Core Equipment ID: MSU ID 018628, Serial # Cy29300507

Description: Thermo Fisher Shandon Cytospin

Room: B446 (Molecular & Biochemical Core)

Champion: Erika Boerman

1.0 Purpose
Standardize the process for control, maintenance, ownership and quality assurance within the core facilities and highlight and explain the capabilities and use of the SOP instrument / process.

1.1 Equipment / Process Capabilities
The Thermo Shandon Cytospin 4 is a self-contained cytocentrifuge whose primary function is to produce a monolayer of cells on to a glass slide from any fluid suspension.

2.0 Reason for Issue
Maintain a document that describes the Standard Operating Procedures that allows for the standard safe and maximal use of the Cytospin equipment or process within the Pharmacology and Toxicology Core Facilities. Provide All Users with the known capabilities of the instrument or process. Enable Users with instrument or procedural insight that may positively impact User research.

3.0 Process Description
Allows Core Facility Users within the Pharmacology and Toxicology Department to properly and effectively use the Cytospin equipment. All users should adhere to the standard SOP protocol.

3.1 Responsibilities:

a. New Users: New users should read the Cytospin SOP then request an initial training session from Brian Jespersen (jespers1@msu.edu). This session should take no more than 15 minutes but is mandatory for equipment use.

b. All Users: All users must adhere to the guidelines listed in the Cytospin SOP
3.2 Equipment Safety Issues

a. Contamination - There are currently no contamination issues with the Cytospin.

If BSL2 cells, radioactive samples, samples with recombinant DNA, or any other samples that require special handling and/or disposal are to be used in the Cytospin, prior authorization MUST be obtained prior to use to ensure the safety and cleanliness of the Cytospin for all users. Contact Brian Jespersen (jespers1@msu.edu) for further information on the use of hazardous samples in the Cytospin.

b. Safety Issues - There are no safety issues associated with the Cytospin when used properly.

3.3 Quality Measures – The Cytospin is under warranty with Thermo Fisher and has a service record containing information about all previous repairs on the equipment. If the Cytospin breaks, immediately notify Brian Jespersen so repairs can take place in a timely fashion. DO NOT attempt to repair the instrument yourself, as this can void the manufacturer’s warranty.

3.4 Procedure; Cytospin 4

a. Setup:

1. Sign up for the equipment in the schedule located next to the Cytospin in B446 Life Sciences prior to use
2. Bring all necessary materials to B446. This generally includes: cell suspension, glass slides, funnel and filter units, gloves, pipettes and pipette tips, and solution into which slides will be placed after spinning (saline, paraformaldehyde, etc.).

b. Procedural Steps

1. Turn on the Cytospin. The main power switch on the side of the instrument should be left on at all times. Turn the instrument on and off using the Power/Standby button on the main control panel of the instrument. The Cytospin will automatically show the settings of the previous user.
2. Set the Cytospin to the appropriate speed, time, and acceleration using the buttons on the main control panel.
   - If the same settings will be used regularly, the user may program the settings into the Cytospin. The cytospin has room for 23 programs so do not save programs into the cytospin if they will not be used on a regular basis. To save a program, simply input the appropriate settings, select a program number (or letter) and press SAVE PROGRAM. The light on the SAVE PROGRAM button will flash until the program has been saved. Note the number or letter or your saved program for future use. DO NOT save over existing programs.

3. Check that the funnel, slide, and filter card are locked firmly into place. An incomplete seal will lead to a loss of cells in the Cytospin.

4. Load the funnel/filter/slide units into the centrifuge head, making sure that the centrifuge is balanced if all slots are not used.

   NOTE: After this point, work quickly to prevent evaporation of fluid from cell suspension

5. Pipette the appropriate amount of cell suspension (100 – 500 µl) into each funnel.

6. Place the plastic lid over the centrifuge, and press down the center button to form a seal. Close the outer lid, and press START. Once the program is started, the lid locks into place for the duration of the program unless the STOP button is pressed to stop the run prematurely.

7. When the program is done, the Cytospin will play a sound and unlock the lid. QUICKLY remove and disassemble each funnel/filter/slide unit, placing the slide into the appropriate solution to prevent drying of the cell monolayer.

c. Clean Up:

1. Record your use of the Cytospin in the binder. This includes your name, date and time of use, lab address and phone number, and program used. If programmed setting were not used, write “custom” in the program column.

2. Throw away all pipette tips, gloves and other disposable items used in B446.
3. Bring all materials back to your lab. Materials used for the Cytospin are NOT to be stored in B446.

3.5 **Core Materials**– None of the accessories used in the Cytospin are provided by Core Facilities.

3.6 **User Materials** – The Cytospin requires specific accessories for use that are not provided by Core Facilities. These include the funnels, filter cards, slides, and slide holders. There are multiple equipment options available from Thermo Fisher depending on the specific objectives of the user. For information about ordering supplies for the Cytospin, contact Erika Boerman ([boermane@msu.edu](mailto:boermane@msu.edu)) or Erica Lange ([elange@msu.edu](mailto:elange@msu.edu)), B420 Life Sciences, 353-9727.

3.7 a. **Records of Use** – The sign-up schedule and usage record binder are both kept in B446 Life Sciences near the Cytospin.

b. **Error Messages / System Issues** – There are six error messages that can occur when using the Cytospin:

<table>
<thead>
<tr>
<th>Error code</th>
<th>Cause</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Err 01</td>
<td>Lid error- the lid switch has not operated correctly</td>
<td>Press STOP, then open and close lid</td>
</tr>
<tr>
<td>Err 02</td>
<td>Speed error- Cytospin cannot reach or maintain desired RPM</td>
<td>Press STOP, then open and close lid. Make sure cytospin head turns freely</td>
</tr>
<tr>
<td>Err 03</td>
<td>Out of Balance Error</td>
<td>Evenly distribute samples in the cytospin</td>
</tr>
<tr>
<td>Err 04</td>
<td>Battery discharge or memory error has caused system to reset</td>
<td>Press STOP, then open and close lid. Leave instrument on 24 hours</td>
</tr>
<tr>
<td>Err 05</td>
<td>Lid unlocked during run</td>
<td>Press STOP, then open and close lid</td>
</tr>
<tr>
<td>Err 06</td>
<td>Lid was not opened and closed when power switched on</td>
<td>Press STOP, then open and close lid</td>
</tr>
</tbody>
</table>
If these basic remedies do not fix the problem, do not take further action. Contact Brian Jespersen (jespers1@msu.edu) for service of the instrument.

3.8 **Resource Index** – The Shandon Cytospin 4 Operator Guide offers some suggestions for use and troubleshooting of the Cytospin for specific applications. For assistance in choosing Cytospin accessories and selecting the program settings for the Cytospin, either contact Thermo Fisher (1-866-984-3766) or users within the department (Erika Boerman (boermane@msu.edu) or Erica Lange (elange@msu.edu), B420 Life Sciences, 353-9727).

### 4.0 Competences, Authorization and Training

5.0 New Users: New users should read the Cytospin SOP then request an initial training session from Brian Jespersen (jespers1@msu.edu). This session should take no more than 15 minutes but is mandatory for equipment use.

### 6.0 SOP Performance and Equipment Review

The SOP for the Cytospin will be updated annually or anytime when a user requests use of the equipment for possible hazardous materials such as BSL2 cells, radioactivity, or recombinant DNA. Any procedural issues should be reported to Brian Jespersen (jespers1@msu.edu). Any SOP reauthorizations or updates are catalogued in the sub points below. Include the listed information.

6.1 Update Date: 03/13/2009
Reason for SOP Change: New SOP
New Version #: 

6.2 Update Date
Reason for SOP Change
New Version #: 

### 7.0 Definitions

Any standard defined term specifically used in the Pharmacology and Toxicology Core Facilities’ SOP. These are terms that carry a unique Core Facility definition that is pertinent to proper SOP understanding and implementation. A list of terms and definitions is maintained to allow Users a quick and efficient reference. Listed below are common Pharmacology and Toxicology Core Facility terms. New common terms are to be approved and added, with definition, to the term reference guide.

a. **SOP** Standard Operating Procedure, which is a standard guide that officially standardizes the process of control, maintenance and ownership, that performs the said task of Cytospin use.
b. **Originator / Author** The individual representing the Pharmacology and Toxicology Core Facilities that created SOP: **Erika Boerman** (boermane@msu.edu)

c. **Stakeholder** Any individual that uses or performs the task of which is the subject of the SOP, including the Pharmacology and Toxicology Core Facilities Department.

d. **New User** An individual who has not completed the requirements of section 4.0.

e. **Approved User** An individual who uses or performs the task of which is the subject of the SOP and has fulfilled section 4.0. This title may only be given by the Equipment Champion and/or the Pharmacology and Toxicology Core Facilities Manager.

f. **Champion** An individual who’s direct expertise with the Thermo Fisher Shandon Cytospin 4 instrument or task, of which is the subject of the SOP and has been recognized by the Pharmacology and Toxicology Core Facilities Committee. The Pharmacology and Toxicology Core Facility Committee may only award the champion title.

### 8.0 Appendix
The below signatures and dates are required for full SOP approval and implementation.

This SOP was written by: Erika Boerman ________________________

This SOP was reviewed by: Dr. Stephanie Watts ____________________

This SOP was authorized by: Dr. J.R. Haywood _____________________

Issue Date: ____________________________