

BD Diagnostics – Preanalytical Systems Technology Built on Trust

Ordering and Technical Information

| Region | BD Customer Service | BD Technical Services |
|-----------------|--|---|
| US | 888.237.2762 (phone orders) 800.847.2220 (fax orders) | 800.631.0174 (phone) www.bd.com/vacutainer/contact (email) |
| Canada | 800.268.5430 | 800.268.5430 ext. 6114 |
| All other areas | Please visit www.bd.com to locate your regional office | |

Visit www.bd.com/proteomics to learn more about our integrated systems.

To learn about BD Vacutainer® specimen collection products, educational materials, or services offered by BD Diagnostics – Preanalytical Systems, please contact your local BD Sales Consultant today.



BD Diagnostics
Preanalytical Systems
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Franklin Lakes, NJ 07417
www.bd.com



Helping all people
live healthy lives

Molecular Diagnostics and Proteomics Blood Collection Systems

About BD

BD, a leading global medical technology company that manufactures and sells medical devices, instrument systems and reagents, is dedicated to improving people's health throughout the world. BD is focused on improving drug therapy, enhancing the quality and speed of diagnosing infectious diseases, and advancing research and discovery of new drugs and vaccines. The Company's capabilities are instrumental in combating many of the world's most pressing diseases. Founded in 1897 and headquartered in Franklin Lakes, New Jersey, BD employs approximately 29,000 people in approximately 50 countries throughout the world. The Company serves healthcare institutions, life science researchers, clinical laboratories, industry and the general public. For more information, please visit www.bd.com.

About BD Diagnostics – Preanalytical Systems

BD Diagnostics is a leading provider of products for the safe collection and transport of diagnostic specimens and of instrumentation for quick, accurate analysis for a broad range of microbiology and infectious disease testing, including the growing problem of healthcare-associated infections. The segment is composed of two operating units: Preanalytical Systems, a world leader in blood collection devices, and Diagnostic Systems, a leader in microbiology testing products and molecular assays. Product platforms for molecular diagnostics and proteomics applications include blood collection systems for sample preservation and standardization, and instrumentation for high resolution separation of proteins, peptides and cell organelles.

Table of Contents

Molecular Diagnostic Testing/Cell Preparation

| | |
|--|---|
| BD Vacutainer® CPT™ | 2 |
| BD Vacutainer® PPT™ | 4 |
| PAXgene® Blood RNA System | 6 |

Proteomics Analysis and Protein Preservation

| | |
|---|----|
| BD™ P100 Blood Collection System for Plasma Protein Preservation | 8 |
| BD™ P700 Blood Collection System for Plasma GLP-1 Preservation | 9 |
| BD™ P800 Blood Collection System for Plasma GLP-1, GIP, Glucagon, and Ghrelin Preservation | 10 |

| | |
|-----------------------------|----|
| BD Accessories | 12 |
|-----------------------------|----|

| | |
|-------------------------|----|
| References | 13 |
|-------------------------|----|

| | |
|--|------------|
| How to Order Our Products | Back Cover |
|--|------------|

BD Vacutainer® CPT™ Mononuclear Cell Preparation Tube

One-Step Cell Separation

The BD Vacutainer CPT tube offers a single-step, standardized method for isolation of lymphocytes and monocytes from whole blood. Whole blood is drawn directly into the cell preparation tube using standard phlebotomy technique and processed in the same closed and sterile tube. The cell separation medium in the cell preparation tube is comprised of a gel and a density gradient liquid. During centrifugation, the gel forms a physical barrier between the mononuclear cells in plasma from the erythrocytes and granulocytes. The separated, concentrated suspension of mononuclear cells in plasma can then be transported in the primary tube.

Alternatives to BD CPT can result in non-standardized methods which can introduce site-to-site variability in quality and quantity of isolated mononuclear cells, longer processing times, and potential exposure of the user to blood.

The mononuclear cells isolated by the BD Vacutainer CPT Cell Preparation Tube can be used for a variety of downstream assays.*



BD Vacutainer® CPT™ Cell Preparation Tube

Unique Benefits:

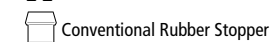
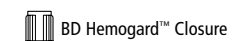
- Standardize cell separation protocol
- Separate mononuclear cells in a single step from whole blood
- Obtain high cell viability and yield
- Transport separated cells in the same processed tube
- Reduce risk of specimen contamination and biohazard exposure
- For *in vitro* diagnostic use



| Reference Number | Glass (G) or Plastic (P) | Tube Size (mm) | Draw Volume (mL) | Closure Type/Color | Label Type | Additive/Concentration | Packaging Box/Case Quantities |
|-------------------------------------|--------------------------|----------------|------------------|-----------------------------|------------|---|-------------------------------|
| Cell Preparation Tube (CPT™) | | | | | | | |
| 362760 | G | 13 x 100 | 4.0 | Conventional/Lt. Blue/Black | Mylar | Sodium Citrate 0.45 mL of 0.1 Molar | 60/Case |
| 362753 | G | 16 x 125 | 8.0 | Conventional/Red/Green | Mylar | Sodium Heparin minimum 132 USP units | 60/Case |
| 362761 | G | 16 x 125 | 8.0 | Conventional/Lt. Blue/Black | Mylar | Sodium Citrate 1.0 mL of 0.1 Molar | 60/Case |

www.vmdp.com

* The BD Vacutainer CPT Cell Preparation Tube has no claims for use with any downstream assay. The use of isolated mononuclear cells must be validated for any given assay.



BD Vacutainer® PPT™ Plasma Preparation Tube

One-Step Sample Collection, Plasma Preparation, and Transportation Tube

The BD Vacutainer PPT is a plastic evacuated tube for the collection of venous blood, which upon centrifugation, separates undiluted EDTA plasma for use in molecular diagnostic test methods, such as but not limited to, polymerase chain reaction (PCR) and/or branched DNA (bDNA) amplification techniques or other procedures where an undiluted EDTA plasma specimen is required as determined by the laboratory.

The BD Vacutainer PPT Tube provides a means for collection, processing and transportation of an undiluted EDTA plasma specimen in a closed evacuated system. The tube combines a gel and spray-dried K₂EDTA anticoagulant for achieving performance. When the sample-filled tube is subjected to centrifugation, the gel migrates and forms a physical barrier between the plasma and most of the cellular elements. Since the tube uses spray-dried K₂EDTA as opposed to liquid additives, the plasma obtained is undiluted.

The result is a convenient, safe, single tube system for the collection of whole blood and the separation of plasma. Samples can be collected, processed and transported *in situ*. The ability to transport the primary tube eliminates the need for aspirating plasma into a secondary tube and reduces exposure to bloodborne pathogens at the collection and sample processing sites.



BD Vacutainer® PPT™ Plasma Preparation Tube

Unique Benefits:

Convenient

- No need for manual transfer of separated plasma into secondary tube
- Minimizes sample identification errors that can occur when tubes are relabeled
- Transport separated plasma in the same processed tube

Consistent

- Spray-dried K₂EDTA anticoagulant ensures undiluted plasma

Safe


- Closed-tube system minimizes exposure to bloodborne pathogens at collection and processing sites
- BD Hemogard™ closure and break-resistant tube reduces sample exposure
- For *in vitro* diagnostic use



| Reference Number | Glass (G) or Plastic (P) | Tube Size (mm) | Draw Volume (mL) | Closure Type/Color | Label Type | Additive/Concentration | Packaging Box/Case Quantities |
|---------------------------------------|--------------------------|----------------|------------------|---------------------------|------------|-----------------------------|-------------------------------|
| Plasma Preparation Tube (PPT™) | | | | | | | |
| 362788 | P | 13 x 100 | 5.0 | BD Hemogard™/ Pearl White | Mylar | K ₂ EDTA 9 mg | 100/1000 |
| 362799 | P | 16 x 100 | 8.5 | BD Hemogard™/ Pearl White | Mylar | K ₂ EDTA 15.8 mg | 100/1000 |

www.vmdp.com

 BD Hemogard™ Closure

 Conventional Rubber Stopper



Analyze RNA As If It Were Still in the Body

The PAXgene Blood RNA System is a revolutionary, enabling technology that consolidates and integrates the key steps of whole blood collection, intracellular RNA stabilization, and RNA purification. By minimizing the instability of intracellular RNA, the system provides enhanced accuracy of RNA analysis.

The PAXgene system uses established and standardized BD Vacutainer® technology, enhancing patient and healthcare worker safety, providing sample protection, and ensuring consistent and accurate blood draw volumes.

The PAXgene Blood RNA Tube contains a proprietary reagent that immediately stabilizes intracellular RNA for three days at room temperature or five days at 2-8°C. PAXgene tubes can be frozen at temperatures of -20°C to -70°C for long-term storage.

The PAXgene kit employs a unique version of Qiagen's proven separation and purification silica membrane technology. The purification process is designed to provide high-quality RNA from samples that have been stabilized by the PAXgene Blood RNA Tube reagent.

The PAXgene Blood RNA System provides clinical laboratories, pharmaceutical companies, Clinical Research Organizations (CROs) and research institutions with a completely integrated approach to whole blood RNA stabilization separation and purification.

PAXgene® Blood RNA System

Unique Benefits:

Trust a proven enabling technology

- The first IVD and CE marked product for RNA preservation and isolation for whole blood
- Reliable, reproducible, quality results backed by over 385 scientific publications
- Fully integrated for manual or automated processing
- Conduct clinical trials and studies without compromising sample quality

Stabilize intracellular RNA at the point of blood collection

- Integrated system for blood collection, stabilization and purification of intracellular RNA
- Transport or store blood specimens for 3 days at 18-25°C or 5 days at 2-8°C
- Freeze tubes at -20 to -70°C for as long as 4 years
- RNA yield* (Avg. 8-10 µg/2.5 mL)

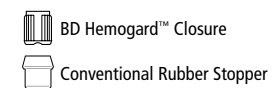
Generate more accurate gene expression data

- Minimize artifacts of induction, down regulation and RNA degradation



| Reference Number | Glass (G) or Plastic (P) | Tube Size (mm) | Draw Volume (mL) | Closure Type/Color | Label Type | Additive/Concentration | Packaging Box/Case Quantities |
|--------------------------------|--------------------------|----------------|------------------|--------------------|------------|------------------------|-------------------------------|
| PAXgene® Blood RNA Tube | | | | | | | |
| 762165** | P | 16 x 100 | 2.5 | BD Hemogard™/Red | Paper | Additive 6.9 mL | 100/Case |

www.PreAnalytix.com



* From 288 blood samples from normal donors.

** PAXgene® Blood RNA Kit (North American Catalog #762164) can be ordered from QIAGEN, or visit <http://www.PreAnalytix.com>. PAXgene is a trademark of PreAnalytix GmbH.

BD™ P100 Blood Collection System for Plasma Protein Preservation



Immediately Stabilizes Plasma Proteins

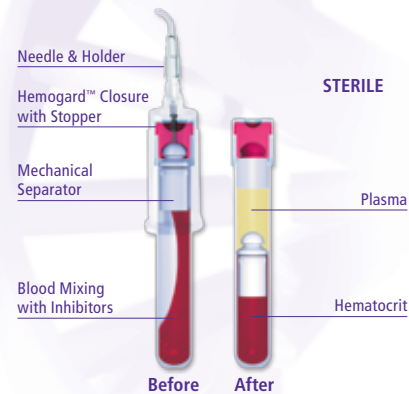
BD P100 is an evacuated blood collection tube that enables greater recovery and preservation of human plasma proteins for proteomics-based biomarker discovery studies. The BD P100 tubes contain a proprietary broad-spectrum protease inhibitor cocktail that provides immediate stabilization of plasma proteins at point of collection. The tube also features a patented, innovative, non-gel “mechanical” separator that results in minimal cellular contamination. The optimized protease inhibitor cocktail combined with features of the mechanical separator minimizes preanalytical variability, thus providing a system for the reproducible collection, separation and transportation of plasma for protein analysis studies.

During centrifugation, the mechanical separator is released from the stopper and migrates to a position between the plasma and cellular elements. After separation, plasma may be aspirated directly from the collection tube, eliminating the need to transfer the plasma to a secondary tube.

Unique Benefits:

BD P100 tubes contain proprietary stabilizers that immediately solubilize during blood collection, enhancing recovery and preservation of plasma analytes:

- On-board stabilizers provide point-of-collection protection of plasma proteins
- Sterile and ready to use
- No reconstitution and secondary transfer steps required
- Innovative mechanical separator minimizes cellular contamination

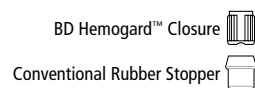


Cross-section view of BD P100 Plasma Tube showing immediate, controlled mixing of blood with the proprietary additive.

| Reference Number | Glass (G) or Plastic (P) | Tube Size (mm) | Draw Volume (mL) | Closure Type/Color | Anticoagulant | Additive | Packaging (Tubes/Kit) |
|---|--------------------------|----------------|------------------|---------------------|-----------------------------|---------------------------------|---|
| BD™ P100 Blood Collection System for Plasma Protein Preservation | | | | | | | |
| 366448 | P | 16 x 100 | ~8.5 | BD Hemogard™/ Clear | 15.8 mg K ₂ EDTA | Proprietary Protein Stabilizers | 24 tubes; 6 tubes/foil pouch 4 foil pouches/kit |

www.bd.com/proteomics

See references on page 13.
BD P100 is for Research Use Only. Not for use in diagnostic procedures.



BD™ P700 Blood Collection System for Plasma GLP-1 Preservation



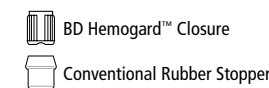
Enhances Preservation of GLP-1

BD P700 is especially suited as the blood collection tube of choice for assays that require quantitation and measurement of the preproglucagon-derived glucose regulatory peptide, glucagon-like peptide 1 (GLP-1). BD P700 contains a proprietary Dipeptidyl Peptidase IV (DPP-IV) protease inhibitor which provides immediate protection of GLP-1 from degradation in plasma.



| Reference Number | Glass (G) or Plastic (P) | Tube Size (mm) | Draw Volume (mL) | Closure Type/Color | Anticoagulant | Additive | Packaging (Tubes/Kit) |
|---|--------------------------|----------------|------------------|------------------------|----------------------------|------------------------------|--|
| BD™ P700 Blood Collection System for Plasma GLP-1 Preservation | | | | | | | |
| 366473 | P | 13 x 75 | ~3.0 | BD Hemogard™/ Lavender | 5.4 mg K ₂ EDTA | Proprietary DPP-IV Inhibitor | 20 tubes; 10 tubes/foil pouch 2 foil pouches/kit |

www.bd.com/proteomics



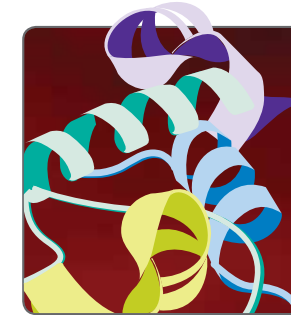
See references on page 13.
BD P700 is for Research Use Only. Not for use in diagnostic procedures.

BD™ P800 Blood Collection System for Plasma GLP-1, GIP, Glucagon, and Ghrelin Preservation

BD P800 Preserves Metabolic Peptides

Enables Metabolic Biomarker Preservation

BD P800 is especially suited as the blood collection tube of choice for assays that require quantitation and measurement of the Glucagon-Like Peptide 1 (GLP-1), Glucose-Dependent Insulinotropic Polypeptide (GIP), Glucagon, and Ghrelin. BD P800 contains a proprietary cocktail of protease, esterase and DPP-IV inhibitors which provides immediate protection of bioactive peptides from degradation in plasma.



The search for proteomic biomarkers in human blood plasma holds incredible clinical potential. Rapid degradation of plasma proteins and peptides due to intrinsic proteolysis occurs within minutes of blood collection and handling. For example, the incretin hormones Glucagon-Like Peptide-1 (GLP-1), Gastric Inhibitory Polypeptide (GIP), and bioactive peptides Glucagon and Ghrelin have an extremely short half-life in blood, making them very challenging for accurate analysis. Therefore, a significant preanalytical challenge is to preserve proteomic sample integrity.



The BD P800 is a sterile, evacuated blood collection tube that offers a standardized method to collect and instantly preserve GLP-1, GIP, Glucagon and Ghrelin. The BD P800 tube has a proprietary cocktail which includes a DPP-IV, esterase and other protease inhibitors that are optimized for blood while yielding high-quality hemolysis-free plasma. The plasma obtained by processing the BD P800 tube can be used immediately, transported, or stored frozen.



Stability (T_{1/2}) of Metabolic Peptides in BD P800 and EDTA Plasma Samples



| Peptide | EDTA (h) | P800 (h) |
|---------------|----------|----------|
| GLP-1 (7-37) | 4-8 | > 96 |
| GLP-1 (7-36A) | 5-23 | > 96 |
| GIP (1-42) | ~ 5 | > 96 |
| Ghrelin | ~ 15 | > 48-72 |
| Glucagon | ~ 5-15 | > 48 |

For clinical research trials, it is highly desirable to have a standardized method to evaluate the metabolic fate of bioactive peptides in biological fluids. Approaches for quantitation of bioactive peptides include immunoassays and mass spectrometric techniques. Disadvantages of some immunoassays include their inability to distinguish between intact and fragmented peptides which may be biologically relevant. Quantification of peptides by this technique, therefore, should be cautiously interpreted. High resolution mass spectrometry is the method of choice for sensitive and selective detection of peptides.

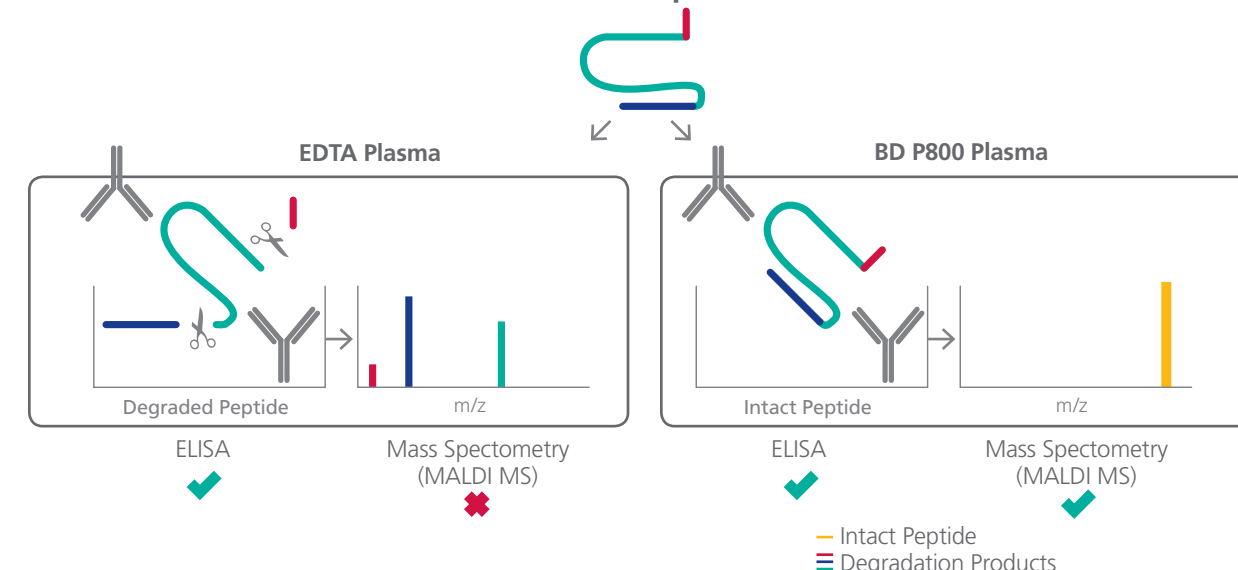
| Reference Number | Glass (G) or Plastic (P) | Tube Size (mm) | Draw Volume (mL) | Closure Type/Color | Anticoagulant | Additive | Packaging (Box/Case) |
|---|--------------------------|----------------|------------------|---------------------|-----------------------------|--|----------------------|
| BD™ P800 Blood Collection System for Plasma GLP-1, GIP, Glucagon, and Ghrelin Preservation | | | | | | | |
| 366420 | P | 13 x 75 | ~2.0 | BD Hemogard™/ Clear | 3.6 mg K ₂ EDTA | Proprietary Cocktail of Protease, Esterase and DPP-IV Inhibitors | 100/Case |
| 366421 | P | 16 x 100 | ~8.5 | BD Hemogard™/ Clear | 15.3 mg K ₂ EDTA | Proprietary Cocktail of Protease, Esterase and DPP-IV Inhibitors | 100/Case |

www.bd.com/proteomics

See references on page 13.
BD P800 is for Research Use Only. Not for use in diagnostic procedures.

BD Hemogard™ Closure 
Conventional Rubber Stopper 

Intact Peptide



Required BD Accessories *(sold separately)*

Please note that all BD Vacutainer® Blood Collection Sets and Accessory Products can be purchased separately from your authorized distributor. Please visit www.bd.com/vacutainer/products for additional information.

BD Vacutainer® Push Button Blood Collection Sets

The BD Vacutainer Push Button Blood Collection Set offers split-second protection for that single moment that could potentially change your life. The push-button safety mechanism instantly helps protect you against needlestick injury.

| Reference Number | Needle Gauge | Needle Length (Inches) | Wing Color | Tubing Length (Inches) | Configuration With or Without Luer | Packaging Box/Case Quantities |
|---|--------------|------------------------|------------|------------------------|------------------------------------|-------------------------------|
| BD Vacutainer® Push Button Blood Collection Sets | | | | | | |
| ✓ 367344 | 21 | .75 | Green | 12 | With | 50/200 |
| ✓ 367352 | 21 | .75 | Green | 12 | Pre-Attached | 20/100 |

BD Vacutainer® Safety-Lok™ Blood Collection Sets

The BD Vacutainer Safety-Lok Blood Collection Set is simple, easy to use, and is safety-engineered. The safety mechanism can be activated immediately after the blood draw and helps protect against needlestick injury. It is also offered with a pre-attached holder for added convenience and to help ensure OSHA single-use holder compliance.

| Reference Number | Needle Gauge | Needle Length (Inches) | Wing Color | Tubing Length (Inches) | Configuration With or Without Luer | Packaging Box/Case Quantities |
|---|--------------|------------------------|------------|------------------------|------------------------------------|-------------------------------|
| BD Vacutainer® Safety-Lok™ Blood Collection Sets | | | | | | |
| 367281 | 21 | .75 | Green | 12 | With | 50/200 |
| 368652 | 21 | .75 | Green | 12 | Pre-Attached | 25/200 |

BD Vacutainer® Holders

BD Vacutainer holders provide a quality, low-cost, single-use product that can help customers comply with OSHA regulations. The BD Vacutainer® One-Use Holder is compatible with BD Vacutainer® Eclipse™ Blood Collection Needles, BD Vacutainer® Safety-Lok™ Blood Collection Sets, BD Vacutainer® Push Button Blood Collection Sets, and the BD Vacutainer® Multi Sample Luer Adapter.

| Reference Number | Description | Packaging Box/Case Quantities |
|-------------------------------|------------------------------|-------------------------------|
| BD Vacutainer® Holders | | |
| ✓ 364815 | BD Vacutainer One-Use Holder | 250/1000 |

www.bd.com/vacutainer



✓ Best Practice

References

BD™ P100 Blood Collection System for Plasma Protein Preservation

Comparative Human Plasma Peptidome Analysis: BD P100 vs EDTA

Journal Articles

J. Yi, et al.

"Inhibition of Intrinsic Proteolytic Activities Moderates Preanalytical Variability and Instability of Human Plasma"
J Proteome Res., 2007;6:1768-1781.

Yi J, Liu Z, Craft D, O'Mullan P, Ju G, Gelfand CA.

"Intrinsic Peptidase Activity Causes a Sequential Multi-Step Reaction (SMSR) in Digestion of Human Plasma Peptides"
J Proteome Res., 2008;7(12):5112-5118.

Craft D, Yi J, Gelfand CA.

"Time-Dependent and Sample-to-Sample Variations in Human Plasma Peptidome Are Both Minimized Through Use of Protease Inhibitors"
Analytical Letters. 2009;42(10):1398-1406.

O'Mullan P, Craft D, Yi J, Gelfand CA.

"Thrombin induces broad spectrum proteolysis in human serum samples"
Clin Chem Lab Med. 2009;47(6):685-693.

Scientific Posters

HUPO, Seattle, Washington, 2007

- Preanalytical Variability of Plasma Samples and Mitigating Strategies
- Monitoring Peptidome Variance within Different Blood Collection to Further Understand Human Plasma Proteome Stability

PepTalk, San Diego, California, 2007

- Stabilization of the Human Plasma Peptidome by Protease Inhibitors

HUPO, Long Beach, California, 2006

- Using LC-MALDI-MS to Study the Variability and Stability of Plasma Proteins

Protein Society, San Diego, California, 2006

- A Deeper Look Into Sample Collection and Handling-induced Variability of Plasma Proteins in Proteomics

HUPO, Boston, Massachusetts, 2006

- Characterization of Intrinsic Proteolytic Damage of Human Plasma Proteins During Sample Preparation

ASMS, Seattle, Washington, 2006

- Preanalytical Variability and the Stability of Human Plasma Proteins: Mass Spectrometry Changes After Blood Collection

US HUPO, Washington, DC, 2005

- Prevention of Proteolytic Digestion of Human Plasma Proteins by Protease Inhibitors

Comparative Human Plasma Peptidome Analysis: BD P100 vs Serum

Journal Articles

J. Yi, et al.

"Inhibition of Intrinsic Proteolytic Activities Moderates Preanalytical Variability and Instability of Human Plasma"
J Proteome Res. 2007;6:1768-1781.

Scientific Posters

HUPO, Seattle, Washington, 2007

- Preanalytical Variability of Plasma Samples and Mitigating Strategies

AACR, Washington, DC, 2007

- Inhibition of Intrinsic Proteolysis Stabilizes Plasma Samples

HUPO, Long Beach, California, 2006

- Inhibition of Intrinsic Proteolytic Activity Moderates Preanalytical Variability and Stabilizes the Human Plasma Proteome

AQUA Peptide Plasma and Serum Studies

Scientific Posters

HUPO, Seoul, South Korea, 2007

- Demonstrating Instability of Peptide Biomarkers in Human Blood Plasma Using Time-Course Mass Spectrometry

Mechanical Separator Studies

Scientific Posters

HUPO, Seattle, Washington, 2007

- Preanalytical Variability of Plasma Samples and Mitigating Strategies

AACC, Chicago, Illinois, 2006

- Effect of Plasma Separators on Peptide MALDI-TOF MS Spectra

Thrombin Studies: Nonspecific Proteolysis Induction in Serum Samples

Scientific Posters

AACC, Chicago, Illinois, 2006

- Thrombin Exhibits Nonspecific Proteolysis in Serum; Observations with Fibrinopeptide A

HUPO, Munich, Germany, 2005

- Intrinsic Preanalytical Variability of Serum Samples Is Evidenced in Peptide MALDI MS Spectra

BD™ P700 Blood Collection System for Plasma GLP-1 Preservation

AQUA Peptide Plasma and Serum Studies

Scientific Posters

HUPO, Seoul, South Korea, 2007

- Demonstrating Instability of Peptide Biomarkers in Human Blood Plasma Using Time-Course Mass Spectrometry

BD™ P800 Blood Collection System for Plasma GLP-1, GIP, Glucagon, and Ghrelin Preservation

Scientific Posters

The Association for Mass Spectrometry: Applications to the Clinical Laboratory, 2010

- Metabolic Peptide Biomarkers: From Sample to Spectrum

BD White Papers

- Ex vivo Stabilization of GLP-1 and GIP in Human Plasma
- Comparison of the BD P800 and BD P700 Blood Collection Systems and Other Protease Inhibitors for the Preservation of Active GLP-1
- Compatibility of BD P800 Tubes with Insulin Testing by Automated Immunoassay Analyzer and ELISA