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Scriptwriter Name: Sri Lakshmi Priya

Project Page Link: <https://review.jove.com/account/file-uploader?src=21981398>

Title: A Mouse Model of Endometriosis Using *Ex Vivo* Cy5.5 Dye-Doped Silica Nanoparticle Labeling for Lesion Visualization

Authors and Affiliations:

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Author Questionnaire

1. Microscopy: Does your protocol require the use of a dissecting or stereomicroscope for performing a complex dissection, microinjection technique, or something similar? **YES**

If **Yes**, can you record movies/images using your own microscope camera?

No, but yes through software. Cy5.5 fluorescence cannot be observed with the naked eye.

If your protocol involves microscopy but you are not able to record movies/images with your microscope camera, JoVE will need to use our scope kit.

If your microscope does not have a camera port, the scope kit will be attached to one of the eyepieces and **you will have to perform the procedure using one eye.**

LEICA M205 FCA

If a dissection or stereo microscope is required for your protocol, please list all shots from the script that will be visualized using the microscope (shots are indicated with the 3-digit numbers, like 2.1.1, 2.1.2, etc.).

Scope shot: 4.9.1

Videographer: Please film the above-mentioned scope shot using a scope kit.

2. Software: Does the part of your protocol being filmed include step-by-step descriptions of software usage? **Yes**

Videographer: Please film the shot labeled as SCREEN.

3. Filming location: Will the filming need to take place in multiple locations? **No**

4. Testimonials (optional): Would you be open to filming two short testimonial statements **live during your JoVE shoot**? These will **not appear in your JoVE video** but may be used in JoVE's promotional materials. **YES**

If **Yes**, please provide the **full name and position** (e.g., Director of [Institute Name], Senior Researcher [University Name], etc.) of the author willing to participate.

Harriet Omenge, Graduate student

Current Protocol Length

Number of Steps: 25

Number of Shots: 44

Interviews

Videographer: Obtain headshots for all authors available at the filming location.

Authors: Answers are slightly edited in accordance with journal guidelines. Please note that **the questions will not appear on screen**. Please answer in **stand-alone full sentence with sufficient context**

INTRODUCTION:

~~REQUIRED:~~ Summarize your research focus and the main questions it aims to answer.

- 1.1. **Harriet Omenge:** Our research focuses on developing a reproducible method for lesion visualization and tracking to facilitate the study of endometriosis.
 - 1.1.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

~~Describe the research contexts or systems in which this protocol can be applied.~~

- 1.2. **Harriet Omenge:** This protocol can be applied for ex vivo labeling to visualize pathological tissue.
 - 1.2.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

CONCLUSION:

~~What does this protocol allow researchers to study or measure?~~

- 1.3. **Harriet Omenge:** This protocol allows researchers to study the development of endometriotic lesions in different locations.
 - 1.3.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

~~Describe the most important consideration or challenge when performing this protocol.~~

- 1.4. **Harriet Omenge:** The most important consideration when performing this protocol is correctly synthesizing the nanoparticle.
 - 1.4.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

~~How can future studies build on this work? Describe the questions or research directions that can be investigated next.~~

1.5. **Harriet Omenge:** Future studies building on this work can add therapeutic targets to the nanoparticle to reduce or completely eradicate endometriotic lesions.

1.5.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

Videographer: Obtain headshots for all authors available at the filming location.

Testimonial Questions (OPTIONAL):

Videographer: Please capture all testimonial shots in a wide-angle format with sufficient headspace, as the final videos will be rendered in a 1:1 aspect ratio. Testimonial statements will be presented live by the authors, sharing their spontaneous perspectives.

- Testimonial statements will **not appear in the video** but may be featured in the journal's promotional materials.
- **Provide the full name and position** (e.g., Director of [Institute Name], Senior Researcher [University Name], etc.) of the author delivering the testimonial.
- Please **answer the testimonial question live during the shoot**, speaking naturally and in your own words in **complete sentences**.

What value do you expect this video article to have for other researchers working in your field?

- 1.6. **Harriet Omenge, Graduate student**: (authors will present their testimonial statements live)
 - 1.6.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

How does the video format of your article help you to share your work with the broader scientific community?

- 1.7. **Harriet Omenge, Graduate student**: (authors will present their testimonial statements live)
 - 1.7.1. INTERVIEW: Named Talent says the statement above in an interview-style shot, looking slightly off-camera.

Ethics Title Card

This research has been approved by the Institutional Animal Care and Use Committee (IACUC) at the University of Missouri

Protocol

Videographer: Please always record an audio slate while filming each shot mentioned in the shotlist.

Videographer's NOTE: Audio slate was used for some shots since they were close up and there wasn't room for hard slate.

2. Synthesis of Cy5.5 Dye-Doped Silica Nanoparticles

Demonstrator: Harriet Omenge

2.1. To begin, dissolve 1 milligram of Cyanine 5.5, or Cy5.5-NHS (*C-Y-five-point-five-N-H-S*), ester in 100 microliters of DMSO in a clear 11.1 milliliter glass threaded vial [1]. Immediately cover the vial with aluminum foil to protect the solution from light [2].

2.1.1. WIDE: Talent adding Cyanine 5.5-NHS ester in a clear 11.1 milliliter glass threaded vial containing dimethyl sulfoxide.

2.1.2. Talent covering the glass threaded vial with aluminum foil.

2.2. Add 1 microliter of 3-aminopropyltriethoxysilane, or APTES (*Ap-tes*), to the dye solution [1].

2.2.1. Talent adding APTES to the dye solution.

2.3. Then, add 0.5 microliter of triethylamine, or TEA (*T-E-A*), to the solution [1]. Mix immediately and place the reaction solution on a stirring setup at 300 rpm in the dark for 24 hours to allow covalent coupling between Cy5.5 and APTES at 30 degrees Celsius [2]. **NOTE:** Authors confirmed the VO for step 2.3

2.3.1. Talent adding 0.5 microliter of TEA to the solution.

2.3.2. Talent mixing the reaction mixture immediately.

Author's NOTE: We skipped 2.4 and 2.5, move the VO to the previous shot

~~2.4. Stir the reaction mixture at 300 rpm at 30 degrees Celsius in the dark for 24 hours to allow covalent coupling between Cy5.5 and APTES [1].~~

~~2.4.1. Talent placing the vial containing the reaction mixture into the stirring setup.~~

~~2.5. Seal the vial with its cap [1]. Wrap the vial with aluminum foil to continue protecting it from light [2].~~

~~2.5.1. Talent sealing the glass threaded vial with its cap.~~

~~2.5.2. Talent wrapping the sealed vial with aluminum foil.~~

Videographer's NOTE: 2.4.1., 2.5.1., and 2.5.2.-skipped at author's request. They were completed in step 2.3.2.

- 2.6. Add 1 microliter of concentrated ammonia solution to a new clear glass threaded vial [1].
 - 2.6.1. Talent adding concentrated ammonia solution to a new, clear glass, threaded vial.
- 2.7. Next, add 8.5 milliliters of absolute ethanol to the vial [1].
 - 2.7.1. Talent adding absolute ethanol to the glass-threaded vial.
- 2.8. Add 350 microliters of tetraethyl orthosilicate or TEOS (*T-E-O-S*) [1] and 15 microliters of the previously prepared Cy5.5-APTES solution to the reaction mixture [2].
 - 2.8.1. Talent adding TEOS to the reaction mixture.
 - 2.8.2. Talent adding Cyanine 5.5-APTES solution to the reaction mixture.
- 2.9. Stir the reaction mixture at 500 rpm at room temperature in the dark for 24 hours to enable covalent incorporation of the dye into the silica matrix [1].
 - 2.9.1. Talent placing the wrapped vial containing the reaction mixture into the stirring setup.

3. Purification and Characterization of Cy5.5 Dye-Doped Silica Nanoparticles

- 3.1. Transfer the entire reaction mixture into a 15-milliliter centrifuge tube [1].
 - 3.1.1. Talent transferring the entire reaction mixture into a 15-milliliter centrifuge tube.
- 3.2. Prepare a balance tube containing an equal volume of distilled water for centrifugation [1].
 - 3.2.1. Talent preparing a balance tube containing an equal volume of distilled water.
- 3.3. Centrifuge both tubes at 12,074 *g* for 10 minutes at 4 degrees Celsius [1]. Confirm that a visible pellet has formed at the bottom of the tube after centrifugation [2].
 - 3.3.1. Talent placing both tubes into the centrifuge.
 - 3.3.2. Shot of a visible pellet formed at the bottom of the centrifuge tube.
- 3.4. Wash the pellet with 10 milliliters of 95 percent ethanol and sonicate for 3 to 5 minutes [1]. Centrifuge at 12,074 *g* for 10 minutes at 4 degrees Celsius [2]. Repeat this wash 3 times, resuspending the pellet by sonication between washes, or until fully dispersed [3].
 - 3.4.1. Talent adding ethanol to the pellet. **Author's NOTE:** Show adding ethanol and resuspending and sonicating. Add this to VO of 3.4.1. Use the footage from 3.4.3

for 3.4.1

3.4.2. Talent placing the tube containing the pellet and 95 percent ethanol into the centrifuge.

3.4.3. Talent resuspending the pellet by sonication between washes until fully dispersed.

3.5. Wash the pellet with 5 milliliters of distilled water [1] by centrifuging at 12,074 g for 10 minutes at 4 degrees Celsius [2]. Repeat this wash 2 times, resuspending the pellet by sonication for approximately 3 to 5 minutes between washes, or until fully dispersed [3]. Confirm that the particle suspension appears visibly blue after complete dispersion [4].

3.5.1. Talent adding distilled water to the pellet.

Author's NOTE: 3.5.2 and 3.5.3 skipped as 3.4.2 and 3.4.3 can be used in their places

~~3.5.2. Talent placing the tube containing the pellet and distilled water into the centrifuge.~~

~~3.5.3. Talent resuspending the pellet by sonication between washes until fully dispersed.~~ **Videographer's NOTE:** 3.5.3.-skipped at author's request. Use scene 3.4.3. here

3.5.4. Shot of the completely dispersed particle suspension appearing visibly blue.

Author's NOTE: 3.5.4-(3.6.1,3.6.2,3.6.3) combined

Videographer's NOTE: Combined 3.5.4., 3.6.1., 3.6.2., and 3.6.3. at author's request. Listen to audio notes

3.6. Transfer the suspension to a glass vial [1]. Wrap the vial with aluminum foil to protect it from light [2]. Store the vial at room temperature [3].

3.6.1. Talent transferring the particle suspension to a glass vial.

3.6.2. Talent wrapping the glass vial with aluminum foil.

3.6.3. Talent placing the wrapped vial in room temperature storage.

3.7. Assess particle dispersion and fluorescence using an in vivo imaging system or IVIS (Eye-VIS) [1]. Use an excitation wavelength of 680 nanometers and an emission wavelength of 710 nanometers for Cy5.5 [2].

3.7.1. Talent placing the sample into the in vivo imaging system for particle dispersion and fluorescence assessment.

3.7.2. SCREEN: Show the in vivo imaging system settings with the excitation wavelength set to 680 nanometers and the emission wavelength set to 710 nanometers for Cyanine 5.5.

Videographer: Film the shot labelled as SCREEN.

4. Endometriosis induction

- 4.1. Inject an 8-week-old female donor mouse subcutaneously with estradiol or E2 (*E-two*) once daily in the morning for 3 consecutive days for hormonal synchronization [1-TXT].
 - 4.1.1. Talent administering a subcutaneous injection of estradiol to an 8-week-old female donor mouse. **TXT: Mouse Strain: C57Bl6J X129Sv**
- 4.2. After 6 hours of administering the final E2 injection and euthanizing the donor mouse, make a 0.5-centimeter midline abdominal incision [1] and remove the uterus [2].
 - 4.2.1. Talent making an incision in the abdominal midline. **TXT: Euthanasia: Cervical Dislocation**
 - 4.2.2. Talent removing the uterus from the donor mouse.
- 4.3. Using a scalpel, mince the uterine tissue into approximately 1 cubic millimeter fragments in a Petri dish [1].
 - 4.3.1. Talent mincing the uterine tissue into approximately 1 cubic millimeter fragments in a Petri dish using a scalpel.
- 4.4. Incubate the uterine tissue fragments with 20 percent volume per volume Cy5.5 dye-doped silica nanoparticles in a 24-well plate containing complete RPMI-1640 medium [1] for 3 hours at 37 degrees Celsius in 5 percent carbon dioxide [2].
 - 4.4.1. Talent placing the uterine tissue fragments in a 24-well plate containing complete RPMI-1640 medium and Cyanine 5.5 dye-doped silica nanoparticles
 - 4.4.2. Talent placing the 24-well plate into the incubator.
- 4.5. Wash the ex vivo-labeled uterine tissue fragments with room-temperature culture medium [1] by centrifuging at 380 g for 2 minutes and repeat the wash 3 times [2].
 - 4.5.1. Talent adding culture medium to the ex vivo-labeled uterine tissue fragments
 - 4.5.2. Talent placing the tube into the centrifuge.
- 4.6. Anesthetize the recipient mouse of the same strain with 3 percent isoflurane in oxygen [1].
 - 4.6.1. Talent administering 3 percent isoflurane in oxygen to the recipient mouse.
- 4.7. Make a 1-centimeter midline abdominal incision in the recipient mouse [1]. Suspend 45 milligrams of Cy5.5-labeled tissue fragments in 500 microliters of PBS [2]. Using a 20-gauge needle, inject the suspension into the peritoneal cavity [3].
 - 4.7.1. Talent making a 1-centimeter midline abdominal incision in the anesthetized recipient mouse.

- 4.7.2. Talent suspending the Cyanine 5.5-labeled tissue fragments in phosphate-buffered saline. **Author's NOTE: Combined 4.7.3 into 4.7.2**
- 4.7.3. Talent injecting the tissue suspension into the peritoneal cavity using a 20-gauge needle.
- 4.8. Close the peritoneum with absorbable suture [1] and the skin with wound clips [2]. Place the mouse in a warm environment and monitor it until recovery from anesthesia [3].
 - 4.8.1. Talent closing the peritoneum with absorbable suture.
 - 4.8.2. Talent closing the skin with wound clips.
 - 4.8.3. Talent placing the mouse in a warm environment.
- 4.9. After euthanizing the mouse at the selected experimental endpoint, collect the endometriotic lesions [1-TXT].
 - 4.9.1. SCOPE: ~~Talent collecting the endometriotic lesions.~~ **TXT: Euthanasia: Cervical Dislocation** **Author's NOTE: Please use lab media 5.12.1 Figure 4D**
Videographer: Please film the scope shot using a scope kit.

Results

5. Results

- 5.1. Transmission electron microscopy revealed uniform spherical nanoparticles with diameters of approximately 156.67 nanometres [1].
 - 5.1.1. LAB MEDIA: Figure 1A. *Video editor: Highlight the dark, round nanoparticles in the transmission electron microscopy image and the 100-nanometer scale bar.*
- 5.2. Dynamic light scattering showed that the silica nanoparticles, or SiNPs (*sigh-N-Ps*), and Cy5.5-SiNPs were colloidally stable, with hydrodynamic diameters of approximately 130.67 nanometres [1] and 185.9 nanometres [2].
 - 5.2.1. LAB MEDIA: Figure 1B. *Video editor: Highlight the black curve labelled "SiNPs".*
 - 5.2.2. LAB MEDIA: Figure 1B. *Video editor: Highlight the red curve labelled "Cy5.5-SiNPs".*
- 5.3. The zeta potential of bare SiNPs was approximately minus 32.39 millivolts [1], and the zeta potential of Cy5.5-SiNPs was approximately minus 50.53 millivolts [2].

- 5.3.1. LAB MEDIA: Figure 1C. *Video editor: Highlight the black bar labelled "SiNPs".*
- 5.3.2. LAB MEDIA: Figure 1C. *Video editor: Highlight the red bar labelled "Cy5.5-SiNPs".*
- 5.4. Photoluminescence spectroscopy confirmed the successful incorporation of Cy5.5 into the silica nanoparticles, and the Cy5.5-SiNPs exhibited characteristic fluorescence [1].
 - 5.4.1. LAB MEDIA: Figure 1D. *Video editor: Highlight the solid and dashed curves and the inset image showing the bright red fluorescent sample.*
- 5.5. No cytotoxicity was observed at Cy5.5-SiNP concentrations up to 10 micrograms per milliliter [1].
 - 5.5.1. LAB MEDIA: Figure 1E. *Video editor: Highlight the bars for 0, 0.5, 1.0, 2.5, 5.0, and 10.0 micrograms per milliliter, and the "NS" label above the graph.*
- 5.6. Cells incubated with 5 micrograms per milliliter Cy5.5-SiNPs exhibited efficient nanoparticle uptake, with fluorescence detected in the perinuclear region [1].
 - 5.6.1. LAB MEDIA: Figure 1F. *Video editor: Highlight the red fluorescence surrounding the blue cell nuclei in the image labeled "Cy5.5-SiNPs".*
- 5.7. Cy5.5-SiNPs showed aqueous stability, with hydrodynamic diameters of 170 to 190 nanometres [1] and stable fluorescence for 7 days [2].
 - 5.7.1. LAB MEDIA: Figure 1G. *Video editor: Highlight the red line labelled NS.*
 - 5.7.2. LAB MEDIA: Figure 1H. *Video editor: Highlight the black line showing fluorescence intensity across Days 1 to 7 and the inset images labelled "Day 1", "Day 3", and "Day 6".*
- 5.8. IVIS imaging showed strong fluorescence from the nanoparticle suspensions [1], while the negative control showed no detectable fluorescence [2].
 - 5.8.1. LAB MEDIA: Figure 2B. *Video editor: Circle and highlight the well labelled "NPs" showing the bright yellow and red fluorescent signal.*
 - 5.8.2. LAB MEDIA: Figure 2B. *Video editor: Circle and highlight the well labelled "H₂O" showing no detectable fluorescent signal.*
- 5.9. Strong and consistent fluorescence signals were detected in uterine tissue fragments labeled with Cy5.5 dye-doped SiNPs [1].
 - 5.9.1. LAB MEDIA: Figure 3. *Video editor: Highlight the tissue fragments in the panel labelled "CY5.5 IVIS spectrum" showing the bright yellow and red fluorescent signal.*
- 5.10. Endometriotic lesions were readily identified within the peritoneal cavity [1].
 - 5.10.1. LAB MEDIA: Figure 4B. *Video editor: Highlight the yellow-circled fluorescent lesion within the abdominal cavity.*
- 5.11. Cy5.5-positive lesions were clearly distinguished from the surrounding host tissues by

IVIS imaging [1] and fluorescence microscopy [2].

5.11.1. LAB MEDIA: Figure 4A. *Video editor: Highlight the bright yellow and red fluorescent signal at the lesion site inside the yellow circle.*

5.11.2. LAB MEDIA: Figure 4C. *Video editor: Highlight the bright yellow fluorescent regions against the blue tissue background.*

5.12. Ex vivo labeling with Cy5.5 dye-doped SiNPs enabled reliable visualization of endometriotic lesions in vivo [1].

5.12.1. LAB MEDIA: Figure 4D. *Video editor: Highlight the black arrows indicating the endometriotic lesion.*

1. Cyanine
Pronunciation link: <https://www.merriam-webster.com/dictionary/cyanine>
IPA: /'saɪ.ə.niːn/, /'saɪ.ə.nən/
Phonetic Spelling: sigh·uh·neen, sigh·uh·nuhn
2. Dimethyl sulfoxide
Pronunciation link: <https://www.merriam-webster.com/dictionary/dimethyl%20sulfoxide>
IPA: /daɪ'mɛθəl səl'fɑːksaɪd/
Phonetic Spelling: dye·meth·uhl sul·fok·side
3. 3-Aminopropyltriethoxysilane
Pronunciation link: No confirmed link found
IPA: /,ɛɪ.miːnoʊ'proʊpəl traɪ,ɛθəksi'seɪn/
Phonetic Spelling: ay·mee·noh·proh·puhl·try·eth·ok·see·sayn
4. Triethylamine
Pronunciation link: <https://www.merriam-webster.com/medical/triethylamine>
IPA: /,traɪ,ɛθəl.ə'miːn/, /,traɪ,ɛθəl'æm,iːn/
Phonetic Spelling: try·eth·uhl·uh·meen, try·eth·uhl·am·een
5. Covalent
Pronunciation link: <https://www.merriam-webster.com/dictionary/covalent>
IPA: /,koʊ'veɪlənt/, /'koʊ,veɪlənt/
Phonetic Spelling: koh·vay·luhnt, koh·vay·luhnt
6. Tetraethyl orthosilicate
Pronunciation link: <https://www.merriam-webster.com/dictionary/ethyl%20silicate>
IPA: /,tɛtrə'ɛθəl ,ɔrθoʊ'sɪlɪkət/
Phonetic Spelling: tet·ruh·eth·uhl or·thoh·sil·ih·kuht
7. Nanoparticles
Pronunciation link: <https://www.merriam-webster.com/dictionary/nanoparticle>
IPA: /'nænə,partɪkəlz/, /'nænoʊ,partɪkəlz/
Phonetic Spelling: nan·uh·par·tih·kuhlz, nan·oh·par·tih·kuhlz

8. Centrifuge
Pronunciation link: <https://www.merriam-webster.com/dictionary/centrifuge>
IPA: /ˈsentrəˌfjuːdʒ/
Phonetic Spelling: sen·truh·fyooj
9. Sonication
Pronunciation link: <https://www.merriam-webster.com/dictionary/sonication>
IPA: /ˌsənəˈkeɪʃən/
Phonetic Spelling: sah·nuh·kay·shuhn
10. Fluorescence
Pronunciation link: <https://www.merriam-webster.com/dictionary/fluorescence>
IPA: /flʊˈresəns/, /flɒˈresəns/
Phonetic Spelling: floo·res·uhns, flaw·res·uhns
11. Estradiol
Pronunciation link: <https://www.merriam-webster.com/dictionary/estradiol>
IPA: /ˌɛstrəˈdaɪəl/, /ˌɛstrəˈdaɪoʊl/
Phonetic Spelling: es·truh·dye·awl, es·truh·dye·ohl
12. Subcutaneously
Pronunciation link: <https://www.merriam-webster.com/dictionary/subcutaneously>
IPA: /ˌsʌb.kjuˈteɪ.ni.əs.li/
Phonetic Spelling: sub·kyoo·tay·nee·uhs·lee
13. Endometriosis
Pronunciation link: <https://www.merriam-webster.com/dictionary/endometriosis>
IPA: /ˌendʊˈmiːtriˈoʊsɪs/
Phonetic Spelling: en·doh·mee·tree·oh·suhs
14. Uterine
Pronunciation link: <https://www.merriam-webster.com/dictionary/uterine>
IPA: /ˈjuːtəˌraɪn/, /ˈjuːtərən/
Phonetic Spelling: yoo·tuh·rine, yoo·tuh·ruhn
15. Isoflurane
Pronunciation link: No confirmed link found
IPA: /ˌaɪsoʊˈflorem/
Phonetic Spelling: eye·soh·floor·ayn
16. Anesthetize
Pronunciation link: <https://www.merriam-webster.com/dictionary/anesthetize>
IPA: /əˈnɛθəˌtaɪz/
Phonetic Spelling: uh·nes·thuh·tize
17. Peritoneal
Pronunciation link: <https://www.merriam-webster.com/medical/peritoneal>
IPA: /ˌpɛrətəˈniːəl/
Phonetic Spelling: peh·ruh·tuh·nee·uhl
18. Peritoneum
Pronunciation link: <https://www.merriam-webster.com/dictionary/peritoneal>
IPA: /ˌpɛrətəˈniːəm/
Phonetic Spelling: peh·ruh·tuh·nee·uhm

19. Endometriotic
Pronunciation link: <https://www.merriam-webster.com/dictionary/endometriosis>
IPA: /ˌendʊˈmiːtriˈætɪk/
Phonetic Spelling: en·doh·mee·tree·ah·tik
20. Transmission electron microscopy
Pronunciation link: <https://www.merriam-webster.com/dictionary/microscopy>
IPA: /trænzˈmɪʃən ɪˈlektɹən maɪˈkraskəpi/
Phonetic Spelling: tranz·mish·uhn ih·lek·tron my·krah·skuh·pee
21. Hydrodynamic
Pronunciation link: <https://www.merriam-webster.com/dictionary/hydrodynamic>
IPA: /ˌhaɪdɹoʊˈdaɪˌnæmɪk/
Phonetic Spelling: hy·droh·dye·nam·ik
22. Colloidally
Pronunciation link: <https://www.merriam-webster.com/dictionary/colloidal>
IPA: /kəˈlɔɪdəli/
Phonetic Spelling: kuh·loy·duh·lee
23. Photoluminescence
Pronunciation link: <https://www.merriam-webster.com/medical/photoluminescence>
IPA: /ˌfoʊtəʊˈluːməˈnesəns/
Phonetic Spelling: foh·toh·loo·muh·nes·uhns
24. Spectroscopy
Pronunciation link: <https://www.merriam-webster.com/dictionary/spectroscopy>
IPA: /spekˈtraskəpi/
Phonetic Spelling: spek·trah·skuh·pee
25. Cytotoxicity
Pronunciation link: <https://www.merriam-webster.com/dictionary/cytotoxicity>
IPA: /ˌsaɪtəˈtɒkˈsɪsəti/
Phonetic Spelling: sigh·tuh·tok·sis·uh·tee
26. Perinuclear
Pronunciation link: <https://www.merriam-webster.com/medical/perinuclear>
IPA: /ˌpɛrɪˈnuːkliər/, /ˌpɛrɪˈnjuːkliər/
Phonetic Spelling: peh·rih·noo·klee·ur, peh·rih·nyoo·klee·ur
27. Microscopy
Pronunciation link: <https://www.merriam-webster.com/dictionary/microscopy>
IPA: /maɪˈkraskəpi/
Phonetic Spelling: my·krah·skuh·pee