



**National Aeronautics and Space Administration
International Life Sciences Working Group**

**June 22, 2001
AN 01-OBPR-04**

Announcement

STS-107 Biospecimen Sharing Plan

**Office of Biological and Physical Research
National Aeronautics and Space Administration
Washington, DC 20546-0001**

Proposals Due: August 6, 2001

**Announcement
STS-107 Biospecimen
Sharing Plan**

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Announcement

STS-107 Biospecimen Sharing Plan

This Announcement solicits proposals for participation in the International Space Life Sciences Working Group (ISLSWG) Biospecimen Sharing Plan (BSP) for space flight rodent experiments. The BSP seeks to maximize the scientific yield from rodents used to conduct experiments on space flight missions. Tissues not required to meet science objectives for experiments selected from a competitive international process and manifested on a space flight mission are made available to the interested scientific community through a similar competitive process.

This Announcement solicits proposals for the scientific utilization of tissues that will be available after completion of approved procedures for experiments manifested on STS-107, a 16-day Space Shuttle mission currently scheduled for launch no earlier than May 2002. Adult male rats will be flown on this mission and control animals will be housed on the ground. Appendix A describes the number of animals, the experimental and control conditions to which they will be exposed, an inventory of the tissues being made available, and the collection and fixation protocols that will be applied to these tissues.

In order to minimize cost and interference with approved STS-107 experiment objectives during postflight operations, collection of tissues will be limited to those not required by STS-107 experiments. The BSP will use tissue-processing methods described in Appendix A in order to ensure completion of STS-107 objectives and contain complexity. If a proposal of exceptional scientific merit requests a variation from the described tissue processing protocols, ISLSWG may choose to select the proposal and request that the investigator perform unique processes as a member of the tissue collection team. A decision to select such a proposal will include due consideration of the impact on the yield and quality of other tissues being collected. For such proposals, the investigator will be responsible for any additional costs associated with the implementation of these alternative processes (e.g., purchasing and shipping alternate chemicals).

U.S. participation in the BSP is open to all investigators currently funded for related research tasks through the Office of Biological and Physical Research programs in Fundamental Space Biology, Bioastronautics Research, and the National Space Biomedical Research Institute.

Proposals should be four to six pages in length and describe the hypothesis, objectives, and goals of the proposed research. The optimum and minimum sample size and quantity required to meet the objectives should be clearly stated. **No NASA funds are available to support the proposed research from U.S. scientists and NASA will not fund international proposals.** Therefore, the proposal must include documentation of existing funds and resources that will be used to

conduct the proposed research. In addition, the proposal and *curriculum vita* of the Principal Investigator should provide sufficient information about his or her qualifications to conduct the proposed study.

This solicitation is coordinated with solicitations from the European Space Agency (ESA), the Canadian Space Agency (CSA), France's Centre National d'Études Spatiales (CNES), Germany's Deutsche Zentrum für Luft-und Raumfahrt (DLR), the National Space Development Agency of Japan (NASDA), and the National Space Agency of Ukraine (NSAU). These ISLSWG member agencies will determine solicitation and funding parameters independently; however, science merit and technical feasibility reviews will include all proposals received regardless of country of origin.

Selection of proposals will be based on the results of science merit and technical feasibility reviews. It is anticipated that selection will occur by October 2001.

A panel of scientific experts will conduct the science merit review. All of the following will be used in determining the merit score:

- **Significance:** Does this study address an important problem? If the aims of the application are achieved, how will scientific knowledge or technology be advanced? What will be the effect of these studies on the concepts, methods, or products that drive this field? Is there a significant societal or economic impact?
- **Approach:** Are the conceptual framework, design, methods, and analyses adequately developed, well integrated, and appropriate to the aims of the project? Is the proposed approach likely to yield the desired results? Does the applicant acknowledge potential problem areas and consider alternative tactics?
- **Innovation:** Does the project employ appropriate novel concepts, approaches, or methods? Are the aims original and innovative? Does the project challenge existing paradigms or develop new methodologies or technologies?
- **Investigator:** Is the investigator appropriately trained and well suited to carry out this work? Is the work proposed appropriate to the experience level of the Principal investigator and any co-investigators?

The technical feasibility review will be conducted by a team of technical experts to determine compatibility of proposed procedures with STS-107 experiment objectives and the limitations stated in Appendix A.

For selected proposals (regardless of country of origin), twelve months following receipt of BSP tissues, investigators will be required to submit to NASA evidence of a publication resulting from the research (i.e., reprint, preprint, or submitted manuscript) or a detailed report describing the results of the research and the plans for publication of the data.

Technical details relevant to this BSP are included in Appendix A. This Announcement and its appendices may be downloaded directly via the World Web at:

http://research.hq.nasa.gov/code_u/nra/current/AN-01-OBPR-04/index.html

Paper copies of the Announcement are available starting June 22, 2001 to those who do not have access to the Internet by calling (202) 479-9030 x277 and leaving a voice mail message. Please leave your full name, address with zip code, telephone number with area code, and the Announcement number (AN 01-OBPR-04).

The following information applies to this Announcement:

Solicitation Announcement Identifier:	AN 01-OBPR-04
Proposal Due Date:	4:30 PM Eastern Daylight Time August 6, 2001
Number of Proposal Copies Required:	Original, plus ten (10) copies
Submit Proposals to:	NASA Peer Review Services STS-107 Biospecimen Sharing Plan Suite 200 500 E Street SW Washington, DC 20024
Additional Information:	David R. Liskowsky, Ph.D. Acting Division Director Fundamental Space Biology NASA Headquarters 300 E Street SW Washington, DC 20546 (202) 358-1963 voice (202) 358-4168 fax david.liskowsky@hq.nasa.gov
Direct Technical Questions to:	Louis Ostrach, Ph.D. Flight Experiment Integration Executive Code UF NASA Headquarters 300 E Street SW Washington DC 20546 (202) 358-0870 voice (202) 358-4168 fax louis.ostrach@hq.nasa.gov

Request Printed Announcement
and Appendices from:

NASA Peer Review Services
STS-107 Biospecimen Sharing Plan
Suite 200
500 E Street SW
Washington DC 20024
(202) 479-9030 x277

Retrieve Announcement and Appendices in Electronic Form at:
http://research.hq.nasa.gov/code_u/nra/current/AN-01-OBPR-04/index.html

Your interest and cooperation in the STS-107 Biospecimen Sharing Program are appreciated.

David R. Liskowsky, Ph.D.
Acting Division Director
Fundamental Space Biology
Office of Biological and Physical Research

Appendix A: STS-107 Biospecimen Sharing Program (BSP)
Appendix B: Instructions for Proposal Preparation and Required Application Forms
Appendix C: Instructions for Electronic Submission of Proposal Cover Sheet

**STS-107 Biospecimen
Sharing Plan (BSP)**

Tissue Collection and Processing

Upon the completion of each STS-107 experiment animal procedure (approximately 15 to 20 minutes postmortem), carcasses will be passed by runner to the designated tissue collector who will prepare the remaining tissues for preservation. The available tissues to be collected are listed in the tables following the description of the animal groups.

Note: the use of animal subjects in all NASA ground and flight research is governed by NASA Policy Directive NPD 8910.1 Care and Use of Animals¹ and NASA Procedures and Guidelines NPG 8910.1 Care and Use of Animals².

Animal Group A

Male Fisher 344 rats (10 weeks old at launch, ~375 grams at tissue collection)

- 5 Flight rats, housed in one Animal Enclosure Module (AEM) during flight
 - Maximum mission length is 16 + 2 days
 - Dissected one day after landing, on R + 1 day
- 5 Asynchronous control rats (72-hours delayed) housed in one AEM on the ground
 - Dissected 72 hours after flight rats

Fixative composition and perfusion protocol: rats will be deeply anesthetized with pentobarbital (30-40 mg/kg, IP), injected with heparin (300 U, IV) and perfused transcardially with (i) 100 ml of 100 mM phosphate-buffered saline (PBS) at room temperature (RT), delivered at 30 ml/min; (ii) 100 ml of 4% paraformaldehyde/0.5% glutaraldehyde in 0.1 M Phosphate Buffer (RT, 30 ml/min); and (iii) 300 ml of the same fixative at 4°C at 20 ml/min). The entire brain will be utilized by the STS-107 investigator after opening the skull and cutting caudally through the cervical spinal cord.

After perfusion and tissue collection by the STS-107 investigator, the following tissues will be available (Table 1). Note: If changes in the tissue storage solution are proposed and approved, the investigator proposing the change will be required to provide detailed protocols for tissue preservation during shipment to their laboratories and may be required to provide experiment-specific storage/transport solutions or chemical constituents.

¹ http://nodis.hq.nasa.gov/Library/Directives/NASAWIDE/Policies/Program_Management/N_PD_8910_1.html

² http://nodis.hq.nasa.gov/Library/Directives/NASAWIDE/Procedures/Program_Management/N_PG_8910_1.html

Table 1: Animal Group A

n = 5 Flight Animals on R + 1 day and 5 AEM Control Animals 72 hrs after flight animals

TISSUE	Proposed Storage Solution
1) Gastroc, Soleus, EDL, Plantaris, Anterior Tibialis, and Adductor Longus (left and right)	Perfused tissue placed in PBS, stored at 4°C.
2) Thymus	Perfused tissue placed in PBS, stored at 4°C.
3) Spleen	Perfused tissue placed in PBS, stored at 4°C.
4) Adrenal Glands	Perfused tissue placed in PBS, stored at 4°C.
5) Kidneys	Perfused tissue placed in PBS, stored at 4°C.
6) Lungs	Perfused tissue placed in PBS, stored at 4°C.
7) Heart	Perfused tissue placed in PBS, stored at 4°C.
8) Liver	Perfused tissue placed in PBS, stored at 4°C.
9) Testes	Perfused tissue placed in PBS, stored at 4°C.
10) Thoracic and Lumbar Vertebrae	Perfused tissue placed in PBS, stored at 4°C.
11) Tibia, Femur, and Humerus (left and right)	Perfused tissue placed in PBS, stored at 4°C.

Animal Group B

Male Sprague Dawley rats (9 weeks old at launch, ~370 grams at tissue collection)

- 8 Flight rats, housed 4 each in 2 AEMs during flight
 - Maximum mission length of 16 + 2 days
 - Dissected on landing day, R + 0 day at ~ R + 6 hours
- 8 Asynchronous ground control rats, housed 4 each in 2 AEMs
 - Dissected 72 hours after flight rats (72-hour delayed controls)
- 8 Vivarium ground control rats, housed 4 per cage in 2 Vivarium cages
 - Dissected 144 hours after flight rats (144-hour delayed controls)

Animals will be deeply anesthetized with sodium pentobarbital (35mg/kg), and then decapitated. The left and right soleus-plantaris-gastrocnemius muscle complex and triceps muscles from both sides of the animals will be removed. The basilar (cerebral artery), the mesenteric artery and vein, and the abdominal aorta will also be removed. Additionally the whole brain, brain stem, kidneys and lungs will be excised. The above tissues will be utilized by the STS-107 investigators.

The following tissues will then be removed and either fixed in 10% neutral formalin and stored at 4°C or frozen in liquid nitrogen and stored at -70°C (Table 2).

Table 2: Animal Group B

n = 8 Flight Animals on R+0 day, and n = 8 AEM Controls, 72 hours after flight animals;
n = 8 Vivarium controls, 144 hrs after flight animals

TISSUE	TISSUE PROCESSING
1) Blood	Blood will be collected immediately following decapitation in a heparinized tube and centrifuged at 2000 rpm for 10 minutes. The plasma will be frozen and stored at -70°C.
2) EDL, Adductor Longus and Anterior Tibialis Muscles (left and right)	One side fixed on 10% formalin and stored at 4°C. One side frozen in liquid nitrogen and stored at -70°C.
3) Thymus	Frozen in LN2 and stored at -70°C.
4) Spleen	Fixed in 10% formalin and stored at 4°C.
5) Adrenal Glands	One fixed on 10% formalin and stored at 4°C. One frozen in LN2 and stored at -70°C.
6) Heart	Fixed in 10% formalin and stored at 4°C.
7) Liver	One lobe fixed in 10% formalin and stored at 4°C. Remaining lobes frozen in liquid nitrogen and stored at -70°C.
8) Testes	One fixed in 10% formalin and stored at 4°C. One frozen in liquid nitrogen and stored at -70°C.
9) Thoracic and Lumbar Vertebrae	Fixed in 10% formalin and stored at 4°C.
10) Tibia, Femur, and Humerus (left and right)	One side fixed in 10% formalin and stored at 4°C. One side frozen in LN2 and stored at -70°C.

Tissue Distribution

All tissues will be shipped under controlled temperature conditions as appropriate for specific preservation methods. Shipping schedules will be determined for each investigator to ensure the safe delivery of tissues suitable for use in the proposed experiments.

Instructions for Proposal Preparation and Required Application Forms

Applicants are encouraged to write thorough but concise proposals. Proposals should be typed on 8-1/2 x 11 inch paper with a 10- or 12-point font. Extensive appendices and bound proposals are discouraged. Reprints and preprints of relevant work will be forwarded to the reviewers if submitted as attachments to the proposal.

The original, plus ten copies, of the proposal must be received by August 6, 2001, 4:30 PM EDT. Submissions received by NPRS after this deadline will be considered late and will be returned to the Principal Investigator without review. However, NASA does reserve the right to review a late submission when it is in the best interest of the Federal Government.

Submit proposals to:

NASA Peer Review Services
500 E Street, SW, Suite 200
Washington, DC 20024
Subject: Biospecimen Sharing Plan (AN 01-OBPR-04)

Telephone number for delivery services: (202) 479-9030

NASA cannot receive deliveries on Saturdays, Sundays or federal holidays.

Proposals submitted in response to this Announcement must be typewritten in English and contain at least the following elements in the following order:

(1) Online Form: Cover Page, Summary, and Budget

The proposal cover page, summary and budget are a single online form available through the SYS-EYFUS Web Site (<http://proposals.hq.nasa.gov>).. You must submit the completed form electronically (**see Appendix C for instructions**). In addition, print a hard copy of this cover page, obtain the necessary signatures and include it as part of the original proposal.

The summary should succinctly convey, in broad terms, what it is the investigator wants to do with the space-flown tissue, how the investigator plans to do it, why it is important, and how it meets the requirements for NASA relevance. Please limit this summary to 400 words or less.

Do not fill out the budget section of this form since this competition is for samples only, not research funds.

- (2) The Research Project Description is limited to 6 pages and contains the following elements:
- Statement of the hypothesis, objective, and value of this research
 - Review of relevant research
 - Description of the diagnostic measurements that would be required to satisfy the scientific objectives
 - A clear and unambiguous justification of the need to use space-flown tissues

(3) References Cited

Provide a bibliographic list of scientific/technical references directly relevant to the project description.

<p style="text-align: center;">Forms A – C are available to download at: http://research.hq.nasa.gov/code_u/nra/current/AN-01-OBPR-04/index.html</p>

(4) Form A: Biographical Sketch

Complete a current *curriculum vita* for the Principal and Co-Investigators, listing education, publications, and other relevant information necessary to assess the experience and capabilities of the senior participants.

(5) Form B: Other Support

Include a summary of current and pending support for the Principal Investigator and Co-Investigators. Indicate existing funding that will be used to conduct the proposed research and document current NASA funding.

(6) Facilities and Equipment

Document that the facilities and equipment necessary to complete the proposed work are available.

(7) Form C: Proposal Checklist

Instructions for Electronic Submission of Proposal Cover Sheet

Obtain a SYS-EYFUS User ID and password by going to the SYS-EYFUS Web site (<http://proposals.hq.nasa.gov>) and performing the following steps:

- Click the hyperlink for **new user**, which will take you to the Personal Information Search Page.
- Enter your first and last name. SYS-EYFUS will **search** for your record information in the SYS-EYFUS database.
- If **new**, enter the information requested and submit
- Confirm your personal information by **choosing** the record displayed.
- Select **continue** and a User ID and password will be emailed to you.

Once you receive your User ID and Password, **login** to the SYS-EYFUS Web site and follow the instructions for a **New Proposal Cover Page**.

Note: All PIs and Co-investigators on the proposal must be entered into the system before completing the electronic cover page.

Fill out the form online and print out a copy for signatures. Use the signed copy as the cover page for the original proposal. Do not reformat this cover page after it is printed, as important NASA-required documentation may be lost.

Investigators without access to the Web or who experience difficulty in using this site may contact the Help Desk at proposals@hq.nasa.gov or (202) 479-9376 for assistance. Please note that submission of the electronic cover page does not satisfy the deadline for proposal submission.