



Sample Submission Guideline

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Metabolomics: Biomedical Sample Classification I

Sample Class	Sample Type
Liquid I	Plasma, Serum, Hemolymph, Whole Blood, Milk, Egg White
Liquid II	Cerebrospinal Fluid (CSF), Interstitial Fluid (TIF), Uterine Fluid, Pancreatic Juice, Bile, Pleural Effusion, Follicular Fluid, Postmortem Fluid, Tissue Fluid, Culture Medium (liquid), Culture Supernatant, Tears, Aqueous Humor, Digestive Juices, Bone Marrow (liquid)
Liquid III	Seminal Plasma, Amniotic Fluid, Prostatic Fluid, Rumen Fluid, Respiratory Condensate, Gastric Lavage Fluid, Broncho-alveolar Lavage Fluid (BALF), Urine, Sweat, Saliva, Sputum
Tissue I	Small Animal Tissues, Placenta, Blood Clot, Mycelium, Nematode, Zebrafish (whole fish), Bone Marrow (solid), Nail
Tissue II	Large Animal Tissues, Whole Insect Body, Wings (of insects), Pupa, Eggs, Large Fungi (mushroom types), Large Algae (red algae), Large Amount of Mycelium/Mycelial Balls, Cartilage, Bone (solid)
Tissue III	Zebrafish Organs, Insect Organs, Whole Microinsect Body (e.g., Drosophila)
Solid I	Feces, Intestinal Contents, Lyophilized Fecal Powder
Solid II	Milk Powder, Microbial Fermentation Product (solid), Culture Medium (solid), Earwax, Lyophilized Tissue Powder, Feed, Egg Yolk, Lyophilized Plant Powder, Lyophilized Egg Powder
Solid III	Honey, Nasal Mucus, Sputum
Solid IV	Sludge, Soil

Metabolomics: Biomedical Sample Requirements I

Sample Type	Recommended Sample Size	Minimum Sample Size	Untargeted (Plus) Metabolomics	TM Widely Targeted Metabolomics	Quantitative Lipidomics	Bile Acids	Energy Metabolism	Amino Acids	Tryptophan	Short-Chain Fatty Acids	Steroid Hormones
Liquid I	100 µl	20 µl	✓	✓	✓	✓	✓	✓	✓	50 µl-100 µl	
Liquid II	100 µl	20 µl	✓	✓	✓	✓	✓	✓	✓	50 µl-100 µl	
Liquid III	500 µl	100 µl	✓	✓	✓	✓	✓	✓	✓	✓	✓
Tissue I	100 mg	20 mg	✓	✓	✓	50 mg - 100 mg					✓
Tissue II	500 mg	20 mg	✓	✓	✓	✓	✓	✓	✓	50 mg - 500 mg	✓
Tissue III	20 units	10 units	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solid I	200 mg	20 mg	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solid II	100 mg	20 mg	✓	✓	✓	✓	✓	✓	✓	✓	✓
Solid III	100 mg	20 mg	✓	✓	✓	500 mg - 2 g					
Solid IV	600 mg	300 mg	✓	✓	✓	✓	✓	✓	✓	✓	✓

Metabolomics Biomedical Sample Classification II

Sample Class	Sample Type
Cell I	Adherent Cells, Animal Cell Lines
Cell II	E. Coli, Yeast Cells
Cell II	Small Amount of Fungal Mycelial Balls/Mycelium, Unicellular Algae (Cyanobacteria), Large Quantities of Bacterial Hyphae (sediment), Mucilaginous Protoplasmic Clusters (hyphae)
Organelle I	Lysosomes, Mitochondria, Endoplasmic Reticulum
Organelle II	Exosomes, Extracellular Vesicles
Special Sample I	Skin Tape or Patch
Special Sample II	Test Strips
Special Sample III	Swab

Metabolomics Biomedical Sample Requirements II

Sample Type	Recommended Sample Size	Minimum Sample Size	Untargeted (Plus) Metabolomics	TM Widely Targeted Metabolomics	Quantitative Lipidomics	Bile Acids	Energy Metabolism	Amino Acids	Tryptophan	Short-Chain Fatty Acids	Steroid Hormones
Cell I	1×10 ⁷ cells	1×10 ⁶ cells	✓	✓	✓	/	✓	✓	✓	✓	✓
Cell II	1×10 ¹⁰ cells	5×10 ⁸ cells	✓	✓	✓	/	✓	✓	✓	✓	✓
Cell III	100 mg	20 mg	✓	✓	✓	/	✓	✓	✓	✓	✓
Organelle I	4×10 ⁷ cells	1×10 ⁷ cells	✓	✓	✓	✓	✓	✓	✓	✓	✓
Organelle II	2×10 ⁹ particles	1×10 ⁹ particles	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special Sample I	2 pieces	1 piece	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special Sample II	2 pieces	1 piece	✓	✓	✓	✓	✓	✓	✓	✓	✓
Special Sample III	1 piece	1 piece	✓	✓	✓	✓	✓	✓	✓	✓	✓





Metabolomics Plant Sample Classification

Sample Class	Sample Type
Tissue I	Root, Stem, Leaf, Fruit, Flower, Bud, Node, Callus
Tissue II	Fruit Peel, Seed Coat
Tissue III	Anther, Filament, Pollen, Style, Stigma, Embryo
Liquid I	Root Exudate
Liquid II	Juice, Wine, Fermentation Broth
Liquid III	Oils, Essential Oils, Honey, Nectar, Paste
Liquid IV	Herb Extract, Herb Decoction, Plant Tissue Fluid
Cell I	Cultured Plant Cell
Cell II	Algae
Solid I	Lyophilized Plant Powder
Solid II	Sludge, Soil



Metabolomics Plant Sample Requirements

Sample Class	Recommended Sample Size	Minimum Sample Size	Widely Targeted Metabolomics	Quantitative Lipidomics	Flavonoid	Carotenoid	Anthocyanin	Energy Metabolism	Amino Acids	Short-Chain Fatty Acids	Plant Hormones	Gibberellin
Tissue I	600 mg	300 mg	✓	✓	✓	✓	✓			200 mg - 300 mg		
Tissue II	600 mg	300 mg	✓	✓	✓	✓	✓					
Tissue III	1.2 g	600 mg	✓	✓	✓	✓	✓					
Liquid I	10 ml	3 ml	✓	1 ml - 2 ml	✓	100 µl - 500 µl				100 µl - 200 µl		
Liquid II	5 ml	3 ml	✓	1 ml - 2 ml	✓							
Liquid III	500 µl	200 µl	✓	✓	✓							
Liquid IV	500 µl	200 µl	✓	✓	✓							
Cell I	1x10 ⁷ cells	1x10 ⁶ cells	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Cell II	300 mg	200 mg	✓	20 mg - 100 mg	✓	✓	✓	✓	✓	✓	✓	✓
Solid I	200 mg	/	✓	✓	✓	✓	✓	100 µl - 200 µl			/	/
Solid II	600 mg	300 mg	✓	/	✓	/	/	✓	✓	✓	✓	✓





Proteomics Sample Requirements I

Sample Class	Sample Type	DIA / DDA Quantitative Proteomics		Phospho-Proteomics	
		Recommended	Minimum	Recommended	Minimum
 Animal Tissue	Normal tissues (heart, liver, spleen lungs, intestines, kidneys, etc.)	50 mg	5 mg	50 mg	30 mg
	Fatty tissue	200 mg	100 mg	1 g	500 mg
	Brain tissue	50 mg	5 mg	100 mg	50 mg
	Bone	1 g	200 mg	1 g	500 mg
	Hair	500 mg	200 mg	1 g	500 mg
	Skin	200 mg	100 mg	/	/
 Plant Tissue	Young tissue (young leaf, seedling, petal, etc.)	200 mg	100 mg	500 mg	200 mg
	Mature tissue (root, stem, fruit, pericarp, etc.)	1 g	500 mg	2 g	1.5 g
	Pollen	40 mg	15 mg	/	/
 Cells	Primary Cells	3×10^6 cells	1×10^6 cells	2×10^7 cells	1×10^7 cells
	Transmissible cells	2×10^6 cells	1×10^6 cells	1×10^7 cells	5×10^6 cells
	Sperm, Platelets	2×10^7 cells	1×10^7 cells	5×10^7 cells	2×10^7 cells
 Protein	Protein	100 μ g	30 μ g	1000 μ g	500 μ g



Proteomics Sample Requirements II

Sample Class	Sample Type	DIA / DDA Quantitative Proteomics		Phospho-Proteomics	
		Recommended	Minimum	Recommended	Minimum
 Liquid Samples	Serum/Plasma	20 µl	5 µl	/	/
	Serum/Plasma (low-abundant proteins enrichment)	200 µl	100 µl	/	/
	Joint fluid, Lymph fluid, Cerebrospinal fluid	200 µl	100 µl	1 ml	500 µl
	Aqueous humor, Vitreous body	300 µl	200 µl	/	/
	Ascites, Follicular fluid	100 µl	50 µl	/	/
	Alveolar lavage fluid (BALF)	1 ml	500 µl	/	/
	Amniotic fluid	1 ml	500 µl	5 ml	2 ml
	Milk	20 µl	5 µl	/	/
	Urine	10 ml	5 ml	50 ml	20 ml
	Saliva (mammals)	1 ml	500 µl	/	/
	Fermentation broth, Bacterial solution	10 ml	5 ml	/	/
	Cellular supernatant	25 ml	10 ml	/	/
 Microorganisms	Bacteria	200 mg	100 mg	/	/
	Fungi	300 mg	150 mg	1 g	500 mg

Transcriptomics Sample Requirements

Sample Class	Sample Type	Recommended Sample Size	Minimum Sample Size
 Tissue Samples	Plant tissues with high nucleotide yields: fresh and young leaves, flowers, stems, stamens, anthers and young seeds of common species.	300 mg	50 mg
	Plant tissues with low nucleotide yields: roots, stems, fruits, pericarp, mature seeds, etc.; Tissues with high waxing, lignification, secondary metabolite content, etc.	300 mg	100 mg
	Animal/Human tissues with high nucleotide yields: internal tissues such as liver, spleen, thymus, heart, brain, lungs, kidneys, etc.	200 mg	20 mg
	Animal/Human tissues with low nucleotide yields: skin, bone, fat, etc.	200 mg	100 mg
 Liquid Samples	Freshly collected whole blood	5 ml	1 ml
	Semi-solid bacteria	0.5 ml	/
Cells 	Fresh cultured cells	5×10^6 cells	1×10^6 cells
	Fungus	5×10^6 cells or 300 mg	1×10^6 cells
RNA 	Total RNA	Concentration ≥ 50 ng/ μ l; Total Amount ≥ 2 μ g; Volume ≥ 15 μ l	

Microbiome Sample Requirements

Sample Class	Sample Type	16S Sequencing		Metagenome Sequencing	
		Recommended	Minimum	Recommended	Minimum
 Solid sample	Feces, Intestinal Contents	2 g	500 mg	2 g	500 mg
	Swab	10 pieces	4 pieces	10 pieces	4 pieces
	Tissue	1 g	500 mg	1 g	500 mg
	Water Body Filter Membrane (pore size 0.22-0.45 µm, diameter 3-4 cm)	2 pieces	1 piece	3 pieces	1 piece
	Soil, Sludge, Sediment, Humus	3 g	0.5 g	3 g	1 g
 Liquid sample	Rumen Fluid, Fermentation Broth, Tissue Fluid(with noticeable precipitate after centrifugation)	3 ml, precipitate 1 g	1 ml, precipitate 0.5 g	3-5 ml, precipitate 1 g	1 ml, precipitate 0.5 g
	Saliva	5 ml	3 ml	7 ml	5 ml
	Serum, plasma	3 ml	1 ml	5 ml	3 ml
	DNA	Concentration ≥ 10 ng/µl, Total Amount ≥ 150 ng, OD260/280 = 1.8-2.0, DNA must have a distinct main band, no degradation, and be free from RNA, proteins, and other impurities.		Concentration ≥ 80 ng/µl, Total Amount ≥ 10 µg, OD260/280 = 1.8-2.0, DNA must have a distinct main band, no degradation, and be free from RNA, proteins, and other impurities.	

Sampling Guideline I

🟢 Serum

Collect whole blood samples using serum separation tubes containing a clot activator. Allow the samples to clot at room temperature for 60 minutes (note: do not shake the tubes). Centrifuge at 3000 rpm for 10 minutes at 4°C, then aliquot 200 µl of the supernatant (serum) into pre-labeled 2 ml centrifuge tubes. Snap freeze the samples in liquid nitrogen for 5-10 minutes, and store them at -80°C.

🟢 Plasma

Collect whole blood samples using blood collection tubes containing an anticoagulant (EDTA or heparin sodium). Gently invert the tubes to mix immediately. Centrifuge at 3000 rpm for 10 minutes at 4°C, then aliquot 200 µl of the supernatant (plasma) into pre-labeled 2 ml centrifuge tubes. Snap freeze the samples in liquid nitrogen for 5-10 minutes, and store them at -80°C. (Note: heparin sodium anticoagulant should not be used for microbiome studies.)

🟢 Animal Tissues

Euthanize the animal and dissect it using sterile surgical instruments to quickly collect the desired tissue. Rinse the tissue with pre-cooled saline to remove blood, and use forceps to remove connective tissue and hair. Rinse again with pre-cooled saline. Cut the tissue into small pieces using a scalpel or surgical scissors and place them in pre-labeled sterile cryogenic vials. Snap freeze the samples in liquid nitrogen for 5-10 minutes, and store them at -80°C. (For transcriptome studies, rinse with RNase-free water.)

🟢 Suspended Cells

Measure the concentration of the cell culture. Transfer a cell suspension containing 1×10^7 cells into a 2 ml centrifuge tube. Centrifuge at 1000g for 10 minutes at 4°C, and discard the supernatant. Quickly wash the cell pellet with pre-cooled PBS (4°C) 2-3 times, each time centrifuging at 1000g for 10 minutes at 4°C and discarding the supernatant. Collect the cell pellet, snap freeze it in liquid nitrogen for 5-10 minutes, and store it at -80°C.

Sampling Guideline II

Adherent Cells

Remove the culture medium and quickly wash the cells 2-3 times with pre-cooled PBS solution. Add an appropriate amount of pre-cooled PBS solution to the culture flask and gently scrape the cells off the flask wall into the PBS solution using a cell scraper. Transfer the mixture to an appropriate centrifuge tube and centrifuge at 300g-500g for 5 minutes at 4°C. Discard the supernatant and wash the cell pellet again with pre-cooled PBS solution. Centrifuge at 1000g for 5 minutes at 4°C and discard the supernatant. Resuspend the cell pellet in pre-cooled PBS solution and measure the cell suspension concentration. Transfer a cell suspension containing 10^7 cells into a 2 mL sterile centrifuge tube, centrifuge at 1000g for 10 minutes at 4°C, and discard the supernatant. Collect the cell pellet, snap freeze it in liquid nitrogen for 5-10 minutes, and store it at -80°C.

Microorganisms

Measure the concentration of the microbial culture. Transfer the culture containing the required amount of microorganisms into an appropriate centrifuge tube. Centrifuge at 4000 rpm for 10 minutes at 4°C, and discard the supernatant. Wash the pellet twice with pre-cooled PBS (4°C), each time centrifuging at 1000 rpm for 10 minutes at 4°C and discarding the supernatant. Collect the microbial pellet, snap freeze it in liquid nitrogen for 5-10 minutes, and store it at -80°C. (For bacteria, it is recommended to sample during the logarithmic growth phase.)

Plant Tissues

Collect the desired tissues from at least 3 plants within one biological replicate from the same corresponding positions (e.g., same light exposure direction) and mix them as one sample. For roots, rinse them under running water to remove soil and impurities, wash them 1-2 times with PBS/RNase-free water, and dry the surface with absorbent paper. If the tissues are too large, freeze them in liquid nitrogen and break them into small pieces. Finally, place the samples in suitable centrifuge tubes (10ml/15ml), snap freeze in liquid nitrogen for 5-10 minutes, and store them at -80°C.

Shipping Guideline

- 1 Dry Ice Booking:** Book sufficient dry ice to maintain low temperatures for the samples during shipping. Please prepare at least 5 kg of dry ice for each transit day.
- 2 Sample Collection:** Collect samples in appropriate tubes. Different services require separate tubes. Ensure each tube is clearly labeled, using markers or ink that will not be erased during shipment. Wrap the tube cap with parafilm.
- 3 Sample Packaging:** Wrap the tubes containing samples in absorbent paper towels and place them in separate sealed plastic bags. Wrap each bag in bubble wrap
- 4 Sample Information Form (SIF):** Print and complete the SIF. The labels on the tubes must match the labels on the SIF. Place the completed form in a sealed plastic bag and include it in the shipment container.
- 5 Box Preparation:** Place the sample tubes and SIF in a polystyrene box with sufficient dry ice. Fill any empty space within the box with bubble wrap or packing material to ensure materials do not move during shipping.
- 6 External Packaging:** Place the polystyrene box into a slightly larger cardboard box and seal it with packing tape. Ensure that a Dry Ice label is affixed to the outside of the shipment.
- 7 Shipping Service:** Ship the package using a Next-Day delivery service.
- 8 Notification:** Email the completed SIF, purchase order (PO) or signed quote, and tracking number to support-global@metwarebio.com.
- 9 Shipping Information:** Attn: Rui He. Addr: 8A Henshaw Street, Woburn, MA 01801, USA. Tel: (781) 975-1541. Email: Support-global@metwarebio.com
- 10 Delivery Timing:** Please plan your shipping day accordingly to ensure the samples will arrive between Monday to Friday.

Note: Unless otherwise specified, clients are responsible for all shipping charges.

Innovative Metabolomics and Proteomics Insights for Better Health

Metware Biotechnology Inc. (MetwareBio) is a multi-omics CRO focusing on developing and applying innovative multi-omics technologies to life science and health research. Based on the high-throughput and ultra-sensitive multi-omics technology and patented widely targeted metabolomics' technology, as well as large-curated metabolite database, MetwareBio offers 'one-stop metabolomics and multi-omics research and analysis services' for research institutes, hospitals and pharmaceutical companies.

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