – Zhang – Publication 2 – Lung Cancer

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.				<input type="checkbox"/> Submitted <input type="checkbox"/> Accepted <input type="checkbox"/> Published
2.				<input type="checkbox"/> Submitted <input type="checkbox"/> Accepted <input type="checkbox"/> Published
3.				<input type="checkbox"/> Submitted <input type="checkbox"/> Accepted <input type="checkbox"/> 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:

Articles outlining the results of this project are currently being developed for publication in peer-reviewed journals.

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.

The preliminary results of this project have great potential for a strong future impact on the treatment for chronic hepatitis B. Hepatitis B is a major cause of cirrhosis and liver cancer, and current treatments have limitations including applicability only to a subset of patients, as well as development of antiviral resistant mutations. It is imperative that we continue to search for new potential drugs to treat or cure hepatitis B moving into the future. Only through continued drug discovery and research can we successfully treat chronic hepatitis B and the associated liver disease/liver cancer, to reduce future morbidity and mortality.

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.

None

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 _____

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. *For Nonformula grants only – include information for only those key investigators whose biosketches were not included in the original grant application.*

BIOGRAPHICAL SKETCH

NAME Haitao Guo, Ph.D	POSITION TITLE Assistant Professor		
eRA COMMONS USER NAME HAITAOGUO1			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Wuhan University, Wuhan, China	B.S.	1992-1996	Virology
Wuhan University, Wuhan, China	Ph.D.	1996-2001	Molecular Virology
Fox Chase Cancer Center, Philadelphia, PA	Postdoctoral	2002-2004	Molecular Virology

A. POSITIONS AND HONORS

Positions and Employment

- 2002-2004 Postdoctoral Fellow, Fox Chase Cancer Center, Philadelphia, PA
2005-2008 Instructor, Drexel Institute for Biotechnology and Virology Research, Drexel University College of Medicine. Doylestown, PA
2008-date Assistant Professor, Drexel Institute for Biotechnology and Virology research, Drexel University College of Medicine. Doylestown, PA

Honors and Professional Memberships

- 2000 First award of the 3rd Conference of Young Microbiology Investigators, Wuxi, China
2002 First Award of Outstanding Popular Science Literature, Hubei, China
2006 First Prize Poster Award for the Young Investigator, International Conference on Antiviral Research. San Juan, Puerto Rico.
2008-date Bruce Witte Fellow of Hepatitis B Foundation, USA

2005-date American Society for Virology (Full Member)
2006-date International Society for Antiviral Research (Member)

B. SELECTED PEER-REVIEWED PUBLICATIONS

Most relevant to the current application (in chronological order)

1. **Guo, H.**, T. Zhou, D. Jiang, A. Cuconati, G. H. Xiao, T. M. Block, J. T. Guo. Regulation of Hepatitis B Virus Replication by Phosphatidylinositol 3-kinase-Akt Signal Transduction Pathway. **J. Virol.** 2007, 81: 10072-80.
2. **Guo, H.**, D. Jiang, T. Zhou, A. Cuconati, T. M. Block, J. T. Guo. Characterization of the Intracellular Deproteinized Relaxed Circular DNA of Hepatitis B Virus: An Intermediate of Covalently Closed Circular DNA Formation. **J. Virol.** 2007, 81: 12472-84.

3. Jiang, D., **H. Guo**, C. Xu, J. Chang, B. Gu, L. Wang, T. M. Block, J.T. Guo. Identification of Three Interferon-Inducible Cellular Enzymes That Inhibit the Replication of Hepatitis C Virus. **J. Virol.** 2008, 82: 1665-78
4. **Guo, H.**, D. Jiang, D. Ma, J. Chang, A. M. Dougherty, A. Cuconati, T. M. Block, J. T. Guo. Activation of Pattern Recognition Receptor-Mediated Innate Immunity Inhibits the Replication of Hepatitis B Virus in Human Hepatocyte-Derived Cells. **J. Virol.** 2009, 83: 847-858.
5. **Guo, H.**, R. Mao, T. M. Block, J. T. Guo. Production and Function of the Cytoplasmic Deproteinized Relaxed Circular DNA of Hepadnaviruses. **J. Virol.** 2010, 84: 387-396.

Additional relevant publications of importance to the field

6. **Guo, H.**, W. S. Mason, C. E. Aldrich, J. R. Saputelli, D. Miller, A. R. Jilbert, J. E. Newbold. Identification and characterization of avihepadnaviruses isolated from exotic anseriformes maintained in captivity. **J. Virol.** 2005, 79: 2729-42.
7. **Guo, H.**, C. E. Aldrich, J. R. Saputelli, C. Xu, W. S. Mason. The Insertion Domain of the Duck Hepatitis B Virus Core Protein Plays a Role in Nucleocapsid Assembly. **Virology** 2006, 353: 443-50.
8. Zhou, T.*, **H. Guo**,* J. T. Guo, T. M. Block. Hepatitis B Virus e Antigen Production is Dependent upon Covalently Closed Circular (ccc) DNA in HepAD38 Cell Cultures and May Serve as a cccDNA Surrogate in Antiviral Screening Assays. (*equal contribution) **Antiviral Res.** 2006, 72: 116-24.
9. J. T. Guo, T. Zhou, **H. Guo**, T. M. Block. Alpha interferon-induced antiviral response non-cytolytically reduces replication defective adenovirus DNA in MDBK cells. **Antiviral Res.** 2007, 76: 232-40.
10. Dougherty A. M.*, **H. Guo**,* G. Westby, Y. Liu, E. Simsek, J. T. Guo, A. Mehta, P. Norton, B. Gu, T. M. Block, A. Cuconati. A Substituted Tetrahydro-Tetrazolo-Pyrimidine is a Specific and Novel Inhibitor of Hepatitis B Virus Surface Antigen Secretion. (*equal contribution) **Antimicrob. Agents Chemother.** 2007, 51: 4427-37.
11. Block, T. M., **H. Guo**, J. T. Guo. Molecular Virology of Hepatitis B Virus for Clinicians. (Review) **Clinics in Liver Disease.** 2007, 11: 685-706.
12. Chang, J, JT. Guo, D. Jiang, **H. Guo**, J. M. Taylor, T. M. Block. Liver Specific microRNA, miR-122, Enhances the Replication of Hepatitis C Virus in Non-hepatic Cells. **J. Virol.** 2008, 82: 8215-8223.
13. Chang, J., L. Wang, D. Ma, X. Qu, **H. Guo**, X. Xu, P. M. Mason, N. Bourne, R. Moriarty, B. Gu, J. T. Guo, T. M. Block. Novel Imino Sugar Derivatives Demonstrate Potent Antiviral Activity against Flaviviruses. **Antimicrob. Agents Chemother.** 2009, 53:1501-08.
14. Ma, D., D. Jiang, X. Qu, J. Kennedy, **H. Guo**, J. Chang, B. Gu, P. Y. Shi, T. M. Block, J. T. Guo. West Nile Virus Differentially Inhibits the Signal Transduction Pathways of Type I and III Interferons. **Antiviral Res.** 2009, 83: 53-60.
15. Xu, C., **H. Guo**, X. B. Pan, R. Mao, W. Yu, X. Xu, L. Wei, J. Chang, T. M. Block, J. T. Guo. Interferons Accelerate the Decay of Replication-competent Nucleocapsids of Hepatitis B Virus. **J. Virol.** (In Press)

BIOGRAPHICAL SKETCH

NAME Norton, Pamela

POSITION TITLE Associate Professor,
Microbiology and Immunology

eRA COMMONS USER NAME pan101

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

INSTITUTION AND LOCATION	DEGREE (<i>if applicable</i>)	YEAR(s)	FIELD OF STUDY
Cornell University	B.A.	1977	Biology
Tufts University	Ph.D.	1986	Molecular Biology
Massachusetts Institute of Technology	Post Doc	1990	Molecular Biology

A. POSITIONS AND HONORS

Training and Experience:

1976-1977 Cornell University, Undergraduate research 1977-1978 Wesleyan University, Graduate research 1978-1980 Sidney Farber Cancer Institute, Research assistant 1981-1986 Tufts University, dissertation research 1986-1990 Massachusetts Institute of Technology, Postdoctoral fellow 1990-1993 Brown University, Assistant Professor of Medicine (Research) 1990-1993 Roger Williams Hospital, Staff Scientist, Gastroenterology Division 1991-1993 Roger Williams Cancer Center Transgenic Mouse Facility, Director 1993-1996 Thomas Jefferson University, Research Assistant Professor of Medicine 1996-2000 Thomas Jefferson University, Research Associate Professor of Medicine 2000-2004 Thomas Jefferson University, Research Associate Professor of Biochemistry and Molecular Pharmacology 2004-2009 Drexel University College of Medicine, Associate Professor of Microbiology and Immunology and Associate Director, Drexel Institute for Biotechnology and Virology Research

Honors and Advisory Committees: 1986-1989 National Research Service Award (F32 CA08027) 1991 Rhode Island Foundation Grant for Medical Research 1991-1996 FIRST Award (R29 GM46402) 1996 NIAMS Special Grants Review Committee Member 1998 NIH Fellowship Application Review Committee, ZRG3 BIO Member 1998 NIH Special Emphasis Panel, ZRG3 BIO Member 2001-2002 NSF reviewer

B. PUBLICATIONS (in chronological order): (selected from 44)

1. Norton, P.A. and J.M. Coffin. (1985) Bacterial β -galactosidase as a marker of Rous sarcoma virus gene expression and replication. *Mol. Cell. Biol.* 5:281-290.
2. Norton, P.A. and J.M. Coffin. (1987) Characterization of Rous sarcoma virus sequences essential for viral gene expression. *J. Virol.* 61:1171-1179.
3. Norton, P.A. and R.O. Hynes. (1987) Alternative splicing of chicken fibronectin in embryos and in normal and transformed cells. *Mol. Cell. Biol.* 7:4297-4307.
4. Norton, P.A. and R.O. Hynes. (1990) In vitro splicing of fibronectin pre-RNAs. *Nucleic Acids Res.* 18:4089-4097.
5. Norton, P.A. (1994) Alternative pre-mRNA splicing: Factors involved in splice site selection. *J. Cell Sci.* 107:1-7.
6. Norton, P.A. (1994) Polypyrimidine tract sequences direct selection of alternative branch sites and influence protein binding. *Nucl. Acids Res.* 22:3854-3860.

7. Perkinson, R.A., B.A. Kuo, and P.A. Norton. (1996) Modulation of transcription of the rat fibronectin gene by cell density. *J. Cell. Biochem.* **63**:74-85.
8. Gorski, G.K., M.C. Aros and P.A. Norton. (1996) Characterization of mouse fibronectin alternative mRNAs reveals an unusual isoform present transiently during liver development. *Gene Expression* **6**:139-149.
9. Wu, J. and P.A. Norton. (1996) Animal models of liver fibrosis. *Scand. J. Gastroenterol.* **31**:1137-1143.
10. Perkinson, R.A. and P.A. Norton. (1997) Expression of the mouse fibronectin gene and a FN-*lacZ* transgene during somitogenesis. *Dev. Dynam.* **208**:244-254
10. Mirza, A., S.-L. Liu, E. Frizell, J. Zhu, S. Maddukuri, J. Martinez, P.J.A. Davies, R. Schwarting, P.A. Norton and M.A. Zern. (1997) A role for tissue transglutaminase in hepatic injury and fibrogenesis, and its regulation by nuclear factor- κ B (NF- κ B). *Am. J. Physiol.* **35**:G281-G288.
11. Jordan-Sciutto, K.L., T.J. Logan, P.A. Norton, A. Derfoul, G.R. Dodge and D.J. Hall. (1997) Reduction in fibronectin expression and alteration in cell morphology are coincident in NIH3T3 cells expressing a mutant E2F1 transcription factor. *Exp. Cell Res.* **236**:527-536.
12. Norton, P.A., T. Uporova and V.D. Bennett. (1998) A highly conserved region upstream of the fibronectin alternative exon IIIA 3' splice site interacts with cell-type specific nuclear proteins. *Biochim. Biophys. Acta* **1395**:145-150.
13. Santos, R. M., P.A. Norton, S. Degli Esposti and M.A. Zern. (1998) TGF- β isoforms in alcoholic liver disease. *J. Gastroenterol.* **33**:383-389.
14. Zhu, J., J. Wu, E. Frizell, S.-L. Liu, R. Bashey, R. Rubin, P. Norton and M.A. Zern. (1999) Rapamycin inhibits stellate cell proliferation in vitro and limits fibrogenesis in an in vivo model of liver fibrosis. *Gastroenterol.* **117**:1198-1204.
15. Kuo, B.A. and P.A. Norton. (1999) Accurate selection of a 5' splice site requires sequences within fibronectin alternative exon B. *Nucl. Acids Res.* **27**:3945-3952.
16. Uporova, T.M., P.A. Norton, R.S. Tuan, and V.D. Bennett. (2000) Alternative splicing during chondrogenesis: cis and trans factors involved in splicing of fibronectin exon EIIIA. *J. Cell. Biochem.* **76**:341-351.
17. Wu, J., S.-L. Liu, J.-L. Zhu, P.A. Norton, S. Nojiri, J.B. Hoek and M.A. Zern. (2000) Roles of tissue transglutaminase in ethanol-induced inhibition of hepatocyte proliferation and α 1-adrenergic signal transduction. *J. Biol. Chem.* **275**:22213-22219.
18. Norton, P.A. (2000) Introduction of DNA into cultured mammalian cells. In "Gene Transfer Methods: Introducing DNA into Living Cells and Organisms", P.A. Norton and L.C. Steel, eds. BioTechniques Press, Eaton Publishing, Natick, MA.
19. Kuo, B.A., T.M. Uporova, H. Liang, V.D. Bennett, R.S. Tuan and P.A. Norton (2002) Alternative splicing during chondrogenesis: modulation of fibronectin exon EIIIA splicing by SR proteins. *J. Cell. Biochem.* **86**:45-55.
20. Norton, P.A. and C.J. Pachuk. (2003) Methods for DNA introduction into mammalian cells. In "Gene Transfer and Expression in Mammalian Cells", S.C. Makrides, ed., Elsevier Science B.V Amsterdam, 263-277.
21. Norton, P.A., Q. Gong, A.S. Mehta, X. Lu and T.M. Block. (2003) Hepatitis B virus-mediated changes in apolipoprotein mRNA abundance in cultured hepatoma cells. *J. Virol.* **77**:5503-5506.
22. Flanagan, M.A., H. Liang and P.A. Norton. (2003) Alternative splicing of fibronectin mRNAs in chondrosarcoma cells: Role of far upstream intron sequences. *J. Cell. Biochem.* **90**:709-718.
23. Norton, P.A., H.M.G.P.V. Reis, S. Prince, J. Larkin, J. Pan, J. Liu, Q.

Gong, M. Zhu and M.A. Feitelson. (2004) Activation of fibronectin gene expression by Hepatitis B virus X antigen. *J. Viral Hepatitis* **11**:332-341.

24. Norton, P.A., B. Conyers, Q. Gong, L.F. Steel, T.M. Block and A.S. Mehta. (2005) Assays for the anti-viral activity of glucosidase inhibitors: secreted alkaline phosphatase as a surrogate marker. *J. Virol. Methods.* **124**:167-172.

NAME Cohen, Chari A.		POSITION TITLE Associate Director of Public Health	
eRA COMMONS USER NAME CHARICOHEN			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
Lafayette College Temple University Drexel University	BS MPH DrPH	1996 2001 Candidate	Biology Community Health Ed. Comm. Health & Prev.

A. Positions and Honors

Positions Held

Research Intern: National Cancer Institute, Pediatric Branch (1996-1997)

Teacher: Curtis High School, Department of Nursing (1997-1998)

Assistant Project Coordinator: Temple U. Dept. of Health Studies, *Health Promotion & Wellness Among Women with Physical Disabilities*, an NIH research project (1999-2000)

Teaching Assistant: Temple U. Dept. of Health Studies (1999-2001)

Project Coordinator: Women's Health and Environmental Network (2001)

Program Coordinator: Hepatitis B Foundation (2001-2007)

Senior Research Associate: Hepatitis B Foundation (2007-2009)

Associate Director of Public Health: Hepatitis B Foundation (2009-present)

Adjunct Faculty: Temple University, Department of Health Studies (2006-2008)

Experience

Ms. Cohen has extensive experience with the development, implementation, and evaluation of hepatitis B research and education programs. She served as PI on an NIH grant (2003-2006) to create a comprehensive, interactive online portal for hepatitis B patients and providers. Currently, her focus is on reducing hepatitis B disparities in high-risk ethnic populations.

Honors

Temple University Teaching Scholar, 2000-2001

Gorsuch Memorial Scholar, 1994

Edward R. Mann Scholar, 1992

Professional Organizations

American Public Health Association (2000-present)
Executive Member/Grant Writer, *National Task Force on Hepatitis B: Focus on Asians and Pacific Islanders* (2001-present)
Member, *Hepatitis B Taskforce for Asian Americans, Native Hawaiians and Pacific Islanders Expert Panel* (2007-Present)
Member, Hepatitis B Advisory Panel (2009)

B. Selected peer-reviewed publications (in chronological order)

***(Note: Maiden name for Cohen is **Bachman**)

- Cohen C**, Holmberg SD, McMahon BJ, Block JM, Brosgart CL, Gish RG, London WT, Block TM. Is chronic hepatitis B being undertreated in the United States? *Journal of Viral Hepatitis* 2011;Early Online.
- Cohen C**, Chen G, Block J, Evans AA, Siu P, Duan L, London WT. Chronic hepatitis B in Chinese immigrants: assessing barriers to health care access. (2009). *Journal of the American Public Health Association*. Presentation abstract for the 2009 Annual Meeting.
- Cohen C**, Chen G, Block J, Evans AA, London WT. Hepatitis B and reduced health care access in Asian immigrant communities in Philadelphia. (2009). Presentation abstract for the 2009 Office of Minority Health Summit.
- Cohen C**, Chen G, Block J, Evans AA, London WT. Reducing the health disparities of hepatitis B and liver cancer in Asians. (2008). Presentation abstract for the 2008 NIH Summit on Health Disparities.
- Cohen C**, Evans A, London WT, Block J, Conti M, Block T. (2008). Underestimation of chronic hepatitis B virus infection in the United States of America. *J Viral Hepatitis*;15(1):12–13.
- Jessop AB, **Cohen C**, Burke M, Conti M, Black M. Hepatitis support groups: meeting the information and support needs of hepatitis patients. (2004). *Gastroenterology Nursing*; 27(4):163-169.
- Cohen C**, Jessop AB, Conti M, Block J. (2002). Public use of an Internet-based support group for chronic hepatitis B carriers: answering some basic questions. *Journal of the American Public Health Association*. Presentation abstract for the 2002 Annual Meeting.
- Jessop AB, Burke M, **Cohen C**, Taylor L. (2002). Meeting the information and emotional needs of hepatitis support group members. *Journal of the American Public Health Association*. Presentation abstract for the 2002 Annual Meeting.
- Chari Cohen, MPH**, Molli Conti*, and Joan M. Block, RN, BSN. (2001). Using Electronic Media For Global HBV Outreach: A Model For Success. Presentation at the CDC Hepatitis Coordinator's Conference.
- Cohen, C**. Assessing an Internet-based support group for chronic hepatitis B patients: exchanging information and support online. (2001). Presentation abstract at Pennsylvania Public Health Association Regional Meeting.
- Bachman, C.**, Bills, D., & Majumdar, S.K. (June 1998). Evidence of p53-induced apoptosis in cancer cells exposed to taxol. *In Vitro Cell Dev Biol Anim.* 34 (6): 434-5.