



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](http://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 standardisation, and instrumentation for high resolution separation of proteins, peptides and cell organelles.

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# BD Vacutainer® CPT™ Mononuclear Cell Preparation Tube



## One-Step Cell Separation

The BD Vacutainer CPT tube offers a single-step, standardised 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-standardised 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.\*

\* 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® CPT™ Cell Preparation Tube


### Unique Benefits:

- Standardise 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/Colour	Label Type	Additive/ Concentration	Packaging Box/Case Quantities
<b>Cell Preparation Tube (CPT™)</b>							
362781	G	13 x 100	4.0	Conventional/ Lt. Blue/Black	Mylar	Sodium Citrate 0.45 mL of 0.1 Molar	60/Case
362780	G	16 x 125	8.0	Conventional/ Red/Green	Mylar	Sodium Heparin minimum 132 USP units	60/Case
362782	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](http://www.vmdp.com)

 BD Hemogard™ Closure

 Conventional Rubber Stopper

# 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  $K_2$ EDTA 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  $K_2$ EDTA 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
- Minimises sample identification errors that can occur when tubes are relabeled
- Transport separated plasma in the same processed tube

#### Consistent


- Spray-dried K<sub>2</sub>EDTA anticoagulant ensures undiluted plasma


#### Safe

- Closed-tube system minimises 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/Colour	Label Type	Additive/ Concentration	Packaging Box/Case Quantities
<b>Plasma Preparation Tube (PPT™)</b>							
362795	P	13 x 100	5.0	BD Hemogard™/ Pearl White	Mylar	K <sub>2</sub> EDTA 9 mg	100/1000
362799	P	16 x 100	8.5	BD Hemogard™/ Pearl White	Mylar	K <sub>2</sub> EDTA 15.8 mg	100/1000

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# PAXgene® Blood RNA System



## Analyse 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 stabilisation, and RNA purification. By minimising the instability of intracellular RNA, the system provides enhanced accuracy of RNA analysis.

The PAXgene system uses established and standardised 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 stabilises 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 stabilised by the PAXgene Blood RNA Tube reagent.

The PAXgene Blood RNA System provides clinical laboratories, pharmaceutical companies, Clinical Research Organisations (CROs) and research institutions with a completely integrated approach to whole blood RNA stabilisation 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

#### Stabilise intracellular RNA at the point of blood collection


- Integrated system for blood collection, stabilisation 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

- Minimise artifacts of induction, down regulation and RNA degradation

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

[www.PreAnalytix.com](http://www.PreAnalytix.com)

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\* From 288 blood samples from normal donors.

\*\* PAXgene® Blood RNA Kit (Catalogue No. 762174) can be ordered from QIAGEN, or visit <http://www.PreAnalytix.com>. PAXgene is a trademark of PreAnalytix GmbH.

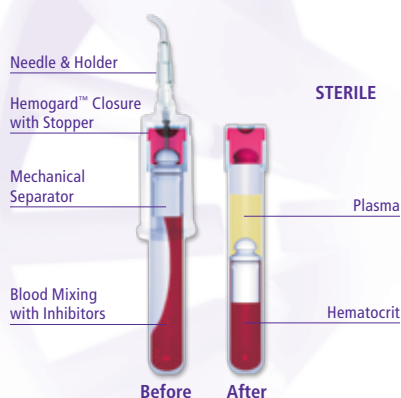
# BD™ P100 Blood Collection System for Plasma Protein Preservation



## Immediately Stabilises 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 stabilisation 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 optimised protease inhibitor cocktail combined with features of the mechanical separator minimises 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.



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

## Unique Benefits:



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

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

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

[www.bd.com/proteomics](http://www.bd.com/proteomics)

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

BD Hemogard™ Closure   
Conventional Rubber Stopper 

# 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 proglucagon-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/Colour	Anticoagulant	Additive	Packaging (Tubes/Kit)
<b>BD™ P700 Blood Collection System for Plasma GLP-1 Preservation</b>							
366473	P	13 x 75	~3.0	BD Hemogard™/Lavender	5.4 mg K <sub>2</sub> EDTA	Proprietary DPP-IV Inhibitor	20 tubes; 10 tubes/foil pouch 2 foil pouches/kit

[www.bd.com/proteomics](http://www.bd.com/proteomics)

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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





## 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.

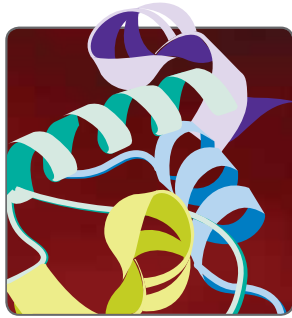
Reference Number	Glass (G) or Plastic (P)	Tube Size (mm)	Draw Volume (mL)	Closure Type/Colour	Anticoagulant	Additive	Packaging (Box/Case)
<b>BD™ P800 Blood Collection System for Plasma GLP-1, GIP, Glucagon, and Ghrelin Preservation</b>							
366420	P	13 x 75	~2.0	BD Hemogard™/ Clear	3.6 mg K <sub>2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

[www.bd.com/proteomics](http://www.bd.com/proteomics)

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

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# BD P800 Preserves Metabolic Peptides



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.

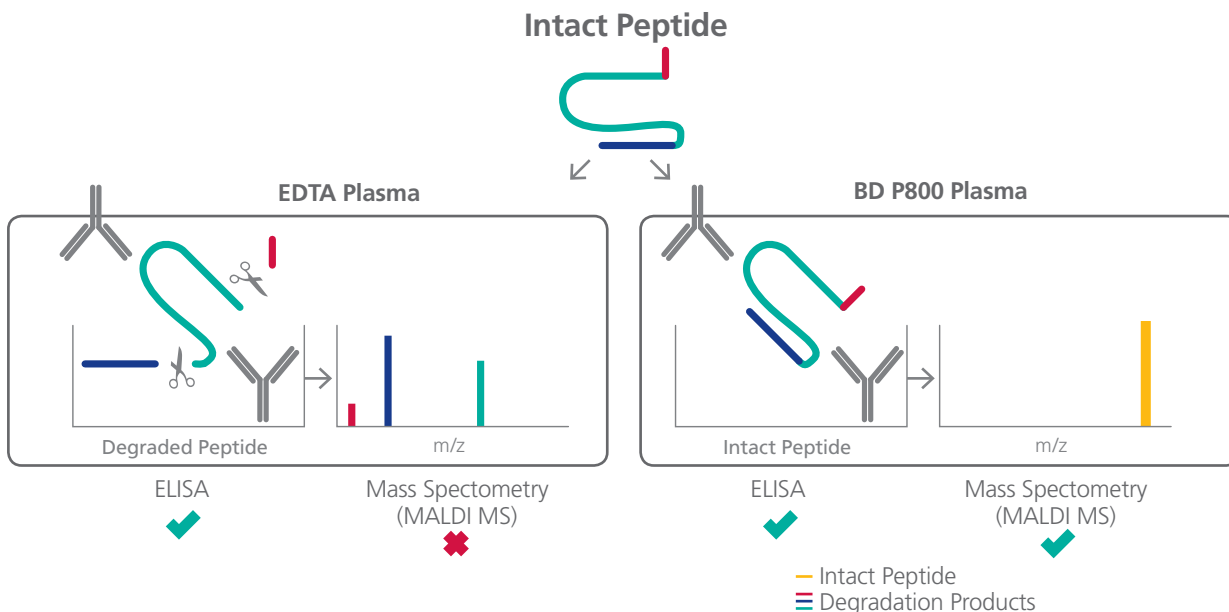


The BD P800 is a sterile, evacuated blood collection tube that offers a standardised method to collect and instantly preserve GLP-1, GIP, Glucagon and Ghrelin. The BD P800 tube has a proprietary cocktail which includes a DPP-IV, esterase and other protease inhibitors that are optimized for blood while yielding high-quality haemolysis-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 standardised 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.



# Required BD Accessories *(sold separately)*

Please note that all BD Vacutainer® Blood Collection Sets and Accessory Products can be purchased separately from your local BD representative.

## BD Vacutainer® Push Button Blood Collection Sets

The BD Vacutainer Push Button Blood Collection Set offers split-second protection at the push of a button. The push-button safety mechanism instantly helps protect you against needlestick injury.



Reference Number	Needle Gauge	Needle Length (Inches)	Wing Colour	Tubing Length (Inches)	Configuration With or Without Luer	Packaging Box/Case Quantities
<b>BD Vacutainer® Push Button Blood Collection Sets</b>						
367344	21	.75	Green	12	With	50/200
368657	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.



Reference Number	Needle Gauge	Needle Length (Inches)	Wing Colour	Tubing Length (Inches)	Configuration With or Without Luer	Packaging Box/Case Quantities
<b>BD Vacutainer® Safety-Lok™ Blood Collection Sets</b>						
367282	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. 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
<b>BD Vacutainer® Holders</b>		
364815	BD Vacutainer One-Use Holder	250/1000



[www.bd.com/vacutainer](http://www.bd.com/vacutainer)

## 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

# BD Diagnostics – Preanalytical Systems Technology Built on Trust

## Ordering and Technical Information

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Germany	+49 6221305553	+49 6221305379	<a href="http://www.bd.com/de">http://www.bd.com/de</a>
Switzerland	+41 614852222	+41 6148522200	<a href="http://www.bd.com/ch">http://www.bd.com/ch</a>
Austria	+43 1706366025	+43 1706366011	
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The Netherlands	+31 206545716	+31 205829421	info.benelux@europe.bd.com
Italy	+39 3356983269	+39 0240918011	<a href="http://www.bdeurope.com/italia">http://www.bdeurope.com/italia</a>
Spain & Portugal	+34 902271727	+34 918488104	order.spain@europe.bd.com/info.spain@europe.bd.com
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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.



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