

committees, which evaluate research proposals that include use of vertebrates. Permission to take small quantities of blood, urine, feathers, feces or fur from healthy animals is usually granted routinely, except in cases where investigators plan experiments that require animals to be housed on-site or that utilise protocols which can be expected to produce significant but unavoidable stress.

Besides specifying numbers to be sampled and times at which animals can be collected, regulatory agencies may dictate the preferred or permitted method of collecting for ethical reasons. In the case of passerine birds, the use of anesthesia for bleeding or even minor abdominal surgery, such as laparotomies, is not recommended [214]. The time permitted to hold animals for processing, while collecting bodily fluids and making morphological measurements, may be limited to one hour to minimise stress. Handling of birds, bats and animals with chemical defences requires special skills, hence close collaboration with a skilled field biologist, certified to handle such species, is advised in these cases. Further guidelines on methods of anesthesia are provided by Dessauer et al. [3, 4].

Research attitudes

A further ethical consideration when obtaining samples concerns the attitudes of researchers to regulations imposed by foreign countries. Many developing countries prohibit the export of any part (including isolated DNA and proteins or even PCR products that still contain some of the template DNA) of endangered or economically important species, which may encompass all biodiversity in some cases [205]. Although these regulations may be viewed as an obstacle to scientific progress and there may be technical ways of circumventing them (e. g., [215]), it is important to realise that such organisms are resources for the countries in question and should be respected as such [216].

Similarly, researchers and scientific administrators should become more aware of the ethical responsibility of providing credit to colleagues in developing countries for assistance rendered, which may include co-authorship of publications, acknowledgements and inclusion of foreign researchers on proposals to granting agencies [2, 97]. Many developing countries now encourage collaboration with local researchers for the promotion of permit applications [203]. For a primer on genetic resources policy, including discussions on national sovereignty, access to and ownership of intellectual property rights, and the “common heritage of mankind”, refer to Stenson and Gray [204] and Hoagland and Rossman [217].

Acknowledgements

We thank Elizabeth Bonwich, Darrel Frost, Gonzalo Giribet, Lisa Kronthal, Mark Siddall and Ward Wheeler for discussions on the above topics and assistance with the voluminous literature. During the writing of this paper, LP was supported by the Foundation for Research Development (Prestigious Scholarship), the American Museum of Natural History (Collection Study Grant) and the Skye Foundation and Charitable Trust.

Appendix

1 Molecular Biology Websites, Products and Services

- Molecular Biology Techniques Forum and Molecular Biology Resources, hosted by the Northwest Fisheries Science Center (NWFSC), National Marine Fisheries Service (NMFS), National Oceanographic and Atmospheric Administration (NOAA), US Department of Commerce, Seattle, WA, USA: <http://www.nwfsc.noaa.gov/protocols/methods/methods.html>; <http://www.nwfsc.noaa.gov/protocols/resources.html>
- Molecular Biology Databases on the Internet, hosted by the Weizmann Institute of Science, Rehovot, Israel: http://bioinfo.weizmann.ac.il/mb/db/species_specific_databases.html
- BioLinks, hosted by the Department of Molecular and Cell Biology (MCB), Harvard University, Cambridge, MA, USA: <http://mcb.harvard.edu/BioLinks.html>
- *Ancient DNA Newsletter*, The Zoological Society of London, Institute of Zoology, London, UK: <http://www.londonzoo.co.uk/ioz>
- *BioTechniques*, Eaton Publishing Co., Natick, MA, USA: <http://www.biotechniques.com>
- BioSupplyNet, Cold Spring Harbor Laboratory Press, Cold Spring Harbor, NY, USA: <http://www.biosupplynet.com/index.cfm>
- Perkin-Elmer, Inc., Wellesley, MA, USA: <http://www.perkinelmer.com>
- Kimberly-Clark Corporation, Dallas, TX, USA: <http://www.kimberly-clark.com>
- VWR Scientific Products, San Francisco, CA, USA: <http://vwrsp.com>
- Nalge-Nunc International Corporation, Rochester, NY, USA: <http://www.nalgenunc.com>
- Revco Technologies, Inc., Asheville, NC, USA: <http://www.revcotech.com>
- Taylor-Wharton International, Theodore, AL, USA: <http://www.taylor-wharton.com>
- For shipping products and services: Saf-T-Pak Inc., Edmonton, AB, Canada: <http://www.saftpak.com>

- To order sections E1342, E1564, E1565, E1566 of the *Annual Book of ASTM Standards* (Vol. 11.05), American Society for Testing and Materials (ASTM), West Conshohocken, PA, USA: E1342 (Practice for Preservation by Freezing, Freeze-Drying, and Low Temperature Maintenance of Bacteria, Fungi, Protista, Viruses, Genetic Elements, and Animal and Plant Tissues); E1564 (Guide for Design and Maintenance of Low-Temperature Storage Facilities for Maintaining Cryopreserved Biological Materials); E1565 (Guide for Inventory Control and Handling of Biological Material Maintained at Low Temperatures); E1566 (Guide for Handling Hazardous Biological Materials in Liquid Nitrogen): <http://www.astm.org>

2 Permits and Regulations

- The International Air Transport Association (IATA), Dangerous Goods Online: <http://www.iata.org/cargo/dg>
- To order IATA publications: *Dangerous Goods Regulations*: <http://www.iata.org/ads/dgr.htm>; *Live Animals Regulations*: <http://www.iata.org/ads/lar.htm>
- Import-export regulations for selected countries, hosted by the Biodiversity and Biological Collections Web Server: <gopher://biodiversity.bio.uno.edu/11/curation/permits>
- Treaty Database, American Society of International Law (ASIL), Wildlife Interest Group, Burlingame, CA, USA: <http://www.eelink.net/~asilwildlife/docs.html>
- *Journal of International Wildlife Law & Policy*, Kluwer Academic Publishers, Norwell, MA, USA: <http://www.jiwl.com>
- Permits for collecting and exporting samples from Australia: <http://pioneer.mov.vic.gov.au/chaec/open.html>
- Instituto Nacional de Biodiversidad (INBio), collecting permits for Costa Rica: <http://www.inbio.ac.cr/en/default.html>
- European Union environmental legislation: http://europa.eu.int/comm/environment/legis_en.htm
- Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (CONABIO), collecting permits for Mexico: <http://www.conabio.gob.mx>
- To obtain current listings of endangered and threatened species, and federal permits for the US: US Fish and Wildlife Service (FWS), International Affairs, Arlington, VA: <http://international.fws.gov>
- To find out about quarantine requirements in shipping to the US: US Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Hyattsville, MD: <http://www.aphis.usda.gov>; USDA APHIS import-export directory: <http://www.aphis.usda.gov/oa/imexdir.html>; USDA APHIS, Veterinary Services, National Center for Import and Export (NCIE): <http://www.aphis.usda.gov/ncie>; USDA, APHIS, Plant Protection and Quarantine (PPQ): <http://www.aphis.usda.gov/ppq>

- US Customs Service, Washington, DC, Importing and Exporting: <http://www.customs.gov/impoexpo/impoexpo.htm>
- To determine if the sample from a vertebrate is disease-free: National Wildlife Health Center, Madison, WI, USA: <http://www.nwhc.usgs.gov>
- To determine whether importation to the US requires special permits because of disease risks: Centers for Disease Control and Prevention (CDC), US Department of Health and Human Services, Atlanta, GA: <http://www.cdc.gov>
- Canadian Food Inspection Agency (CFIA), Nepean, ON, Canada: <http://www.cfia-acia.agr.ca>
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES): <http://www.unep.ch/cites>
- TRAFFIC, Cambridge, UK: <http://www.traffic.org>
- World Wildlife Fund (WWF), Washington, DC, USA: <http://www.worldwildlife.org>
- The World Conservation Union (IUCN), Gland, Switzerland: <http://www.iucn.org>
- To join the permits listserver: Email listserv@sivm.si.edu. No subject is required. In the body of the message, issue the command: Subscribe PERMIT-L Firstname Surname
- Examples of frozen tissue collections policy: <http://abscweb.wr.usgs.gov/research/ammtap/request.htm>; <http://www.uaf.edu/museum/af/using.html>; <http://www.washington.edu/burkemuseum/tissuepolicy.html>; <http://www.lms.si.edu/tissuepolicy.html>

3 Live Stock Centers and Seed Banks

- Database of Laboratory Animals in Japan, University of Tokushima, Tokushima, Japan: <http://www.anex.med.tokushima-u.ac.jp/index.html>
- *E. coli* Collection, National Institute of Genetics, Mishima, Japan: <http://shigen.lab.nig.ac.jp/ecoli/strain>
- *E. coli* Reference Collection (ECOR) and DEC *E. coli* Collection, Penn State University, University Park, PA, USA: <http://www.bio.psu.edu/People/Faculty/Whittam/Lab/ecor>; <http://www.bio.psu.edu/People/Faculty/Whittam/Lab/deca>
- *E. coli* Genetic Stock Center (CGSC), Yale University, New Haven, CT, USA: <http://cgsc.biology.yale.edu>
- *Salmonella* Genetic Stock Center (SGSC), University of Calgary, AB, Canada: <http://www.ucalgary.ca/~kesander>
- Soil Microbiology Division, International Rice Research Institute, Manila, Philippines: <http://www.irri.org>
- *Chlamydomonas* Genetics Center, Duke University, Durham, NC, USA: <http://www.biology.duke.edu/chlamy>

- *Pseudomonas* Genetics Stock Center (PGSC), University of East Carolina, Greenville, NC, USA: <http://www.pseudomonas.med.ecu.edu/Pseudomonas/index1.html>
- Microalgal Biotechnology Labs and Biomass Conversion/Organic Synthesis Labs, Center for Basic Sciences, National Renewable Energy Laboratory (NREL), Golden, CO, USA: http://www.nrel.gov/basic_sciences/biosci.html
- Fungal Genetics Stock Center (FGSC), University of Kansas Medical Center, Kansas City, KS, USA: <http://www.fgsc.net>
- US Department of Agriculture Agricultural Research Service (USDA-ARS), US Plant, Soil and Nutrition Laboratory, Ithaca, NY, USA: <http://www.arserrc.gov/naa/home/fedpsnl.htm>
- USDA Forest Service, Forest Products Laboratory (Center for Forest Mycology), Madison, WI, USA: <http://www.fpl.fs.fed.us>
- National Germplasm Resources Laboratory (NGRL), Beltsville, MD, USA, and National Germplasm Repositories of the USDA National Plant Germplasm System (NPGS): <http://www.barc.usda.gov/psi/ngrl/ngrl.html>; <http://www.ars-grin.gov/npgs/rephomepgs.html>; <http://www.ars-grin.gov/npgs/holdings.html>
- National Seed Storage Laboratory (NSSL), Fort Collins, CO, USA: <http://www.ars-grin.gov/ars/NoPlains/FtCollins>
- The *Arabidopsis* Information Resource (TAIR): <http://www.arabidopsis.org>
- SENDAI *Arabidopsis* Seed Stock Center (SASSC), Department of Biology, Miyagi University of Education, Miyagi, Japan: <http://shigen.lab.nig.ac.jp/arabidopsis>
- Nottingham *Arabidopsis* Stock Center (NASC), The University of Nottingham, Nottingham, UK: <http://nasc.nott.ac.uk/home.html>
- *Arabidopsis* Information Management System (AIMS), *Arabidopsis* Biological Resource Center, Columbus, OH, USA: <http://aims.cse.msu.edu/aims>
- Barley Germplasm Database, National Institute of Genetics, Mishima, Japan: <http://www.shigen.nig.ac.jp/barley/Barley.html>
- Maize Genetics Cooperation Stock Center, University of Illinois at Urbana, Champaign, IL, USA: <http://w3.aces.uiuc.edu/maize-coop>
- Maize Germplasm Collection, North Central Regional Plant Introduction Station, Iowa State University, Ames, IA, USA: <http://w3.ag.uiuc.edu/maize-coop/ncrpis.html>
- Oryzabase, Rice Genetic Resources Center, National Institute of Genetics, Mishima, Japan: <http://shigen.lab.nig.ac.jp/rice/oryzabase>
- US Potato Gene Bank, Sturgeon Bay, WI, USA: <http://www.ars-grin.gov/ars/MidWest/NR6>
- Tomato Genetic Resources Center (TGRC), University of California, Davis, CA, USA: <http://tgrc.ucdavis.edu>
- US National Arboretum, Woody Landscape Plant Germplasm Repository, Glenn Dale, MD, USA: http://www.ars-grin.gov/cgi-bin/npgs/html/site_holding.pl?NA

- The Millenium Seed Bank Project, Science and Horticulture, Royal Botanic Gardens Kew, Richmond, UK: <http://www.rbgekew.org.uk/seedbank>
- *Index Seminum*: Seed Exchange (selected websites): <http://www.unimo.it/ortobot/seedexc/seedexc.htm>; <http://www.helsinki.fi/ml/botgard/indesem.html>; <http://www.toyen.uio.no/botanisk/bothage/catalog>
- American Fern Society (AFS) Spore Exchange, Hacienda Hts., CA, USA: <http://amerfernsoc.org/sporexyy.html>
- Nematode Collection, University of California, Davis, CA, USA: <http://ucdnema.ucdavis.edu/imagemap/nemmap/museum.htm>
- *Caenorhabditis* Genetics Center (CGC), University of Minnesota, St. Paul, MN, USA: <http://biosci.umn.edu/CGC/CGChomepage.htm>
- *Drosophila* Genetic Resources, National Institute of Genetics, Mishima, Japan: <http://www.shigen.nig.ac.jp/fly/nighayashi.html>
- *Drosophila* Stock Center, Facultad de Ciencias, Universidad Nacional Autónoma (UNAM), México: <http://hp.fciencias.unam.mx/Drosophila/LOSHTML/portada.html>
- The *Drosophila* Species Stock Center, Tucson, AZ, USA: <http://stockcenter.arl.arizona.edu>
- *Drosophila melanogaster* Stock Center, Indiana University, Bloomington, IN, USA: <http://flybase.bio.indiana.edu/stocks>
- Szeged *Drosophila melanogaster* P Insertion Mutant Stock Center, Department of Genetics, József Attila University, Szeged, Hungary: <http://gen.bio.u-szeged.hu/stock>
- Exelixis Inc., EP Flystation, San Francisco, CA, USA: <http://cdigraphics.com/flystation2>
- Mosquito Colonies, Department of Medical Entomology, South African Institute for Medical Research (SAIMR), Johannesburg, South Africa: <http://www.wits.ac.za/fac/med/entomology/resource.htm>
- Instituto Butantan, São Paulo, Brazil: <http://bernard.pitzer.edu/~lyamane/butantan.htm>
- *Tribolium* Stock Center, Kansas State University, Manhattan, KS, USA: <http://bru.usgmrl.ksu.edu/beeman%5Ctribolium>
- Zebrafish Information Network (ZFIN): <http://zfin.org>
- Zebrafish International Resource Center (ZFIN), University of Oregon, Eugene, OR, USA: http://zfin.org/zf_info/stckctr/stckctr.html
- The Indiana University Axolotl Colony, Indiana University, Bloomington, IN, USA: <http://www.indiana.edu/~axolotl>
- Jax® Mice, The Jackson Laboratory, Bay Harbor, ME, USA: <http://jaxmice.jax.org/index.shtml>
- Mutant Mouse Database, Oak Ridge National Laboratory, Oak Ridge, TN, USA: <http://lsd.ornl.gov/htmouse>
- *Peromyscus* Genetic Stock Center, University of South Carolina, Columbia, SC, USA: <http://stkctr.biol.sc.edu>

4 Cell Lines and Culture Collections

- Common Access to Biological Resources and Information (CABRI) Consortium: <http://www.cabri.org>
- Shared Information of Genetic Resources (SHIGEN), National Institute of Genetics, Mishima, Japan: <http://shigen.lab.nig.ac.jp>
- Genetic Resource Databank (GRD), National Institute of Genetics, Mishima, Japan: <http://www.shigen.nig.ac.jp/grd>
- Cell Line Database (CLDB) and Interlab Project, Genova, Italy: <http://www.biotech.ist.unige.it/interlab/cldb.html>
- Interlab Cell Line Collection (ICLC), Genova, Italy: <http://www.iclc.it>
- Coriell Cell Repositories, National Institute of General Medical Sciences (NIGMS), National Institutes of Health, Bethesda, MD, USA: <http://locus.umdnj.edu>
- The University of Michigan Breast Cell/Tissue Bank and Data Base, University of Michigan, Ann Arbor, MI, USA: <http://www.cancer.med.umich.edu/umbnkdb.html>
- Japanese Collection of Research Bioresources (JCRB) Cell Bank and Human Science Research Resources Bank (HSRRB), National Institute of Health Sciences (NIHS), Tokyo, Japan: <http://cellbank.nihs.go.jp>
- The National Laboratory for the Genetics of Israeli Populations (NLGIP), Tel Aviv University, Tel Aviv, Israel: <http://www.tau.ac.il/medicine/NLGIP/nlgip.htm>
- American Type Culture Collection (ATCC), Manassas, VA, USA: <http://www.atcc.org>
- European Collection of Cell Cultures (ECACC), Center for Applied Microbiology and Research (CAMR), Salisbury, UK: <http://www.biotech.ist.unige.it/cldb/descat5.html>
- World Federation for Culture Collections-Microbial Resources Centers (WFCC-MIRCEN), World Data Centre for Microorganisms (WDCM), Wako, Saitama, Japan: <http://wdcm.nig.ac.jp>
- Home Pages of Culture Collections in the World, hosted by WFCC-MIRCEN: <http://wdcm.nig.ac.jp/hpcc.html>
- Microbial Strain Data Network (MSDN), Sheffield, UK: <http://panizzi.shef.ac.uk/msdn>
- UK National Culture Collections (UKNCC): <http://www.ukncc.co.uk>
- US Federation for Culture Collections (USFCC): <http://methanogens.pdx.edu/usfcc>
- Deutsche Sammlung von Mikroorganismen und Zellkulturen GmbH (DSMZ), The German Collection of Microorganisms and Cell Cultures, Braunschweig, Germany: <http://www.dsmz.de/index.html>
- The German Collection of Human and Animal Cell Cultures, The German Collection of Microorganisms and Cell Cultures, Braunschweig, Germany: <http://www.biotech.ist.unige.it/cldb/coll121.html>

- The Netherlands Culture Collection of Bacteria (NCCB), formerly LMD and Phabagen, Utrecht University, Utrecht, The Netherlands: <http://www.cbs.knaw.nl/nccb/database.htm>
- The Culture Collection of Algae and Protozoa, Institute of Freshwater Ecology (IFE) Windermere Laboratory at Ambleside and Dunstaffnage Marine Laboratory (DML) at Oban, UK: <http://www.ife.ac.uk/ccap>
- The Culture Collection of Algae at The University of Texas Austin (UTEX), Austin, TX, USA: <http://www.bio.utexas.edu/research/utex>
- Culture Collection of Algae, Department of Cell Biology and Applied Botany, Philipps-Universität, Marburg, Germany: <http://staff-www.uni-marburg.de/~cellbio/welcomeframe.html>
- National Collection of Type Cultures and Pathogenic Fungi (NCTC), Public Health Laboratory Service (PHLS), UK: <http://www.phls.co.uk/services/nctc/index.htm>
- University of Alberta Microfungus Collection and Herbarium (UAMH), University of Alberta, Edmonton, AB, Canada: <http://www.devonian.ualberta.ca/uamh>
- Culture Collection of Microorganisms, Institute for Fermentation, Osaka (IFO), Japan: <http://wwwsoc.nacsis.ac.jp/ifo/microorg/microorg.htm>
- USDA Agricultural Research Service (ARS) Microbial Culture Collection (NRRL), Peoria, IL, USA: <http://nrnl.ncaur.usda.gov>
- Molecular Pathology Shared Resource, Cancer Center, University of California San Diego (UCSD), CA, USA: <http://cancer.ucsd.edu/molpath/examples.htm>
- Molecular Pathology Collection (frozen and archival human pancreatic ductal carcinomas, metastatic lesions, preneoplastic lesions, and tumor-derived cell lines), Allegheny University, Philadelphia, PA, USA: <http://www.mcphu.edu/research/rspt/resdb/frozenandarchival.html>
- The Cloning Vector Collection, National Institute of Genetics, Mishima, Japan: <http://www.shigen.nig.ac.jp/cvector/cvector.html>
- cDNA libraries available commercially: CLONTECH Laboratories, Inc., Palo Alto, CA, USA: <http://www.clontech.com/index.shtml>; OriGene Technologies, Inc., Rockville, MD, USA: <http://www.origene.com/cdnalib.htm>; Stratagene, La Jolla, CA, USA: <http://www.stratagene.com/home.htm>

5 Frozen Tissue Collections

- Departamento de Ciencias Biológicas, Facultad de Ciencias Agrarias, Universidad Nacional de Cuyo, Mendoza, Argentina: <http://www.uncu.edu.ar>
- Department of Biological Sciences, Macquarie University, Sydney, NSW, Australia: <http://www.bio.mq.edu.au>
- School of Biological Science, University of New South Wales, Sydney, NSW, Australia: <http://www.bioscience.unsw.edu.au>
- School of Biological Sciences, University of New England, Armidale, NSW, Australia: <http://www.une.edu.au/sciences/schoolbiosci/index.html>

- CSIRO Marine Laboratories, Cleveland, QLD, Australia: <http://www.bne.marine.csiro.au>
- The Australian Biological Tissue Collection, Evolutionary Biology Unit, South Australia Museum, Adelaide, SA, Australia: <http://www.samuseum.sa.gov.au/ebu.htm>
- Institut für Medizinische Chemie, Veterinärmedizinische Universität Wien, Wien, Austria: <http://www-med-chemie.vu-wien.ac.at>
- Royal Ontario Museum and Department of Zoology, University of Toronto, ON, Canada: <http://www.rom.on.ca/index.html>; <http://www.zoo.utoronto.ca>
- Redpath Museum, McGill University, Montreal, QC, Canada: <http://www.redpath-museum.mcgill.ca>
- Finnish Game and Fisheries Research Institute, Ahvenjarvi Game Research Station, Ilomantsi, Finland: <http://www.rktl.fi/english>
- Section de Biologie, Institut Curie, Paris, France: <http://www.curie.fr>
- Institut des Sciences de l'Evolution, Université Montpellier II, Montpellier, France: <http://www.isem.univ-montp2.fr>
- Département de Biologie-Ecologie, Université Paul Valéry, Université Montpellier III, Montpellier, France: <http://alor.univ-montp3.fr/epe/Index.html>
- Department of Zoology, Hessisches Landesmuseum Darmstadt (HLMD), Darmstadt, Germany: <http://www.darmstadt.gmd.de/Museum/HLMD>
- Biology Department, Philipps-Universität, Marburg, Germany: <http://www.uni-marburg.de/biologie/welcomeengl.html>
- Institut für Physiologie, Universität Regensburg, Regensburg, Germany: <http://www.biologie.uni-regensburg.de/InstituteNWFIII/physiologie.html>
- Max Planck Institute of Biochemistry, Martinsried, Germany: http://www.biochem.mpg.de/home_en.html
- The Institute of Evolution, University of Haifa, Haifa, Israel: <http://research.haifa.ac.il/~evolut/~evolut.html>
- Department of Chemistry, Faculty of Science and Graduate School of Science, Tohoku University, Aobayama, Sendai, Japan: <http://www.chem.tohoku.ac.jp/index-e.html>
- Department of Biology, Universiti Putra Malaysia (UPM), Serdang, Selangor, Malaysia: <http://fsas.upm.edu.my/~arahim/jabbio/index.html>
- Institute of Biological Sciences, University of Malaya, Kuala Lumpur, Malaysia: <http://biology.um.edu.my/home.html>
- Department of Biochemistry, University of Nijmegen, Nijmegen, The Netherlands: <http://www-bioch.sci.kun.nl/bioch/ger.html>
- Department of Clinical and Human Genetics, Faculty of Medicine, Free University, Amsterdam, The Netherlands: <http://www.med.vu.nl/org/afd/kga>
- Department of Human and Clinical Genetics, University of Leiden, Leiden, The Netherlands: http://www.medfac.leidenuniv.nl/humangenetics/stages_nl.html
- Department of Biology and Nature Conservation, Zoological Institute, Agricultural University of Norway, Ås, Norway: http://www.nlh.nlh.no/institutt/ibn/default_english.htm

- Department of Anatomy, Faculty of Medicine, Jagiellonian University, Krakow, Poland: <http://www.cm-uj.krakow.pl/guide/cm4133.html>
- Institute of Zoology, Academia Sinica, Taipei, Taiwan, Republic of China: <http://www.sinica.edu.tw/zool/english/eindex.htm>
- Department of Anatomy and Biology, National Defense Medical Center, Taipei, Taiwan, Republic of China: <http://www.ndmctsg.edu.tw>
- Laboratory of Isotopic Investigations, Engelhardt Institute of Molecular Biology, Moscow, Russia: <http://www.imb.ac.ru>
- Department of Genetics and Pathology, Uppsala University, Uppsala, Sweden: <http://www.genpat.uu.se>
- Zoological Institute, Department of Biology, University of Bern, Bern, Switzerland: <http://www.cx.unibe.ch/zos/zoologie>
- Institute of Ecology – Laboratory for Zoology, Université de Lausanne, Lausanne-Dorigny, Switzerland: <http://www.unil.ch/izea>
- Laboratory of Molecular Biology, Institute of Clinical Pathology, University Hospital, Zürich, Switzerland: <http://www.unizh.ch/pathol>
- Department of Biology, School of Environment and Life Sciences, University of Salford, Salford, UK: <http://www.els.salford.ac.uk/proper/biology.htm>
- Department of Human Sciences, Faculty of Science, Loughborough University, Leicestershire, UK: <http://www.lboro.ac.uk/departments/hu/index.html>
- School of Biology and Biochemistry, Queen's University, Belfast, Northern Ireland, UK: <http://www.qub.ac.uk/bb>
- National Marine Fisheries Service (NMFS) Laboratories, National Oceanographic and Atmospheric Administration (NOAA), US Department of Commerce, USA: <http://www.websites.noaa.gov/guide/government/nmfs.html>; <http://www.nmfs.noaa.gov/regional.htm>
- Department of Biological Sciences, University of Alabama, Tuscaloosa, AL, USA: <http://www.as.ua.edu/biology/scf>
- Alaska Frozen Tissue Collection, University of Alaska Museum, University of Alaska Fairbanks, Fairbanks, AK, USA: <http://zorba.uafadm.alaska.edu/museum/af/index.html>
- Alaska Department of Fish and Game, Gene Conservation Laboratory, Anchorage, AK, USA: <http://www.cf.adfg.state.ak.us/geninfo/research/genetics/genetics.htm>
- Auke Bay National Marine Fisheries Laboratory, National Marine Fisheries Service (NMFS), National Oceanographic and Atmospheric Administration (NOAA), US Department of Commerce, Juneau, AK, USA: <http://www.afsc.noaa.gov/abl>
- Alaska Marine Mammal Tissue Archival Project (AMMTAP), Anchorage, AK, USA: <http://abscweb.wr.usgs.gov/research/ammtap/index.htm>
- Department of Pharmacology, University of Arizona College of Medicine, Tucson, AZ, USA: http://www.pharmacology.arizona.edu/Pharm_Tox
- Laboratory of Molecular Systematics, California Academy of Sciences, San Francisco, CA, USA: <http://www.calacademy.org/research>

- Museum of Vertebrate Zoology (MVZ), University of California, Berkeley, CA, USA: <http://www.mip.berkeley.edu/mvz/collections/TissueCollection.htm>
- Center for Reproduction of Endangered Species (CRES), Zoological Society of San Diego, San Diego, CA, USA: http://sandiegozoo.org/cres/frozen_resource.html
- Division of Biological Sciences, Section of Ecology and Evolution, University of California, Davis, CA, USA: <http://www.eve.ucdavis.edu>
- Beckman Research Institute, Duarte, CA, USA: <http://bricoh.coh.org/docs>
- Department of Organismic Biology, Ecology and Evolution, University of California, Los Angeles, CA, USA: <http://www.obee.ucla.edu>
- Department of Biochemistry and Molecular Biology, Colorado State University, Fort Collins, CO, USA: <http://www.bmb.colostate.edu>
- Department of Biological Sciences, University of Connecticut, Storrs, CT, USA: <http://www.biology.uconn.edu>
- Peabody Museum of Natural History, Yale University, New Haven, CT, USA: <http://www.peabody.yale.edu/collections>
- Department of Biology, University of Miami, Coral Gables, FL, USA: <http://fig.cox.miami.edu>
- Department of Chemistry, Florida State University, Tallahassee, FL, USA: <http://www.chem.fsu.edu>
- Conservation Genetics Laboratory, Nova Southeastern University Oceanographic Center, Dania Beach, FL, USA: <http://www.nova.edu/ocean>
- Department of Biochemistry and Molecular Biology, University of Florida Medical School, Gainesville, FL, USA: <http://www.med.ufl.edu/biochem>
- Department of Small Animal Clinical Sciences, University of Florida College of Veterinary Medicine, Gainesville, FL, USA: <http://www.vetmed.ufl.edu/sacs/index.htm>
- Department of Zoology, University of Florida, Gainesville, FL, USA: <http://www.zoo.ufl.edu>
- Savannah River Ecology Laboratory, Institute of Ecology, Aiken, SC, USA: http://www.uga.edu/srel/DNA_Lab/dna_lab.htm
- School of Integrative Biology, University of Illinois, Urbana, IL, USA: <http://www.life.uiuc.edu/sib>
- Field Museum of Natural History, Chicago, IL, USA: http://www.fnmh.org/research_collections
- Organismal Biology and Anatomy, Division of Biological Sciences, University of Chicago, Chicago, IL, USA: <http://pondside.uchicago.edu/oba>
- Department of Biology, Indiana University, Bloomington, IN, USA: <http://www.bio.indiana.edu>
- Department of Microbiology and Immunology, Indiana University School of Medicine, Indianapolis, IN, USA: <http://www.iupui.edu/~micro>
- Museum of Natural History, University of Kansas, Lawrence, KS, USA: <http://www.nhm.ku.edu/research.html>

- Collection of Genetic Resources, Museum of Natural Science, Louisiana State University, Baton Rouge, LA, USA: <http://www.museum.lsu.edu/LSUMNS/Museum/NatSci/tissues.html>
- Division of Biochemistry and Molecular Biology, Department of Biological Sciences, Louisiana State University, New Orleans, LA, USA: <http://www.biology.lsu.edu/bmb>
- Department of Biology, College of Life Sciences, University of Maryland, College Park, MD, USA: <http://www.life.umd.edu/biology/index.html>
- Laboratory of Genomic Diversity, Frederick Cancer Research and Development Center, National Cancer Institute, National Institutes of Health, Frederick, MD, USA: http://rex.nci.nih.gov/lgd/front_page.htm
- Captive Propagation Research Group, Patuxent Wildlife Research Center, U.S. Geological Survey (USGS) and U.S. Fish and Wildlife Service (FWS), Laurel, MD, USA: <http://www.pwrc.usgs.gov>; <http://patuxent.fws.gov>
- Department of Entomology, University of Massachusetts, Amherst, MA, USA: <http://www.umass.edu/ent/index.html>
- Department of Anatomy and Cell Biology, Wayne State University School of Medicine, Detroit, MI, USA: <http://www.med.wayne.edu/anatomy>
- Department of Biology, University of Michigan, Ann Arbor, MI, USA: <http://www.biology.lsa.umich.edu>
- Bell Museum of Natural History, University of Minnesota, Minneapolis, MN, USA: <http://www1.umn.edu/bellmuse/collections.html>
- Division of Biological Sciences, University of Montana, Missoula, MT, USA: <http://biology.umt.edu>
- Center of Theoretical and Applied Genetics, Department of Ecology, Evolution and Natural Resources, Rutgers University, New Brunswick, NJ, USA: <http://www.rci.rutgers.edu/%7Edeeenr/index.html>
- Rutgers University Cell and DNA Repository, Nelson Biological Laboratories, Rutgers University, Piscataway, NJ, USA: <http://lifesci.rutgers.edu/~genetics>
- Division of Biological Materials, Museum of Southwestern Biology, University of New Mexico, Albuquerque, NM, USA: <http://www.unm.edu/~museum>
- Ambrose Monell Collection for Molecular and Microbial Research, American Museum of Natural History, New York, NY, USA: <http://www.amnh.org/science/genomics/research/frozen.html>
- Bassett Healthcare Research Institute, Cooperstown, NY, USA: <http://www.bassetthealthcare.org/research/programs.html>
- Department of Biological Sciences, Fordham University, Bronx, NY, USA: <http://www.fordham.edu/biology>
- Department of Biology, University of Rochester, Rochester, NY 14267, USA: <http://www.rochester.edu/College/BIO>
- Department of Ecology and Evolutionary Biology, Cornell University, Ithaca, NY, USA: <http://www.es.cornell.edu>
- Bronx Zoo and Wildlife Conservation Society, Bronx, NY, USA: <http://wcs.org/home/science/genetics>

- Department of Biology, King's College, Briarcliff Manor, NY, USA: <http://www.kings.edu/biology/bioweb.html>
- Roswell Park Memorial Institute, Buffalo, NY, USA: <http://www.cog.ufl.edu/publ/inst/inpg4920.htm>
- Biology Department, Belmont Abbey College, Belmont, NC, USA: <http://www.belmontabbeycollege.edu>
- Cincinnati Museum of Natural History, University of Cincinnati, Cincinnati, OH, USA: <http://www.cincymuseum.org>
- Forensic Laboratory, U.S. Fish and Wildlife Service, Ashland, OR, USA: <http://www.lab.fws.gov>
- Academy of Natural Sciences, Philadelphia, PA, USA: <http://www.acnatsci.org>
- Department of Psychiatry, University of Pittsburgh School of Medical, Pittsburgh, PA, USA: <http://www.wpic.pitt.edu>
- Carnegie Museum of Natural History, Pittsburgh, PA, USA: <http://www.clpgh.org/cmnh>
- Veterinary Department, Riverbanks Zoo and Botanical Garden, Columbia, SC, USA: <http://www.riverbanks.org>
- National Biomonitoring Specimen Bank (NBSB), National Institute of Standards and Technology (NIST), Chemical Science and Technology Laboratory, Charleston, SC, USA: http://www.nist.gov/public_affairs/gallery/specimen.htm
- National Marine Mammal Tissue Bank, National Marine Fisheries Service (NMFS) Marine Mammal Health and Stranding Response Program, Ft. Johnson National Oceanographic and Atmospheric Administration (NOAA) Facility, Charleston, SC, USA: http://www.nmfs.noaa.gov/prot_res/PR2/Health_and_Stranding_Response_Program/mmhsrp.html
- Division of Biology, University of Tennessee, Knoxville, TN, USA: <http://www.bio.utk.edu>
- Department of Biology, Natural History Collection, Angelo State University, San Angelo, TX, USA: <http://www.angelo.edu/dept/biology/info/asnhc.htm>
- Department of Biological Sciences, University of North Texas, Denton, TX, USA: <http://www.ias.unt.edu>
- Natural Science Research Laboratory, Museum of Texas Tech University, Lubbock, TX, USA: <http://www.nsrl.ttu.edu/collecti.htm>
- Texas Cooperative Wildlife Collection, Texas A&M University, College Station, TX, USA: <http://wfscnet.tamu.edu/tcwc/tissues.htm>
- Texas Memorial Museum and Section of Integrative Biology, University of Texas, Austin, TX, USA: <http://www.tmm.utexas.edu/research/index.html>; <http://www.biosci.utexas.edu/IB>
- Department of Biology and Biochemistry, University of Houston, Houston, TX, USA: <http://www.bchs.uh.edu>
- Department of Zoology, College of Biology and Agriculture, Brigham Young University, Provo, UT, USA: <http://bioag.byu.edu/zoology>

- Department of Biology, College of Agriculture and Life Sciences, University of Vermont, Burlington, VT, USA: <http://www.uvm.edu/~biology>
- Burke Museum, University of Washington, Seattle, WA, USA: <http://www.washington.edu/burkemuseum/tissuepolicy.html>
- Northwest Fisheries Science Center (NWFSC), National Marine Fisheries Service (NMFS), National Oceanographic and Atmospheric Administration (NOAA), US Department of Commerce, Seattle, WA, USA: <http://research.nwfsc.noaa.gov/nwfsc-homepage.html>
- Washington Department of Fish and Wildlife, Olympia, WA, USA: <http://www.wa.gov/wdfw>
- Laboratory of Molecular Systematics, National Museum of Natural History, Smithsonian Institution, Washington, DC, USA: <http://www.lms.si.edu/frozenscollections.html>
- National Zoological Park, Smithsonian Institution, Washington, DC, USA: <http://natzoo.si.edu>
- Department of Biological Sciences, Marshall University, Huntington, WV, USA: <http://www.marshall.edu/biology>
- Department of Physiology, University of Wisconsin Medical School, Madison, WI, USA: <http://www.physiology.wisc.edu>
- International Crane Foundation, Baraboo, WI, USA: <http://www.savingcranes.org>
- Molecular Systematics Laboratory, Zoological Museum, University of Wisconsin, Madison, WI, USA: <http://www.wisc.edu/zoology/museum/museum.html>
- Department of Biological Sciences, University of Wisconsin-Parkside, Kenosha, WI, USA: <http://www.uwp.edu/academic/biology/biologymenu/Index.htm>

6 Commercial Supply Companies

- Berkshire Biological Supply Co., Westhampton, MA, USA: <http://www.crocker.com/~berkbio>
- Carolina Biological Supply Co., Burlington, NC, USA: <http://www.carolina.com>
- Fisher Scientific, Educational Materials Division, Chicago, IL, USA: <https://www1.fishersci.com/main.jsp>
- Fluker Farms, Inc., Port Allen, LA, USA: <http://www.flukerfarms.com>
- Glades Herp., Inc., Ft. Myers, FL, USA: <http://www.gherp.com>
- Gulf Specimen Marine Laboratories, Inc., Panacea, FL, USA: <http://www.gulfspecimen.org>
- Marine Biological Laboratory, Marine Resources Center, Woods Hole, MA, USA: <http://zeus.mbl.edu/public/organisms/catalog.php3>
- Pacific Biological Supply, Sherman Oaks, CA, USA: <http://www.pacificbio.com>

- Ward's Natural Science Establishment, Inc., Rochester, NY and Santa Fe Springs, CA, USA: <http://www.wardsci.com>

7 Botanical and Zoological Gardens

- Botanic Gardens Conservation International (BGCI), an International Clearing House Mechanism for Botanic Gardens of the World, Royal Botanic Gardens Kew, Richmond, UK: <http://www.bgci.org.uk>
- Internet Directory for Botany (IDB), University of Alberta, Edmonton, AB, Canada: <http://www.botany.net/IDB>
- Lists of Botanical Gardens and Arboreta: http://dir.yahoo.com/Science/Biology/Botany/Botanical_Gardens; http://dir.yahoo.com/Science/Biology/Botany/Botanical_Gardens/Arboretums; <http://www.botany.net/IDB/subject/botgard.html>
- CAUZ Directory, The Consortium of Aquariums, Universities and Zoos (CAUZ) for Worldwide Conservation: <http://www.selu.com/bio/cauz>
- American Zoo and Aquarium Association (AZA) Zoo and Aquarium Directory: <http://www.aza.org/members/zoo>
- WWW Virtual Library: Zoos, hosted by ZooNet: http://zoonet.home.mindspring.com/www_virtual_lib/zoos.html
- The Cyber ZooMobile, Zoo Links: <http://www.primenet.com/~brendel/zoo.html>
- The Good Zoo Guide Online: <http://www.goodzoos.com>
- ZooNet: <http://www.zoonet.org>
- ZooWeb: World Wide Link to Zoos and Aquariums: <http://www.zooweb.net>
- Lists of Aquariums and Aviaries: <http://dir.yahoo.com/Science/Biology/Zoology/Zoos/Aquariums>; <http://dir.yahoo.com/Science/Biology/Zoology/Zoos/Aviaries>
- Public butterfly gardens and zoos, hosted by The Butterfly Website: <http://www.mgfx.com/butterfly/gardens/index.cfm>
- Insect Zoos, Butterfly Gardens and Museums in North America, hosted by the Entomological Society of America: http://www.entsoc.org/education/insect_zoos.htm

8 Natural History Museums, Herbaria and Directories of Specialists

- Association of Systematics Collections (ASC), Washington, DC, USA: <http://www.ascoll.org>
- Society for the Preservation of Natural History Collections (SPNHC): <http://www.spnhc.org>
- The Systematics Association, The Natural History Museum, London, UK: <http://www.systass.org>
- The Biodiversity and Biological Collections Web Server, University of New Orleans, New Orleans, LA, USA: <http://biodiversity.uno.edu>