GL Sciences

Sample Preparation for Biological Samples

MonoSpin

Biological Samples
Spin Cartridges

Sample Preparation for Biological Samples

Monospin is a solid-phase extraction spin column designed for biological samples such as blood, serum, and urine.
It utilizes silica monoliths as its base material, featuring uniform continuous pores.
Through centrifugation, it effectively and rapidly extracts, isolates, purifies, and concentrates samples.

Whole Blood

Plasma, Serum

Urine

Operation method

Short time centrifugation is used to pass the liquid in solid-phase extraction.

The whole sample treatment process can be done within 10 min.

Condition, Equilibrate | **Load** | **Wash** | **Elute** | **Ready for Analysis**

Centrifuge Operation

Format

MonoSpin series cartridges of different types are available:
Type S: Excellent for pretreating the sample for 50–800 µL
Type L: Appropriate for sample 0.5–8 mL.
For the details of the varied functional group, please see the next page.

Spin Type

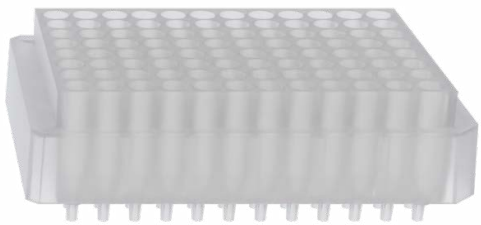
- Disk size : 4.2 × 1.5 mm
- Sample volume : up to 800 µL
- Elution volume : 50 to 800 µL
- Centrifugation speed : 2,000 to 10,000 × *g*

Large Type

- Disk size : 9 × 3 mm
- Sample volume : up to 8 mL
- Elution volume : 0.5 to 8 mL
- Centrifugation speed : 1,000 × *g*

NOTE) MonoSpin ProA and MonoSpin ProG have different shapes. Please see page 16 for details.

96 Well plate type



- Sample volume : up to 800 µL
- Elution volume : 50 to 800 µL
- Centrifugation speed : 1,000 to 5,000 × *g* (can be used in vacuum aspiration)

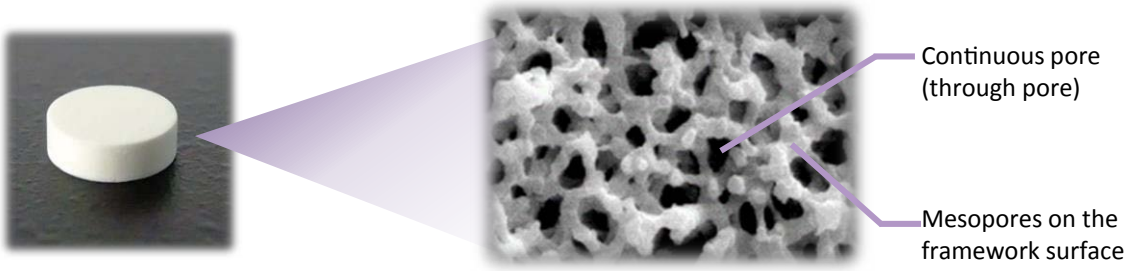
NOTE) MonoSpin C18 FF, MonoSpin ProA and MonoSpin ProG have different specifications.
Please see page 14 and 15 for details.

Large Spin Column

- Maximum 16 mg antibody can be recovered by centrifuge.

Silica monolith ~ New separation media that are neither particulate nor membrane ~

Silica monoliths are integral silica gels with uniform continuous pores and produced from ethyl silicate. Unlike the particle media, the silica monolith is shaped like a disk. Silica monoliths have high liquid permeability and large surface area as they have through-pores and mesopores on their framework surface. Thus, this state-of-the-art medium is becoming popular worldwide for its properties: high recovery, high performance of adsorption, and desorption.

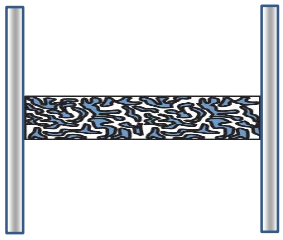


Silica monolith structure

Advantages of Monolithic SPE materials over particle packed SPE materials

- ❖ Disk-shaped silica monoliths do not use frits to hold particle media in traditional solid-phase extraction cartridges.
- ❖ Monolithic material has a massive surface area, making it possible to reduce the sample volume. Silica monoliths makes it possible to retain samples in the cartridge and completely elute small samples during processing.
- ❖ Despite its high liquid permeability, it is also suitable for fast elution without losing its high recovery as it achieves rapid sample diffusion and separation.

Silica monolith



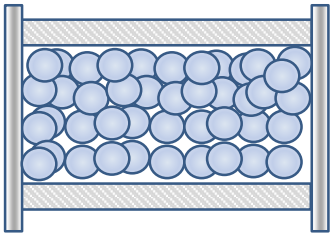
- No filter required
- Minimized separation media

Bed volume for separation media : small

Sample diffusion in the column : fast

Separation speed : fast

Particle-filled Form



- Need for filters

→ liquid may be remained in the filter

Bed volume for separation media : large

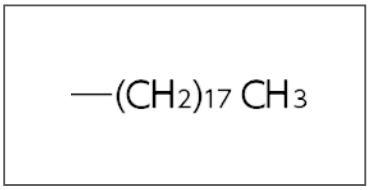
Sample diffusion in the column : slow

Separation speed : slow

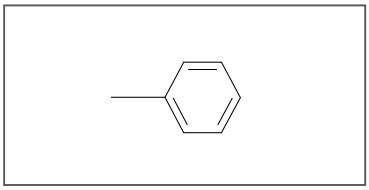
MonoSpin series lineup

- **Reversed Phase Columns**

MonoSpin C18/C18 FF

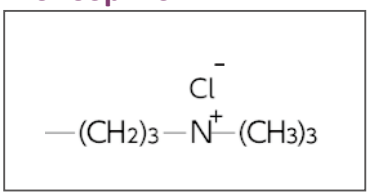


MonoSpin Ph

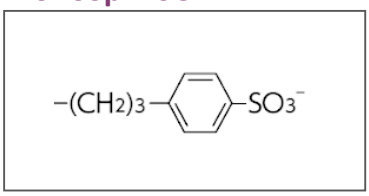


- **Ion Exchange Columns**

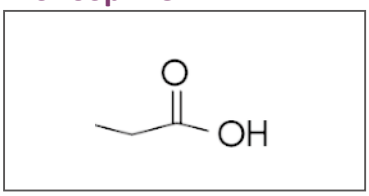
MonoSpin SAX



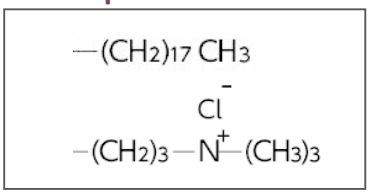
MonoSpin SCX



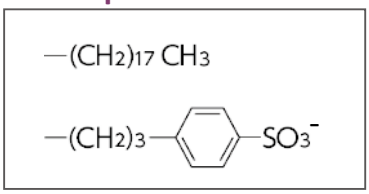
MonoSpin CBA



MonoSpin C18-AX

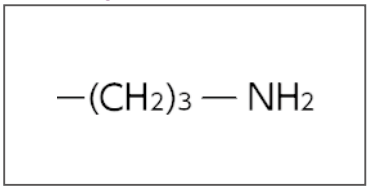


MonoSpin C18-CX

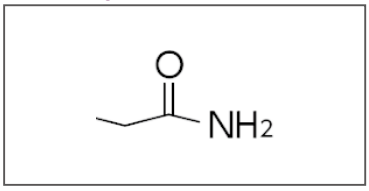


- **HILIC Columns**

MonoSpin NH2

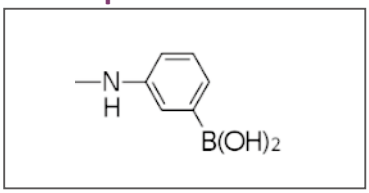


MonoSpin Amide

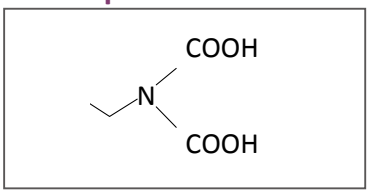


- **Affinity Columns**

MonoSpin PBA



MonoSpin ME



MonoSpin TiO

TiO_2

MonoSpin Phospholipid

TiO_2

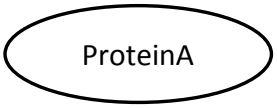
ZrO_2

MonoSpin Trypsin HP

Trypsin

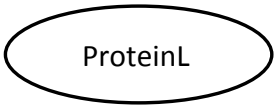
- **Antibody Purification Columns**

MonoSpin ProA



MonoSpin ProG

MonoSpin ProL



Characteristics of MonoSpin Series

Purification and Enrichment of Trace Analytes

Due to its high permeability, the MonoSpin series enables quicker and more efficient purification and enrichment with centrifugation.
It is also recommended to elution small volume samples, and trace analytes can be collected without dilution.

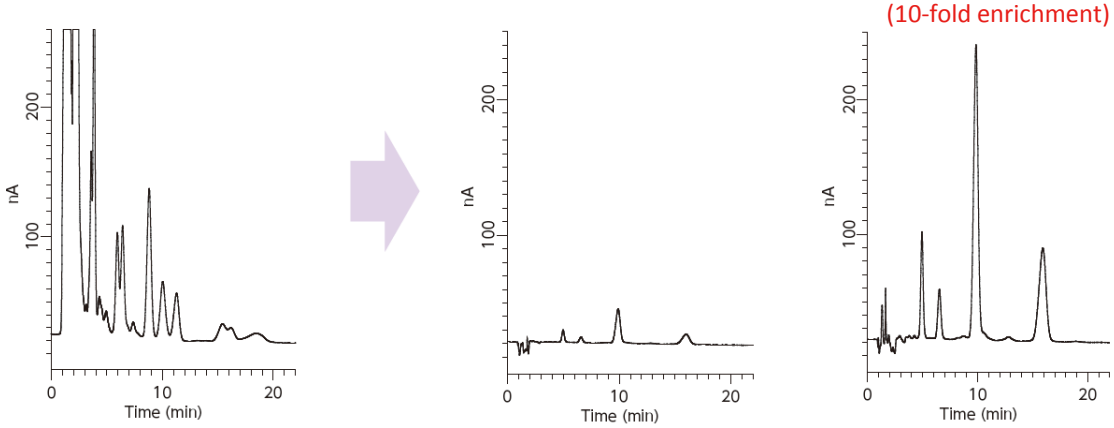
S type

Purification of Catecholamine by MonoSpin PBA
Sample volume : 500 µL

Before purification

Elution Volume : 500 µL

Elution Volume : 50 µL
(10-fold enrichment)



Conditions

Column : Inertsil ODS-3（5 µm, 150×2.1 mm I.D.）
Eluent : 50 mM Phosphate buffer (pH 5.6)
50 mg/L EDTA, 600 mg/L IPCC-008, -10% Methanol
Flow Rate : 0.3 mL/min

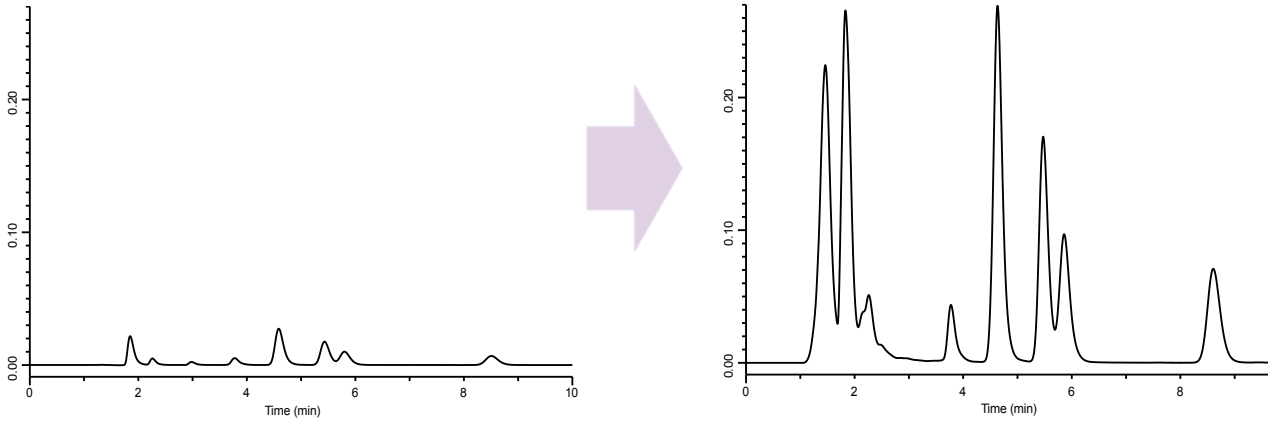
Col.Temp. : 35 ℃
Injection Vol. : 5 µL
Detection : ECD Pulse Mode

Please see page 10 for preprocessing methods, etc.

L type

Purification of Serum samples by MonoSpin L
Sample volume : 5,000 µL
Elution volume : 500 µL
(10-fold concentration)

Before purification



Conditions

Column : Inertsil ODS-3（5 µm, 150×4.6 mm I.D.）
Eluent : CH_3CN/3 mM KH_2PO_4, 27 mM SDS= 48 / 52
Flow Rate : 1.0 mL/min

Col.Temp. : 40 ℃
Injection Vol. : 1 µL
Detection : 230 nm

Physical properties of MonoSpin series

Product name	Functional Group	S Type / 96 well		L Type		Surface Area (m2/g)	Bed Capacity (For type S)	
		Through pore (µm)	Mesopore (nm)	Through pore (µm)	Mesopore (nm)			
MonoSpin C18	Octadecyl group	5	10	10	10	350	100 µg	Amitriptyline
MonoSpin C18 FF	Octadecyl group	20	15	10	10	300	50 µg	Amitriptyline
MonoSpin Ph	Phenyl group	5	10	-	-	350	100 µg	Amitriptyline
MonoSpin C18-AX	Octadecyl group,	5	10	-	-	350	100 µg	Ibuprofen
	Quaternary ammonium							
MonoSpin C18-CX	Octadecyl group,	5	10	-	-	350	100 µg	Amitriptyline
	Benzenesulfonic acid group							
MonoSpin SAX	Trimethylaminopropyl group	5	10	10	10	350	100 µg	Ibuprofen
MonoSpin SCX	Propylbenzenesulfonic acid group	5	10	10	10	350	100 µg	Amitriptyline
MonoSpin NH2	Aminopropyl-group	5	10	10	10	350	100 µg	Maltopentaose
MonoSpin CBA	Carboxyl group	5	10	10	10	350	100 µg	Amitriptyline
MonoSpin Amide	Amide group	5	10	-	-	350	100 µg	Angiotensin Ⅱ
MonoSpin PBA	Phenylboronic acids	5	10	-	-	350	100 µg	Dopamine
MonoSpin TiO	Titanium dioxide	20	15	-	-	200	40 µg	Adenosine monophosphate
MonoSpin Trypsin HP	Trypsin	5	10	-	-	100	-	-
MonoSpin ME	Iminodiacetic acid group	5	10	10	10	350	25 µg	Cu ions
MonoSpin Phospholipid	Titanium dioxide Zicronium dioxide	5	10	10	10	350	10 µL	Human serum
MonoSpin ProA	Protein A	2	60	2	60	-	400 µg	Human IgG
MonoSpin ProG	Protein G	2	60	2	60	-	300 µg	Human IgG
MonoSpin ProL	Protein L	2	60	2	60	-	200 µg	Human IgG

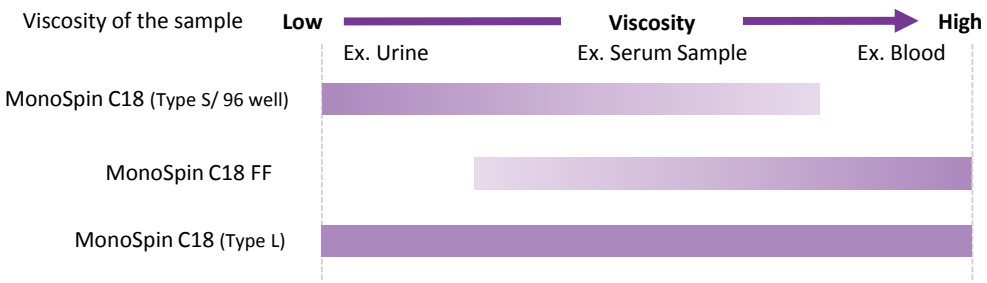
Specifications for Shape and Type

Type	MonoSpin S type *1	MonoSpin FF *2	MonoSpin L type	MonoSpin 96 well type
Disk size	4.2×1.5 mm	4.2×1.5 mm	9×3 mm	4.2×1.5 mm
Sample Volume	Up to 800 µL	Up to 800 µL	Up to 8 mL	Up to 800 µL
Elution Volume	50 to 800 µL	50 to 800 µL	0.5 to 8 mL	100 to 800 µL
Centrifugal force	2,000 to 10,000 × *g*	1,000 × *g*	1,000 × *g*	1,000 to 5,000 × *g*

*1:MoSpin ProA and MonoSpin ProG are different in specifications. Please refer to page 15 for the details.
*2:FF type is available for MonoSpin C18 FF only.

The Viscosity of the Sample

The MonoSpin series is optimized as a spin column for pretreatment of biological samples. If you are working on very viscous samples such as blood, MonoSpin C18 FF is the best choice.
Please refer to the following chart for choosing the suitable MonoSpin.



Application

Purification of Amphetamines in urine using MonoSpin C18

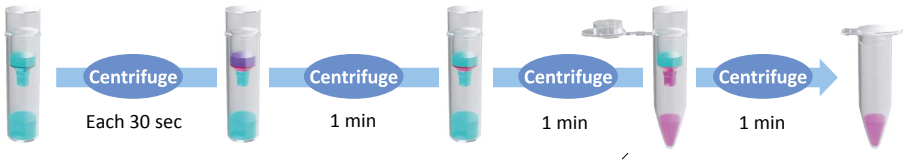
Sample Volume 800 µL

Urine : 400 µL

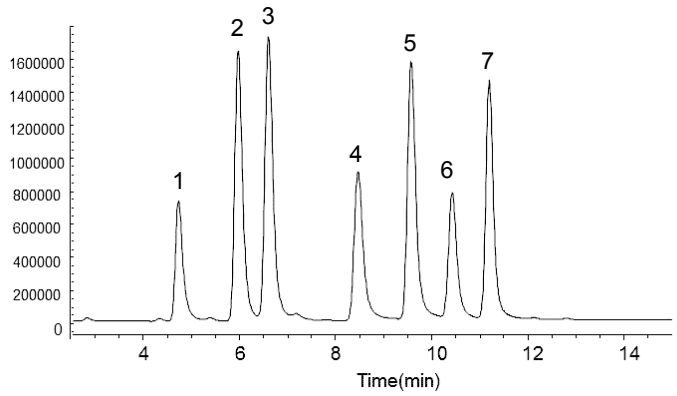
Buffer solution (pH 13) : 400 µL

*Sample was mixed for 1 min at 10,000 x g. Transferred and used the supernatant as sample.

Centrifuge : 5,000 × *g*



1. Condition	2. Load	3. Wash	4. Elute	Ready for Analysis
① Methanol 300 µL ② Buffer (pH 13) 300 µL (①→Centrifuge→②)	Sample solution 800 µL	Buffer (pH 13) 300 µL	Methanol-0.1 % Formic acid (1:1, v/v) 100 µL	



※ Data provided by Dr. Namera, Hiroshima University

Conditions

Column : InertSustainSwift C18
(3 µm, 150 × 2.1 mm I.D.)

Eluent : A) 10 mM $HCOONH_4$ (pH 3.3)
B) CH_3OH
A/B = 90/10 - 2 min - 90/10 - 13 min - 70/30, v/v

Flow Rate : 0.3 mL/min

Col. Temp. : 40 ℃

Detection : LC/MS

Sample : 1. Norephedrine
2. Ephedrine
3. Methylephedrine
4. Amphetamine
5. Methamphetamine
6. 3,4-methylenedioxyamphetamine
7. 3,4-methylenedioxymethamphetamine

Recovery of drugs in biological samples using MonoSpin C18

Sample Volume 600 µL

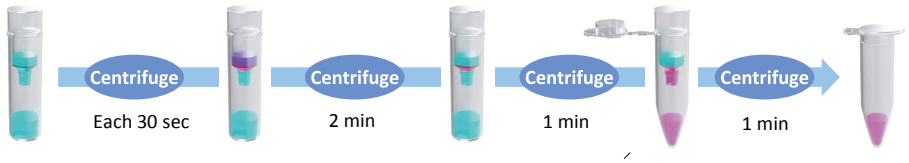
Serum : 200 µL

10 mM potassium phosphate :

400 µL (pH 7.0)

* Sample was mixed for 1 min at 10,000 ×g. Transferred and used the supernatant as sample.

Centrifuge : 2,300 × *g*



1. Condition
① Methanol 300 µL
②10 mM Potassium phosphate (pH 7.0) 300 µL
(①→Centrifuge→②)

2. Load
Sample solution 600 µL

3. Wash
Water 300 µL

4. Elute
Acetonitrile 200 µL

Ready for Analysis

Day-to-day reproducibility of the drug in serum using MonoSpin C18 (3 days, n = 10).

Sample	Concentration (ng/mL)	Recovery rate (%)	RSD (%)
Desipramine	5	91.2	4.8
	10	86.1	3.3
	50	85.2	5.9
	250	88.4	6.5
Imipramine	5	96.3	9.5
	10	95.8	1.5
	50	94.5	0.9
	250	95.9	0.9
Fluvoxamine	5	96.8	11.6
	10	87.1	5.0
	50	86.8	8.1
	250	87.5	9.7
Paroxetine	5	83.7	3.9
	10	84.1	7.8
	50	83.9	8.2
	250	86.7	7.5

Sample	Concentration (ng/mL)	Recovery rate (%)	RSD (%)
Maprotiline	5	85.7	8.1
	10	84.7	3.2
	50	88.6	5.4
	250	87.5	7.7
Duloxetine	5	106.3	9.9
	10	104.8	6.7
	50	99.8	8.7
	250	99.8	6.0
Amitriptyline	5	83.7	7.0
	10	81.8	2.8
	50	83.8	3.0
	250	88.4	2.7
Sulpiride	5	97.9	9.0
	10	95.5	8.5
	50	90.8	2.6
	250	92.6	3.0

Application

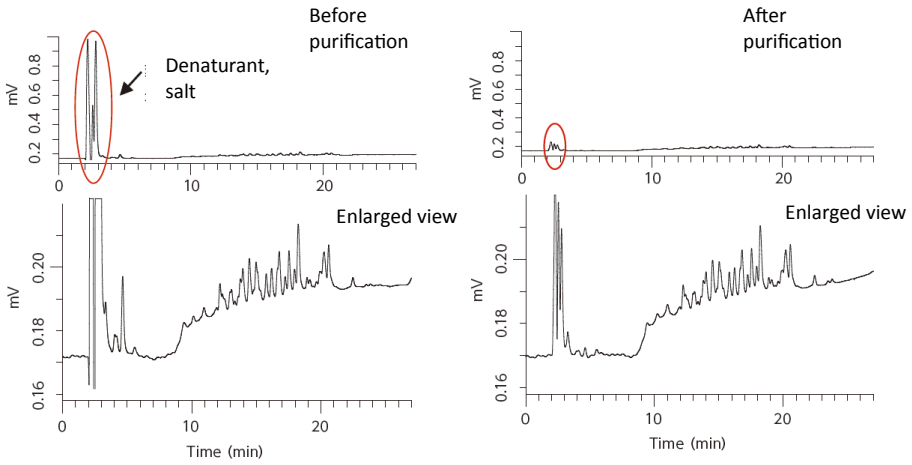
Desalination of protein digestion using MonoSpin C18

Maximum sample solution 800 µL

After Tryptic digestion,
add TFA to adjust the concentration to o.1%.

Centrifuge : 2,300 × *g*

1. Condition	2. Load	3. Wash	4. Elute	Ready for Analysis
① Acetonitrile 200 µL ② 0.1% aqueous TFA 200 µL (①→Centrifuge→②)	Sample solution Maximum 800 µL	0.1 % aqueous TFA 200 µL	60 % acetonitrile 200 µL	



Conditions

Column : Inertsil ODS-3
(3 µm, 150× 2.1 mm I.D.)

Eluent : A) H_2O (0.1 % TFA)
B) CH_3CN (0.1 % TFA)
A/B = 90/10 - 20 min - 50/50

Flow Rate : 0.2 mL/min

Col. Temp. : 40 ℃

Detection : UV 210 nm

Sample : Digested BSA 2 µL

Highly concentrated denaturant and salt in digestive were successfully removed using MonoSpin C18.

Rapid Digestion of BSAs by MonoSpin Trypsin HP

■ Ex. Reductive alkylation protocol

1 mg bovine serum-albumin

----- 500 mM Tris-HCL(pH 8. 0)-- 8 M urea (Solution 1): 175 µL

----- 40 mg/mL Dithiothreitol in Solution 1: 25 µL

----- Incubation at 37 ℃ for 90 min

----- 40 mg/mL Iodoacetamide in Solution 1: 50 µL

----- Incubation at 37 ℃ for 30 min (under shaded conditions)

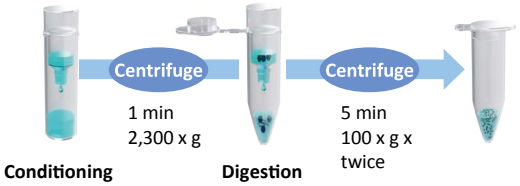
Reductive alkylation of proteins: 250 µL

----- Dilute with 50 mM Ammonium bicarbonate to adjust the urea to 2 M: 750 µL

↓

MonoSpin Trypsin HP

NOTE) The method of reductive alkylation should be optimized depending on the type of protein.



Conditions

Column : Inertsil ODS-3
(3 µm, 150× 2.1 mm I.D.)

Eluent : A)H_2O (0.1 %HCOOH)
B)CH_3CN (0.1 %HCOOH)
A/B = 90/10 - 20 min - 50/50

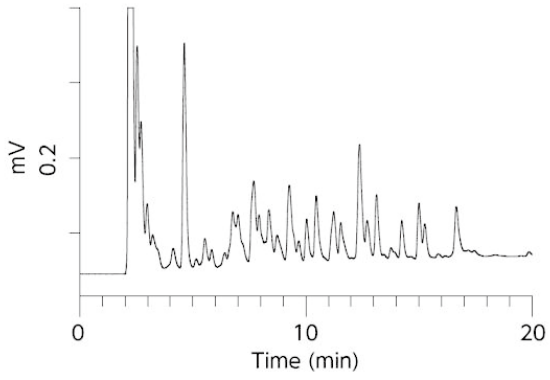
Flow Rate : 0.2 mL/min

Col. Temp. : 40 ℃

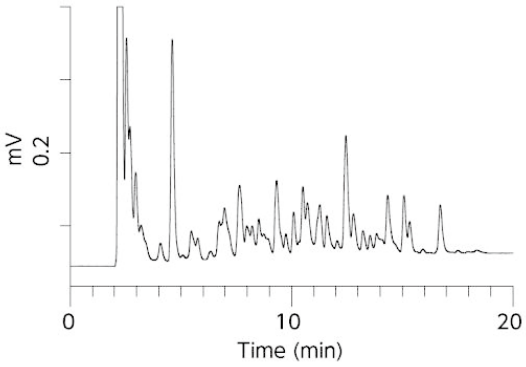
Detection : UV 210 nm

Sample : Digested BSA 2 µL

● In-Solution digestion (37 ℃ for 10 h)



● Digested with MonoSpin Trypsin HP(at 25℃ for 10 min)



NOTE) For digestion, be sure to use protein after reductive alkylation.

Trypsin-immobilized spin column can complete the process just in 10 min.

Application

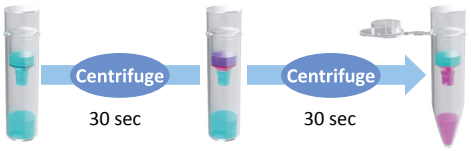
Fractionation of Protein digests using MonoSpin SCX

The use of spin columns and elution salt concentration stepwise makes it feasible to fractionate peptides without using 2D-LC or other complex systems.

Sample Volume: 500 µL

Used Peptide sample dissolved in 0.1% Formic acid after desalting with MonoSpin C18.

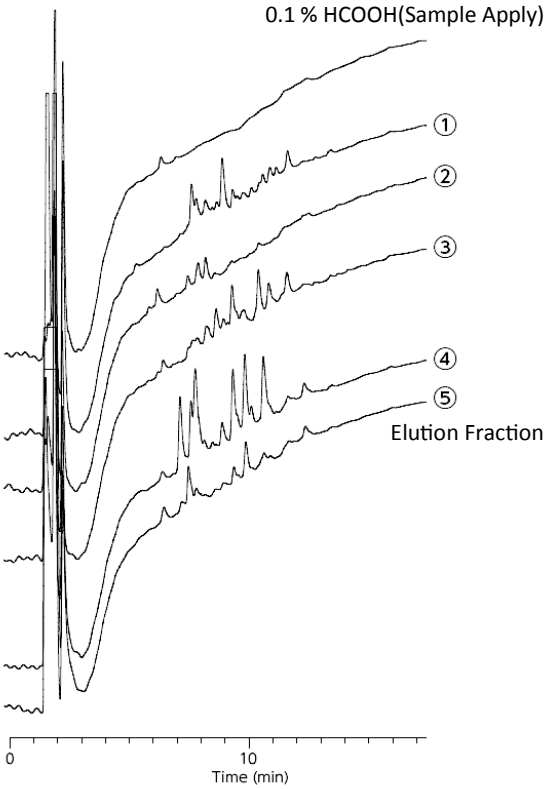
Centrifuge : 10,000 × *g*



1. Condition, Equilibrate
0.1 % formic acid
300 µL

2. Load
Peptide sample
500 µL

3. Elute



Apply the eluent, centrifuge, and then attach a new tube to apply the next eluent.

Each eluate composition

① 25 mM $HCOONH_4$ 200 µL
② 50 mM $HCOONH_4$ 200 µL
③ 100 mM $HCOONH_4$ 200 µL
④ 500 mM $HCOONH_4$ 200 µL
⑤ 1 M $HCOONH_4$ 200 µL

Injection) Each solution contains 10% acetonitrile.

Conditions

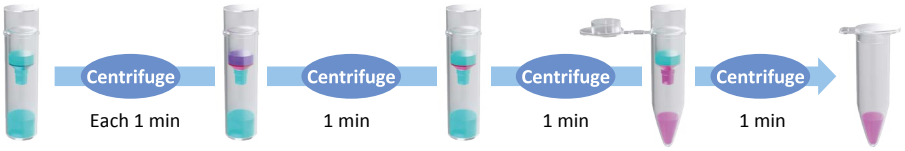
Column : Inertsil ODS-3 (3 µm, 2.1 ×150 mm)
: A)H_2O (0.1 % HCOOH)
B)CH_3CN (0.1 % HCOOH)
A/B = 90/10 - 20 min - 50/50
Detection : UV 210 nm
Flow Rate : 0.2 mL/min
Col. Temp. : 40 ℃
Injection Vol. : 2 µL

Purification of pyridylaminated glycans using MonoSpin NH2

Sample volume: 800 µL

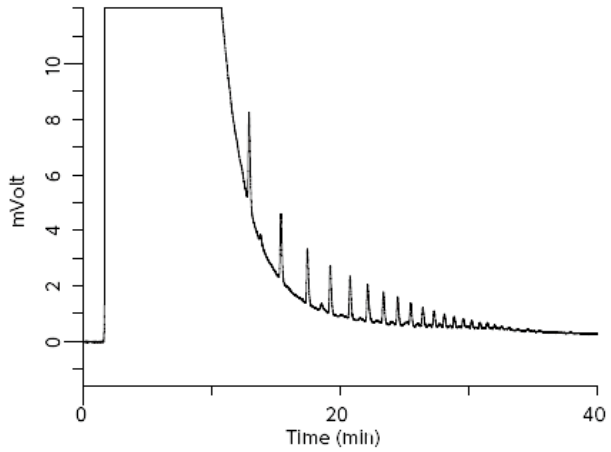
Dissolve the sample to adjust the concentration of ACN to 90~95%.

Centrifuge : 2,300 × *g*

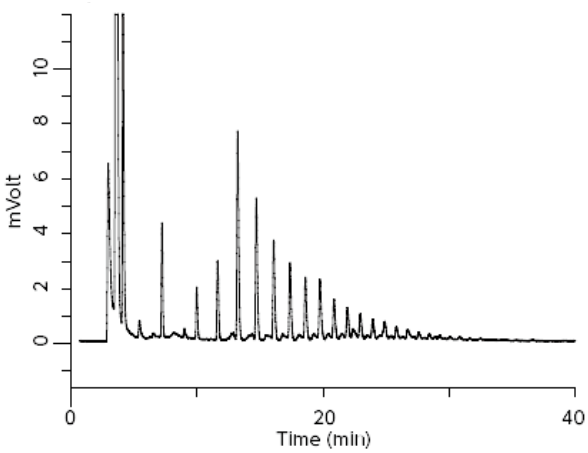


1. Condition	2. Load	3. Wash	4. Elute	Ready for Analysis
① 50 % acetonitrile (0.1 % formic acid) 500 µL ② 90 % acetonitrile (0.1 % formic acid) 500 µL (①→Centrifuge→②)	Sample solution 800 µL	90 % acetonitrile (0.1 % formic acid) 500 µL	50 % acetonitrile (0.1 % formic acid) 50 - 800 µL	

Before purification



Purified with MonoSpin NH2



Conditions

Column : NH2 Column
(5 µm, 250 × 4.6 mm I.D.)
A) H_2O/CH_3CN
= 5/95 0.1 % HCOOH
B) H_2O/CH_3CN
= 95/5 0.1 % HCOOH
A/B = 90/10-10 min–90/10-40 min-60/40

Flow Rate : 1 mL/min
Detection : FL Em 320 nm, Ex 400 nm
Injection Vol. : 1.5 µL

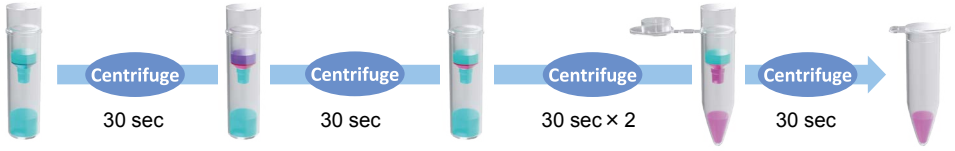
Application

Purification of Paraquat and Diquat using MonoSpin CBA

Sample volume 600 µL

Urine: 200 µL
10 mM potassium phosphate
Buffer solution (pH 7.0): 400 µL

Centrifuge : 10,000 × *g*



1. Condition
10 mM Potassium Phosphate Buffer (pH 7. 0) 200 µL

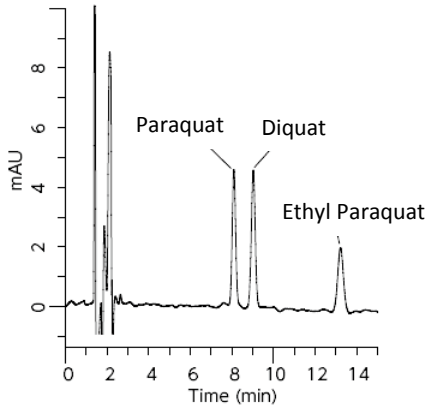
2. Load
Sample solution 600 µL

3. Wash
10 mM potassium phosphate Buffer (pH 7. 0) 200 µL

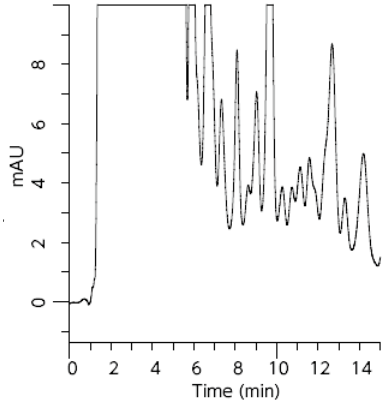
4. Elute
1 % Hydrochloric acid
30% Methanol
69% Water
200 µL

Ready for Analysis

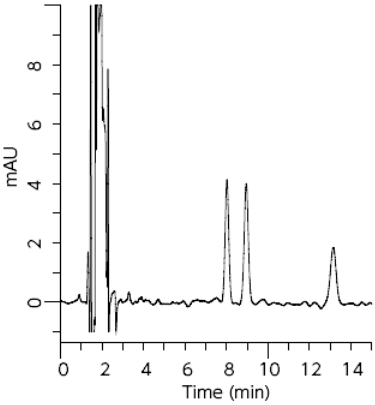
Standard Solution (1 µg/mL)



Urine ＋ pesticide (1 µg/mL each)



After purification with MonoSpin CBA



Conditions

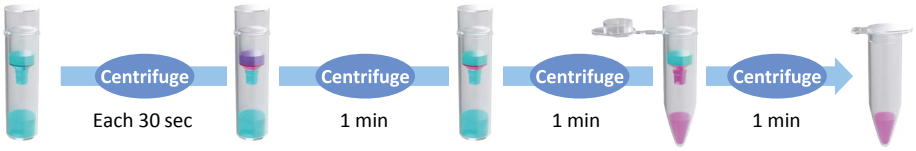
Column : Inertsil ODS-3 (5 µm, 150 mm× 4.6 mm I.D.)
Eluent : 0.2 M phosphoric acid,
0.1 M diethyl amine, 7.5 mM IPCC08 (IPCC-0.8, Sodium 1-Octanesulfonate)
/Acetonitrile=89/11
Flow Rate : 1 mL/min
Col.Temp. : 40 ℃
Detection : PDA 290 nm
Injection Vol. : 50 µL

Recovery of hormones in serum using MonoSpin C18

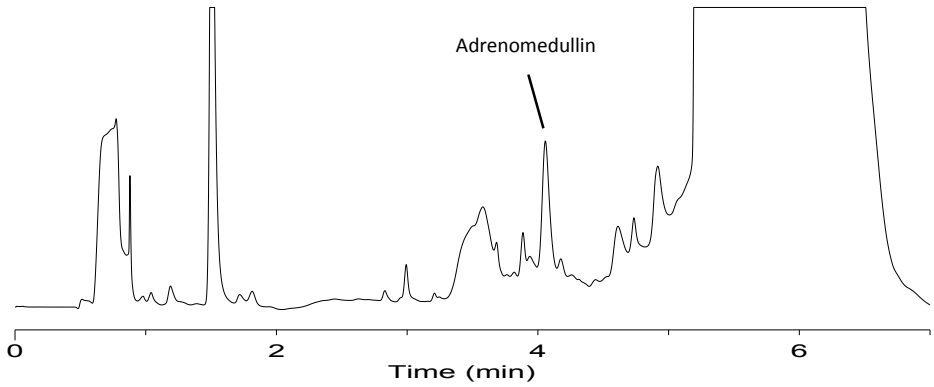
Sample preparation

Add 10 µL of 1 mg/mL adrenomedullin to serum: 190 µL.
Centrifuge the sample after addition of 0.1% TFA solution 200 µL.
Used the supernatant as sample.

Centrifuge : 2,300 × *g*



1. Condition	2. Load	3. Wash	4. Elute	Ready for Analysis
① Acetonitrile 200 µL ② 0.1% aqueous TFA: 200µL (①→Centrifuge→②)	Samples were prepared 400 µL of supernatant	0.1% aqueous TFA 200 µL	Contain 0.1% TFA 60% acetonitrile solution 200 µL	



Conditions

Column : InertSustain C18 (2 µm, 50 ×2.1 mm I.D.)
Eluent : A)0.1 % TFA in Water
B) 0.1 % TFA in Acetonitrile
A/B = 85/15 – 5 min – 50/50-2 min-50/50
Flow Rate : 200 µL/min
Col.Temp. : 40 ℃
Detection : UV 210 nm
Injection Vol. : 10 µL

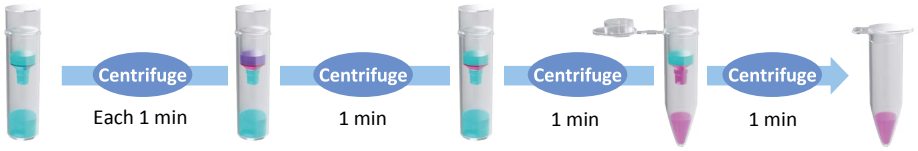
Application

Purification of Catecholamines using MonoSpin PBA

Sample solution 250 µL

Sample solution (urine or serum) 200 µL
1 M Dipotassium hydrogen phosphate
(adjusted to pH 8 with phosphoric acid) 50 µL

Centrifuge : 10,000 × *g*



1. Condition
1% acetic acid solution: 200 µL
→ 100 mM Dipotassium hydrogen phosphate
Adjusted to pH 8: 50µL

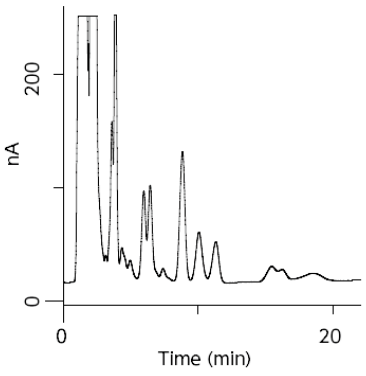
2. Load
Sample solution 250 µL

3. Wash
100 mM hydrogen phosphate
Aqueous dipotassium solution
(adjusted to pH 8 with phosphate) 200 µL

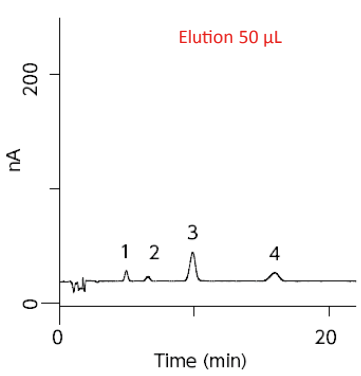
4. Elute
1% acetic acid solution 200 µL

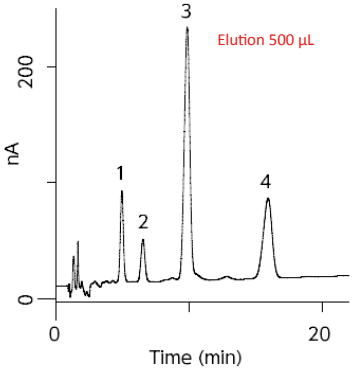
Ready for Analysis

Before Purification



Purification with MonoSpin PBA (sample amount:500 µL)





Conditions

Column : Inertsil ODS-3 (5 µm, 150 mm×2.1 mm I.D.)
Eluent : 50 mM Phosphate Buffer (pH 5.6)
50 mg/L EDTA
600 mg/L IPCC-008
-10 % Methanol
Flow Rate : 0.3 mL/min

Col.Temp. : 35 ℃
Injection : 5 µL
Detection : ECD Pulse Mode
Sample : 1. Noradrenaline
2. Adrenaline
3. DHBA
4. Dopamine

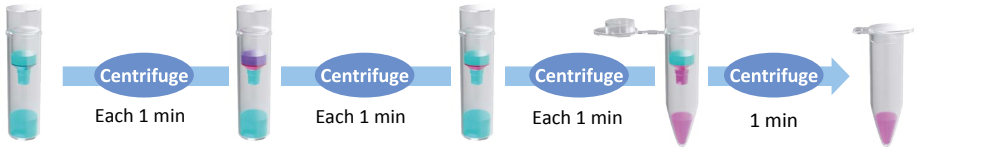
By using MonoSpin PBA, we can selectively recover and purify compounds with cis-type diols such as catecholamines. See our website Technical Note LT093 for more information.

Purification of Organophosphorus pesticides in human serum using MonoSpin TiO

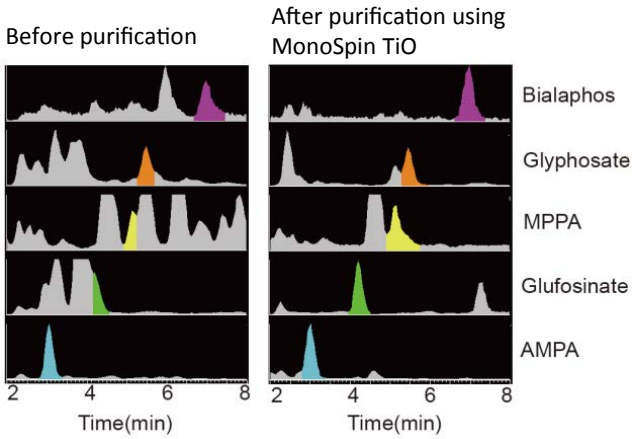
Sample Volume 50 µL

Sample 10 µL
Water 40 µL

Centrifuge : 5,200 × *g*



1. Condition	2. Load	3. Wash	4. Elute	Ready for Analysis
① 80% acetonitrile (0.1 % TFA) 50 µL ② 50% acetonitrile (0.1 % TFA) 50 µL (①→Centrifuge→②)	Sample solution 50 µL → Collect the solution and repeat Put on a column	①80% acetonitrile (0.1 % TFA) 50 µL ②50% acetonitrile (0.1 % TFA) 50 µL (①→Centrifuge→②)	2% ammonia solution 50 µL	*N-acetyl-O-methyl Derivatives* To LC/MS

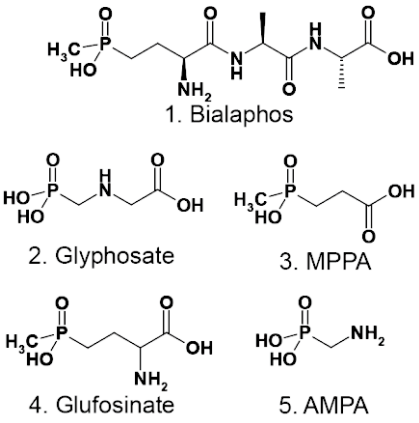


MonoSpin TiO shows selectivity for phosphate sites in compounds.

Conditions

Column : ODS Column (150 ×2.1 mm I.D.)
: A)CH_3OH
B)20 mM $HCOONH_4$ (pH 3.0)
A/B = 15/85, v/v
Flow Rate : 0.2 mL/min
Detection : SIM

Injection Vol.: 5 µL
Sample : 1. Bialaphos
2. Glyphosate
3. MPPA
4. Glufosinate
5. AMPA



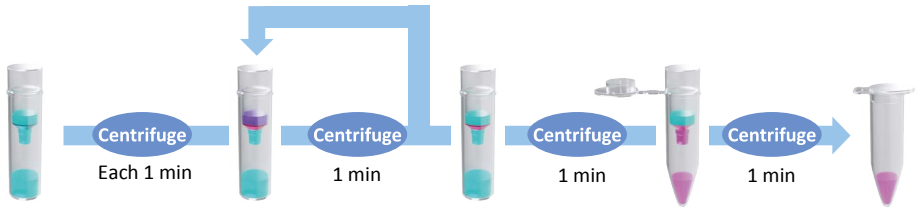
Application

With Insulin or BSAs

Sample Preparation

Adjust concentration of Insulin and BSA with 0.1% aqueous TFA.

Centrifuge : 2,000 × *g*



1. Condition
① ACN: 300µL
② 0.2% TFA in H2O: 300µL
(①→Centrifuge→②)

2. Load
Sample solution
300 µL

3. Wash
0.2 % TFA in H_2O
300 µL

4. Elute
C_2H_5OH/H_2O/TFA
=60:40:0.1 300 µL

Ready for Analysis

①Insulin (*n*=3)

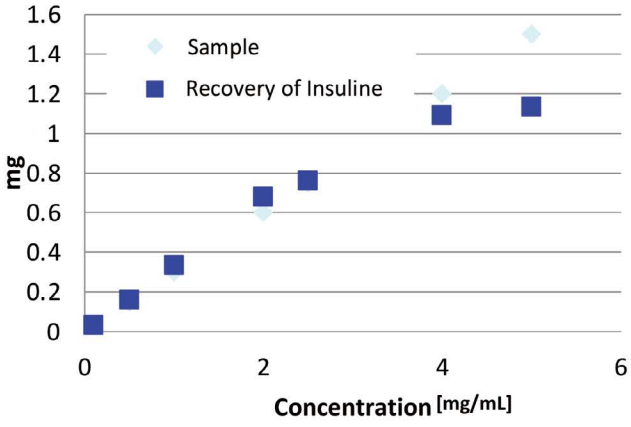
Concentration (mg/mL)	0.1	0.5	1.0	2.0	2.5	4.0	5.0
Recovery rate (%)	105.9	105.8	111.5	113.2	101.2	90.7	75.4
Sample (mg)	0.030	0.15	0.3	0.60	0.75	1.2	1.5
Recovery (mg)	0.032	0.16	0.33	0.68	0.76	1.1	1.1

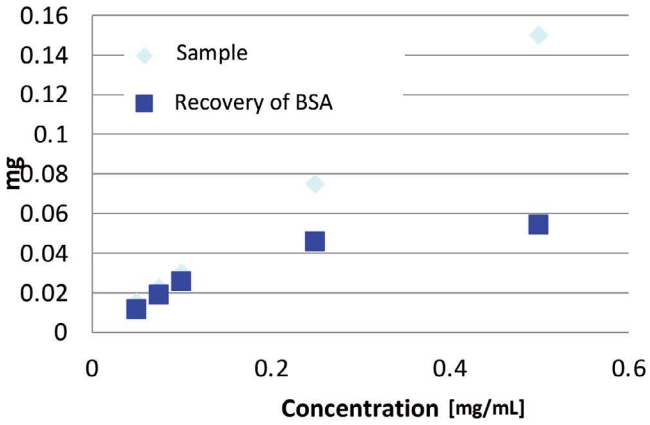
Preferred reference quantities

②BSA (*n*=3)

Concentration (mg/mL)	0.05	0.075	0.10	0.25	0.50
Recovery rate (%)	76.7	84.8	86.1	61.1	36.2
Sample (mg)	0.015	0.023	0.030	0.075	0.15
Recovery (mg)	0.012	0.019	0.026	0.046	0.054

Preferred reference quantities





The amount of recovery becomes constant reaching at a certain point. The maximum loading amount shown below is calculated by the amount of sample recovered at the point.

Insuline= 1.2 mg (recovery rate=90.7 %)

BSA=0.03 mg (recovery rate=86.1 %)

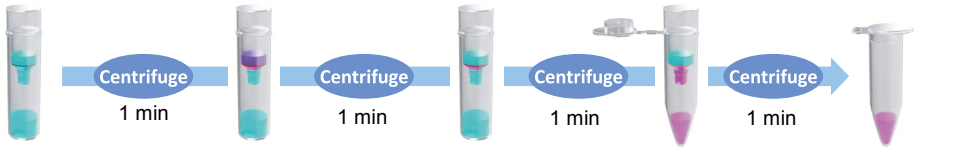
Analysis of blood samples using MonoSpin C18FF

Sample Preparation

Mix blood sample (0.3 mL) and 300 mM phosphate buffer (pH 10.0).

Use supernatant as sample after centrifugation at 12,000 x g for 5 min.

Centrifuge : 1,000 × *g*



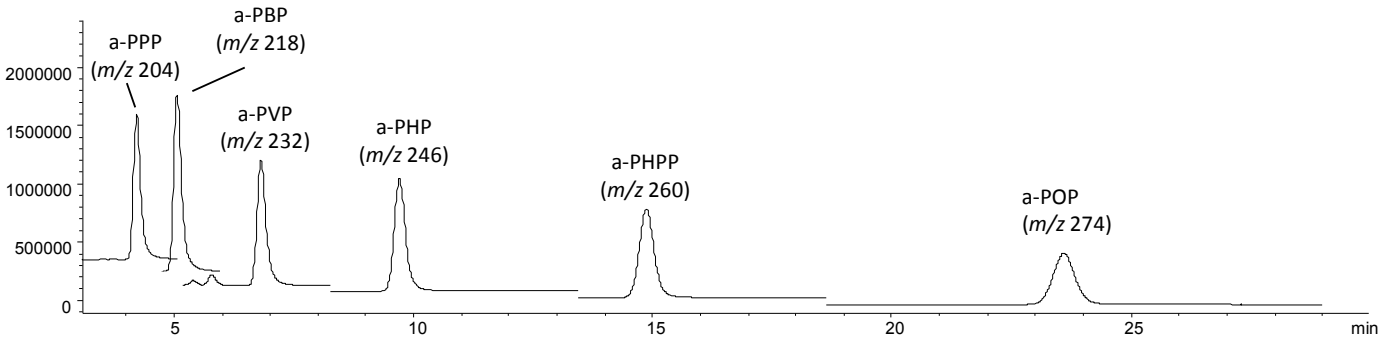
1. Condition
① MeOH: 300 µL
② 300 mM phosphate buffer (pH 10): 300 µL
(①→Centrifuge→②)

2. Load

3. Wash
300 mM phosphate buffer(pH 10): 300 µL

4. Elute
MeOH 100 µL

Ready for Analysis



Conditions

Column : InertSustain Phenyl (3 µm, 150 ×2.1 mm I.D.)

Eluent : CH_3CN-$HCOONH_4$ (10 mM, 0.1 % HCOOH) = 25:75 (v/v)

Flow Rate : 0.2 mL/min

Col.Temp. : 40 ℃

Detection : MS (ESI)

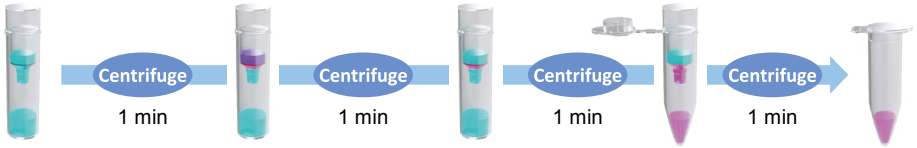
Analysis of cyclosporin A in serum using MonoSpin C18 and Ph.

Sample solution

uman serum: 0.1% formic acid: cyclosporin (50% acetonitrile containing 0.1% formic acid) = 200:190:10µL, centrifuged at 10,000 x g for 1 min, and the supernatant was used as the sample solution.

* By removing fine particles by centrifugation in advance, the flow of the spin column will be improved.

Centrifuge : 3,000 × *g*



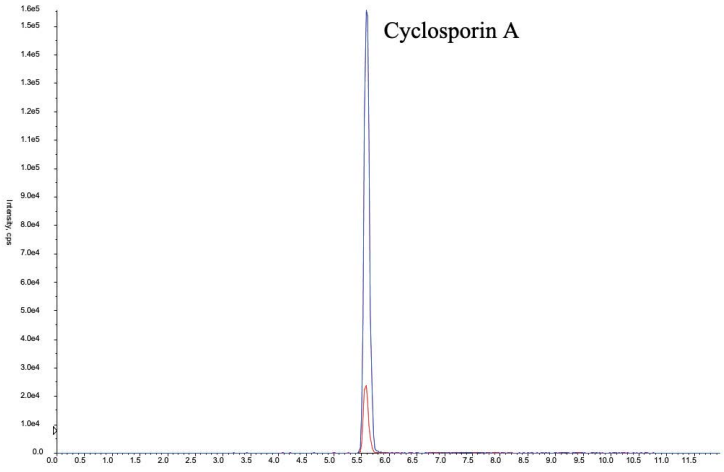
1. Condition	2. Load	3. Wash	4. Elute	Ready for Analysis
① Acetonitrile 200 µL ② 0.1% formic acid aq 200 µL	sample solution 400 µL	② 0.1% formic acid aq 400 µL	0.1% formic acid Acetonitrile 80% aq 200 µL	

Spike recovery test results

		Rec (%)	RSD (%)
0.5 ng/mL	C18	94.8	2.4
	Ph	103.8	10.0
5 ng/mL	C18	98.6	12.1
	Ph	115.6	14.8

(0.5,5 ng/mL in sample, n=3 x 1 days)

Chromatogram example of standard solution



Conditions

Column : InertSustain Phenyl (GL Sciences Inc.)
(3 µm, 50 x 2.1 mm I.D.)

Column Cat.No. : 5020-16433

Eluent : A) CH_3CN
B) 0.1% HCOOH in H_2O

Time (min)	A (vol%)	B (vol%)
0.0	10	90
7.0	90	10
10.0	90	10
10.1	10	90
13.0	10	90

Flow Rate : 0.4 mL/minCol. Temp.

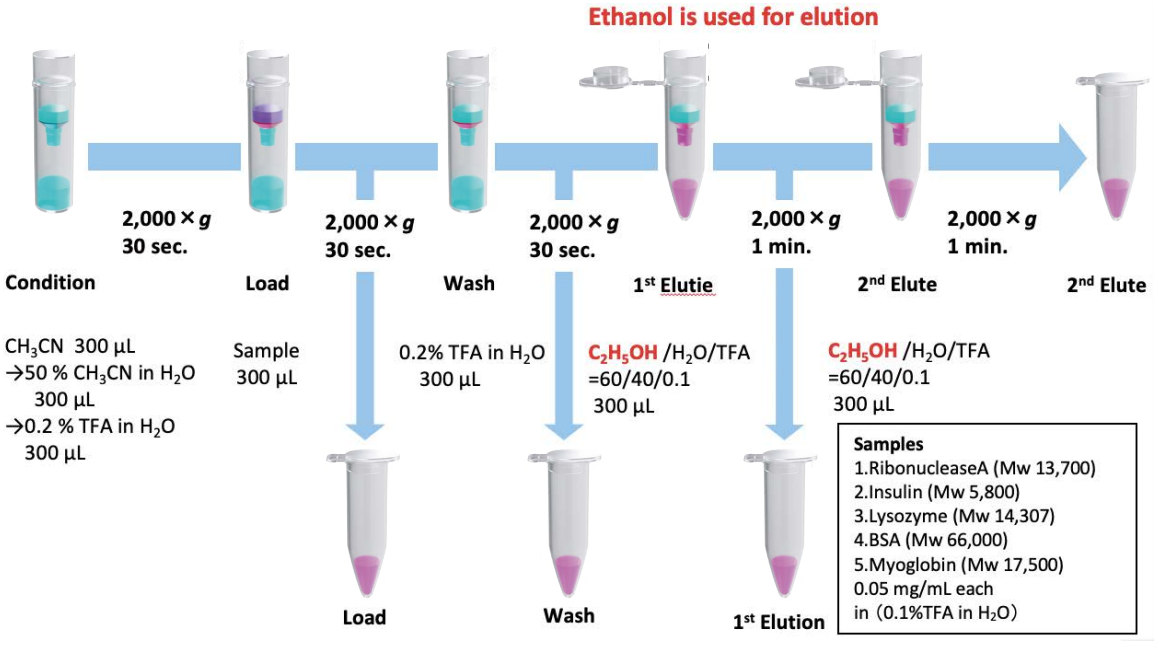
Col. Temp. : 50 ℃

Detection : MS/MS(SCIEX)
(QTRAP 6500+: ESI, Positive, SRM)

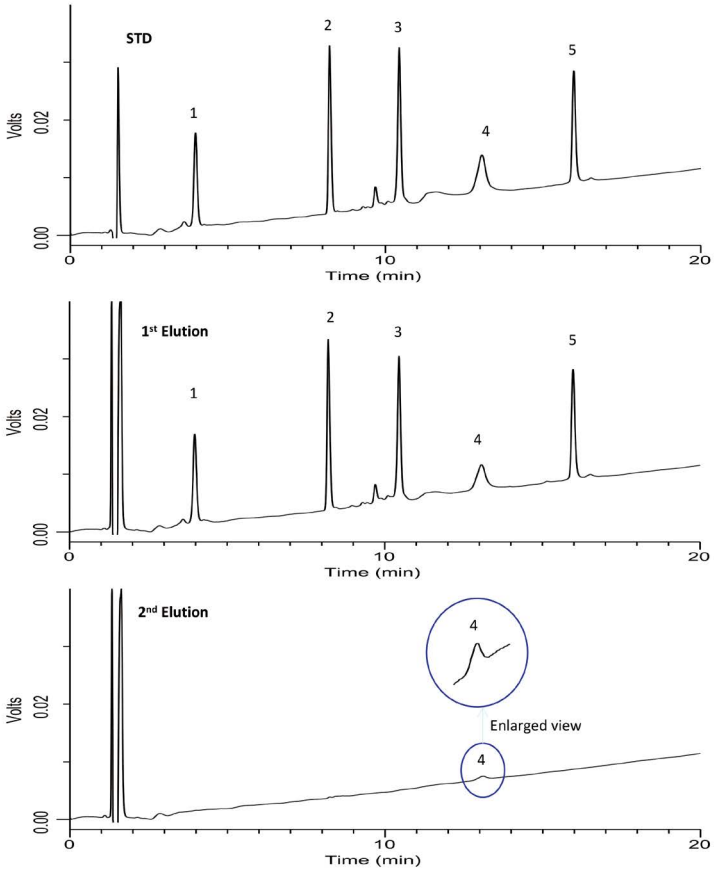
Injection Vol. : 5 µL

Sample : Cyclosporin A (20 ng/mL)
Q1/Q3 = 1220/1203
Q1/Q3 = 1220/1185

Analysis of Peptides and Proteins Using MonoSpin C18



1.RibonucleaseA (Mw 13,700)
2.Insulin (MW 5,800)
3.Lysozyme (MW 14,307)
4.BSA (MW 66,000)
5.Myoglobin (MW 17,500)



Conditions

Column : InertSustainBio C18 (1.9 µm, 100× 2.1 mm I.D.)

Eluent : A) 0.1 % TFA in H_2O
B) 0.1 % TFA in CH_3CN
A/B=72/28 - 20min - 45/55 - 0.1 min - 72/28 – 5 min

Flow rate : 0.2 mL/min

Col.Temp : 40 ℃

Detection : UV 220 nm

Injection Vol : 2 µL

Analysis of serum sample using MonoSpin Phospholipid

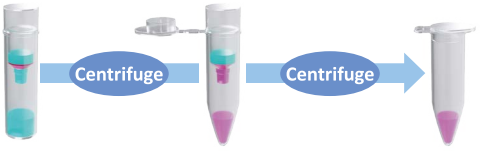
Sample solution 50 µL

Sample solution (serum) 10 µL

0.1 % Formic acid in acetonitrile 40 µL

centrifuged at 10,000 x g for 1 min, and the supernatant was used as the sample solution

Centrifuge : 3,000 × *g*
30 sec



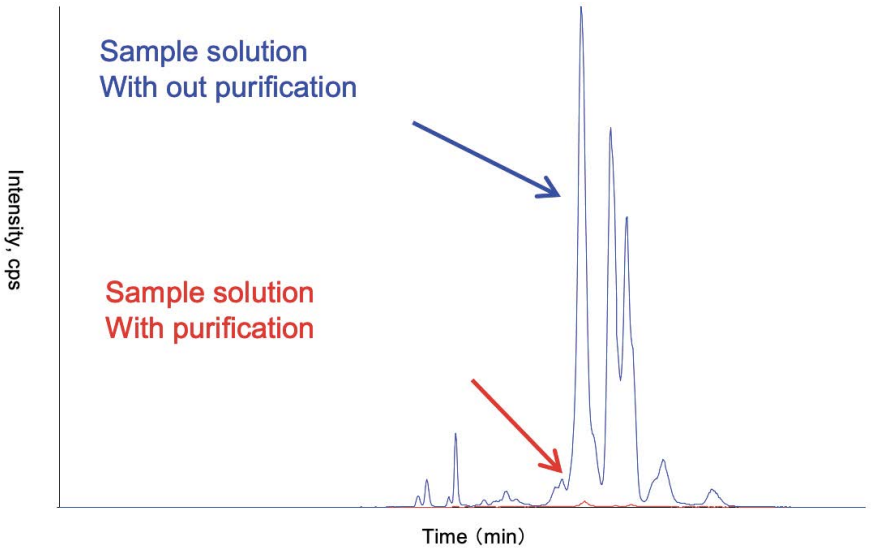
1. Condition

0.1 % Formic acid
In Acetonitrile
200 µL

Sample solution 50 µL

Phospholipid removed sample

Total Iom Chromatograms



Analysis of Ribavirin in Human Serum using MonoSpin PBA

Sample solution

0.6 % ammonia aqueous solution, human serum and Ribavirin were diluted with water and mixed together at 50 : 49 : 1, and centrifuged at 5,000×g for 3 minutes. The supernatant was collected as a sample solution.

*It is important to collect and use the supernatant as a sample solution to prevent the MonoSpin PBA from clogging.

Centrifuge : 2,300 × *g*, 2 min

1. Condition
400 µL
0.6 % ammonia aqueous solution

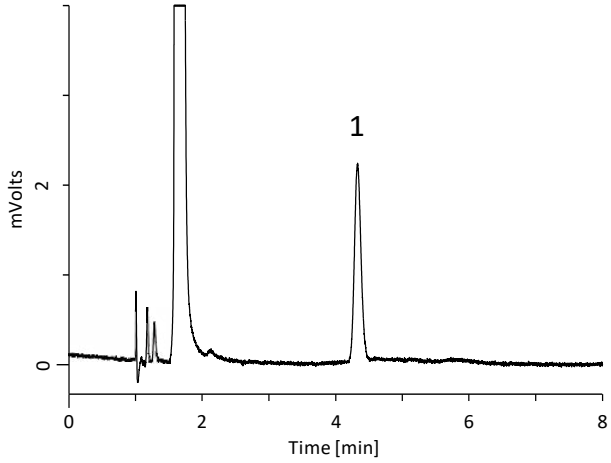
2. Load
400 µL
sample solution

3. Wash
400 µL
0.6 % ammonia aqueous solution

4. Elute
200 µL
1 % formic acid aqueous solution

Ready for Analysis

◆ **Standard Solution**



HPLC Conditions

Column : InertSustain AQ-C18 HP (3 µm, 150 × 2.1 mm I.D.)
(3 µm, 50 x 2.1 mm I.D.)

Eluent : A) Solution*
B) Solution/CH_3CN=19/1, (v/v)
A/B = 100/16 (v/v)

Flow rate : 0.3 mL/min

Column temp. : 25 ℃

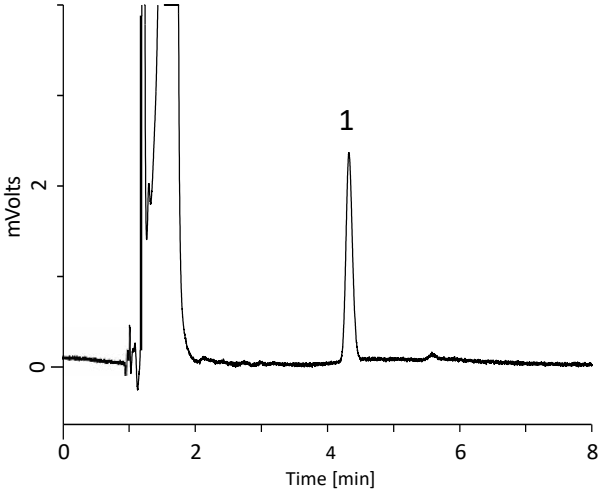
Detection : UV 220 nm

Injection Vol. : 5 µL

*Preparation method of solution:
2 g of anhydrous sodium sulfate were dissolved in 300 mL of water and then 8 mL of phosphoric acid were added to 2 L.

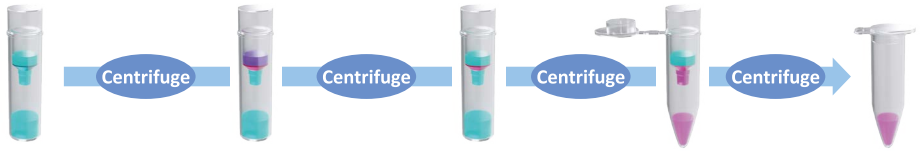
◆ **Spike and Recovery Test ① (Intra-day Reproducibility)**

Chromatogram of the recovery solution (1 µg/mL)



Analysis of 2-AB Derivatized Glycans Using MonoSpin

Centrifuge : 9,000 × *g*, 1 min



1. Condition
Solution A 200 µL
↓
Solution B 200 µL

2. Load
Sample Solution
200 µL

3. Wash
Solution B 200 µL

4. Elute
Solution A 200 µL

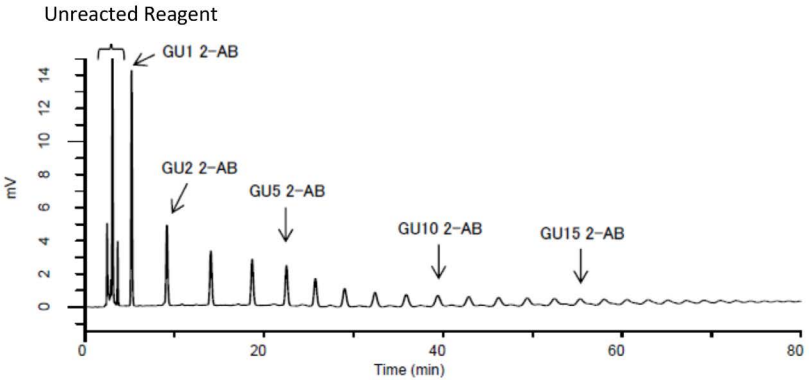
Ready for Analysis

Solution A
Water : Acetonitril : Formic acid = 50:50:0.1 (v/v/v)

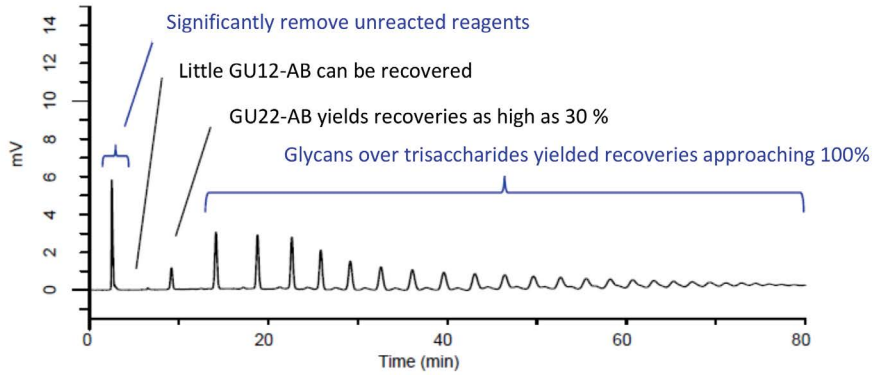
Solution B
Water : Acetonitril : Formic acid = 10:90:0.2 (v/v/v)

Sample Solution
In this study, 10µL of water and 180µL of acetonitrile were mixed with 10µL of a solution containing 2-AB sugar chains dissolved in DMSO:acetic acid=70:30 (v/v).

Sample Solution Measurement Without Purification



Sample Solution Measurement After Purification using MonoSpin Amide



Conditions

System : GL7700 HPLC System
Column : InertSustain Amide (5 µm, 250 X4.6 mm I.D.)
Eluent : A) CH_3CN
B) 50nM $HCOONH_4$ in H_2O (pH 4.4, HCOOH)

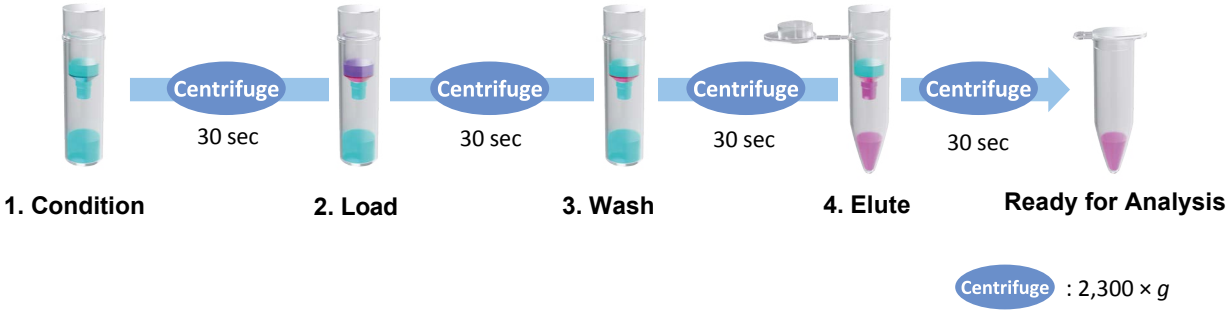
Time (min)	A (vol%)	B (vol%)
0	80	20
20	65	35
80	50	50
90	50	50

Flow Rate : 1.0 mL/min
Col. Temp. : 50 ℃
Eluent : FL Ex 330 nm Em 420 nm
(FL7753 FL Detector)
Injection Volume : 25 µL
Sample : 2-AB Labeled Glucose Homopolymer Ladder

MonoSpin ProA, MonoSpin ProG

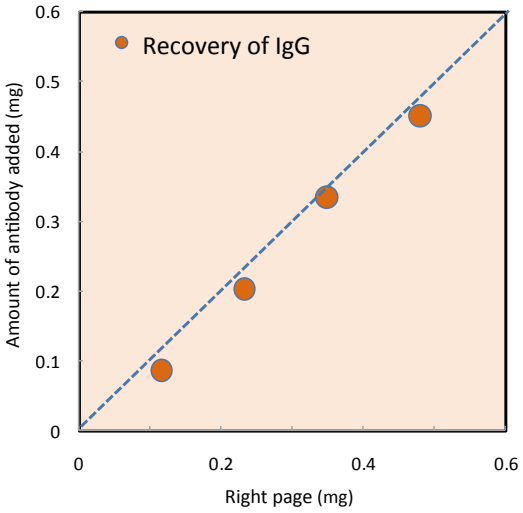
Ultra-high-speed processing ensures stable recovery

Antibodies can be easily purified by centrifugation in a short time in a tabletop centrifuge With silica monoliths. When collecting antibodies, the neutralizing solution can be added to the collection tube in advance to immediately neutralize the antibodies collected by the acid immediately. This action greatly reduces the risk of antibody degeneration.

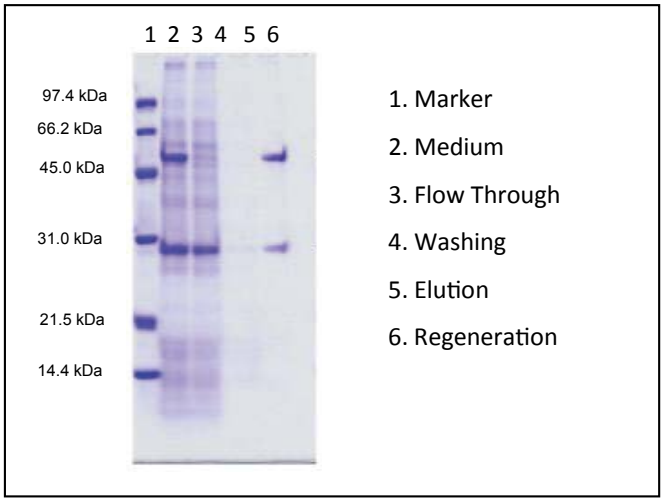


As shown below, the antibody concentrations were determined quantitatively from the medium of CHOcells. The purified antibodies show very few impurities by the results of electrophoresis.

Calibration curve of IgG concentration

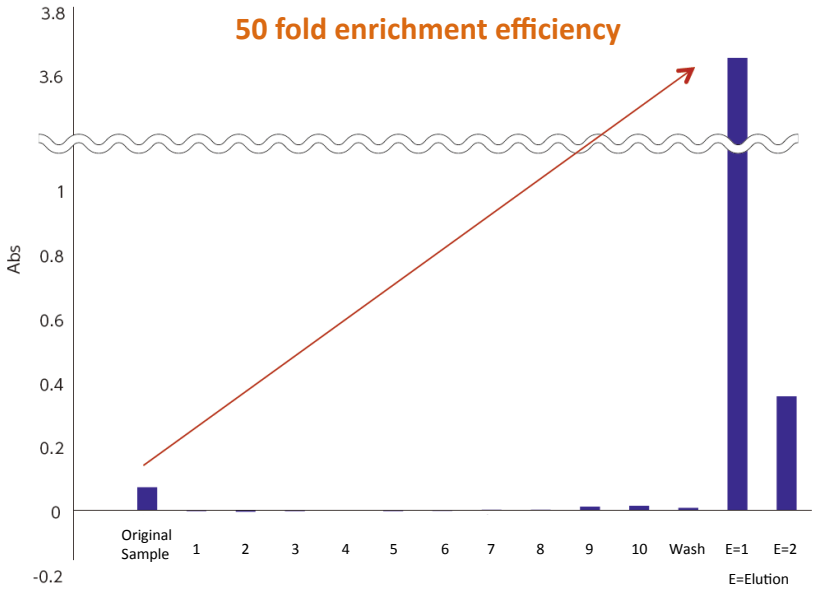


Results of recovery electrophorensis



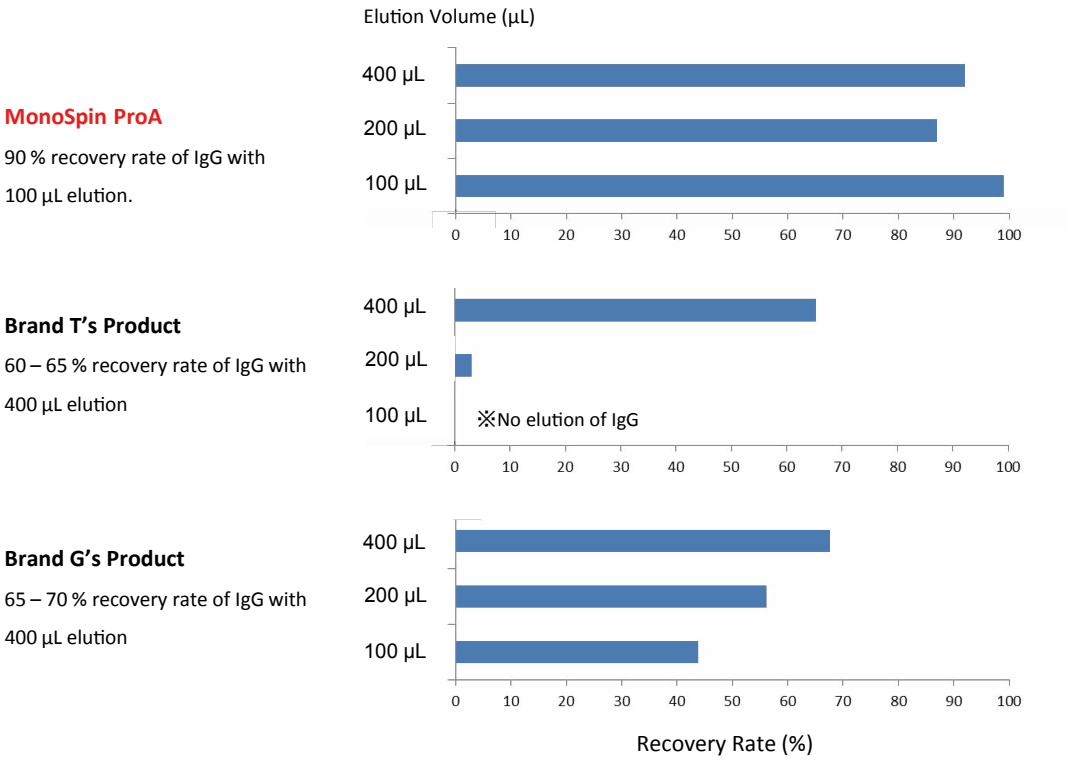
Enrichment of Antibody Solution Using MonoSpin ProA

Human IgG solution (500 µL of 0.025 mg/mL) was applied to a MonoSpin ProG spin column 10 times (In = I1–I10). Then, the elution of IgG concentration was determined twice with 100 µL elution buffer (En = E1 and E2). The first IgG elution (E1) was 50 fold concentration of the standard solution and indicates a 90% recovery of IgG without loss.

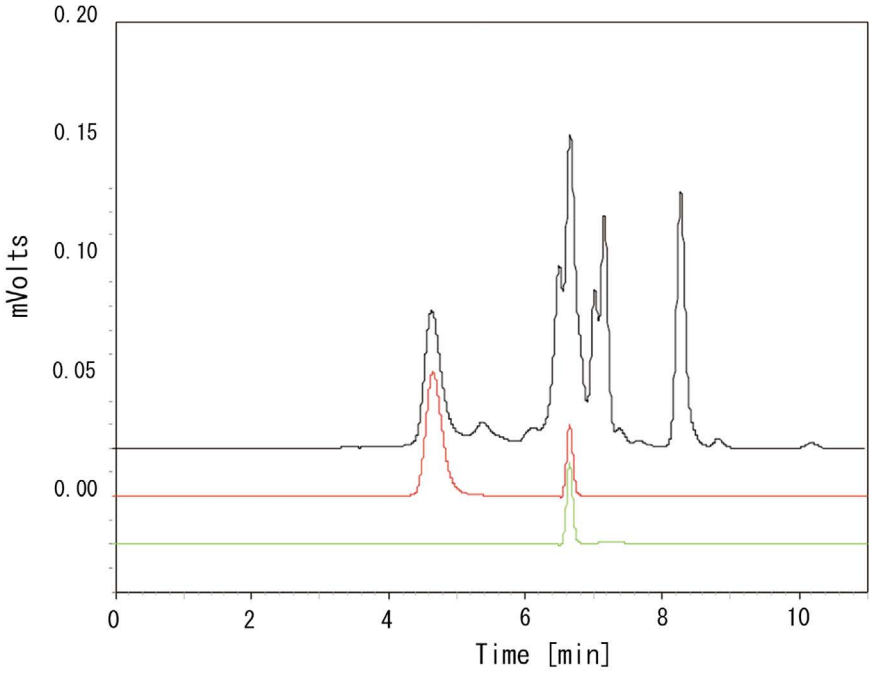


Elution Volume and Recovery Rate Comparing with Other Brands Products

MonoSpin ProA needs only 100 µL elution buffer to obtain a recovery rate of at least 90% IgG. However, other brands' products require 400 µL or more elution buffer with a recovery rate of 70% IgG.



Purification of Antibody using MonoSpin ProA



HPLC Conditions

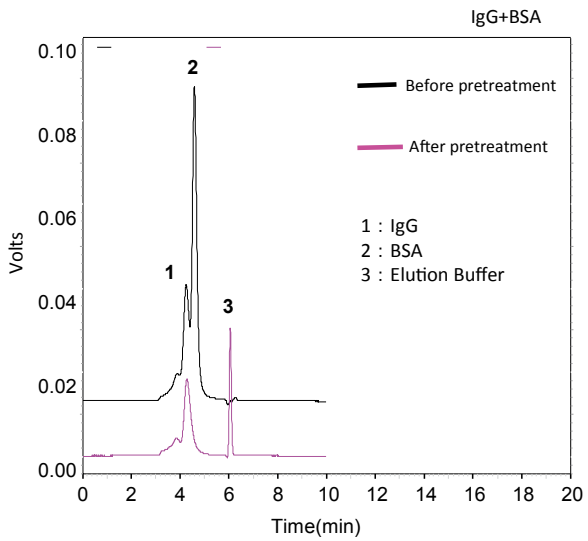
Column	: ProteoSil 300-SEC (5µm, 4.6 x 250 mm)
Eluent	: 100 mM Phosphate buffer (pH7) -100 mM NaCl
Flow rate	: 1 mL/min
Column temp.	: 40 ℃
Detection	: UV 280 nm
Injection	: 10 µL

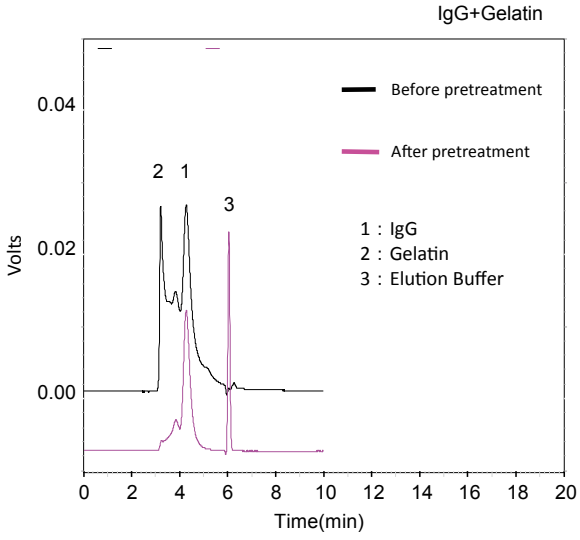
CHO cell culture

Purification using MonoSpin ProA

Elution buffer

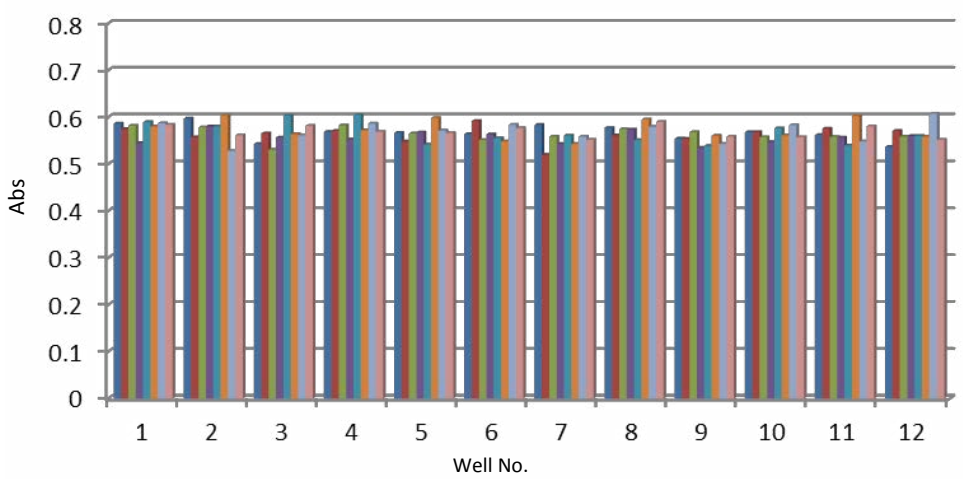
Removal of preservatives in antibody solutions





MonoSpin ProA/ProG enables you to remove proteins such as BSA and Gelatin in antibody solutions without dilution.

Recovery of antibodies from CHO cell culture medium (96-well plate)



Sample volume : 150 µL
Elution volume : 150 µL
Recovery rate : 90% (CV 3.1 %)
IgG concentration : 1.3 mg/mL

Purification of multiple antibodies using MonoSpin L and ProA

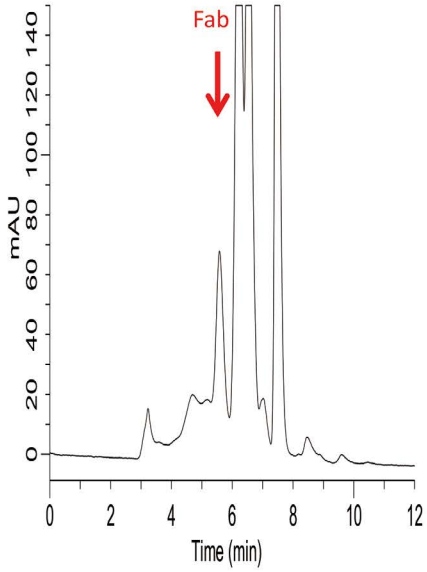
Procedure

1. Apply 5 mL of equilibration buffer.
2. Apply sample (Max. 8 mL) after filtration through 0.2 µL filtration.
3. Apply 5 mL of washing buffer.
4. Apply 5 mL of elution buffer.

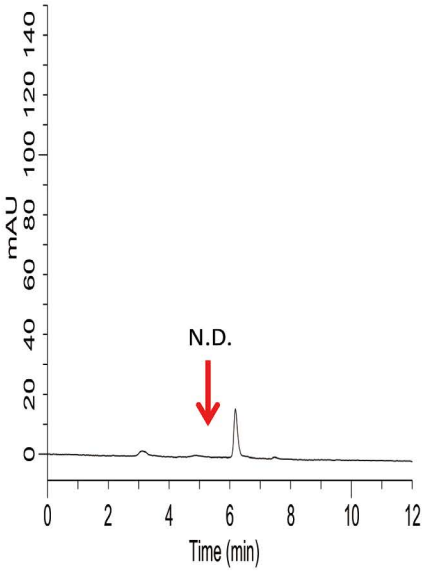
Centrifugal force at each step : 1,500 x g, 2 min
* MonoSpin ProA/G buffer kit was used.

Selectivity of MonoSpin ProL

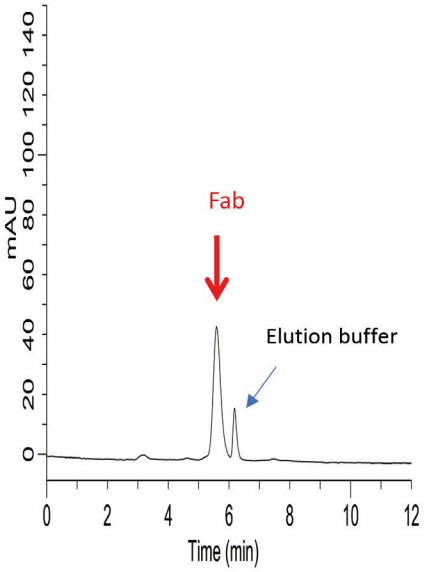
Cell culture



MonoSpin ProA
: Low selectivity to Fab

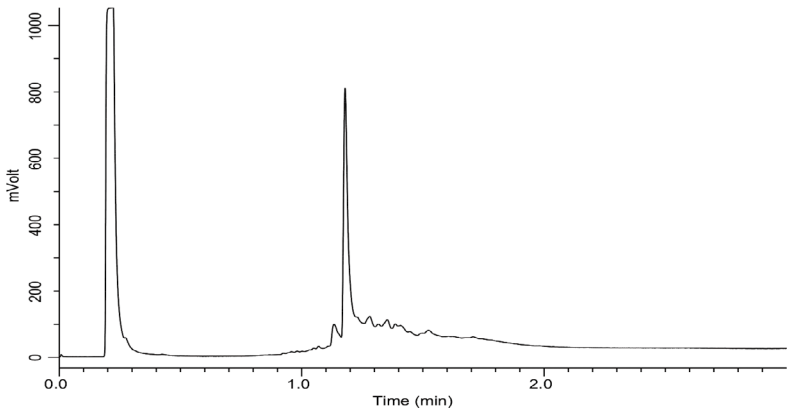


MonoSpin ProL
: High selectivity to Fab

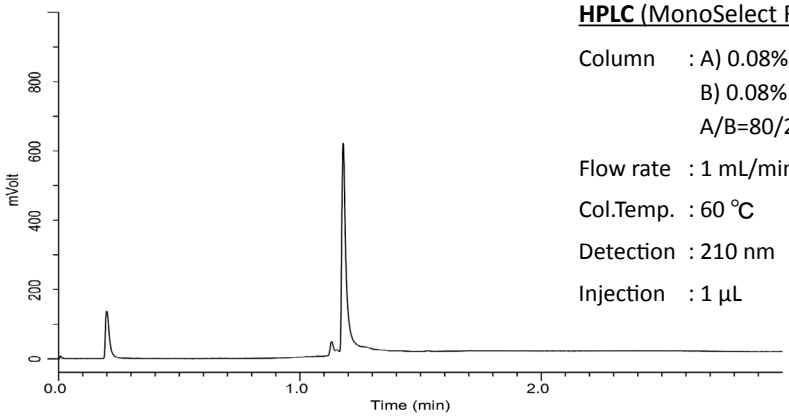


Purification of Fab using MonoSpin ProL

① Cell culuter



② Purification using MonoSpin ProteinL



HPLC (MonoSelect RP-mAb)

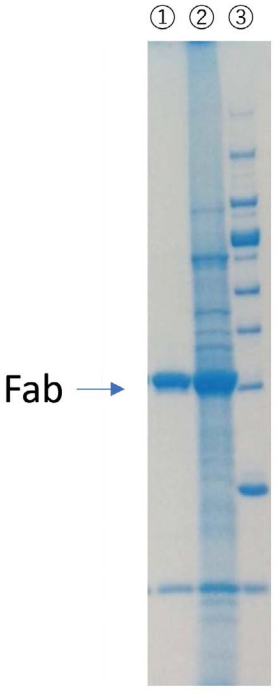
Column : A) 0.08% HCOOH-0.02% TFA-H_2O
B) 0.08% HCOOH-0.02% TFA-CH_3CN
A/B=80/20-2.5 min-10/90

Flow rate : 1 mL/min

Col.Temp. : 60 ℃

Detection : 210 nm

Injection : 1 µL



① Purification using MonoSpin ProL
② cell culture
③ Marker

Publicly Available Reference

MonoSpin	Target	Articles
C18-CX	acetamiprid (ATP) and imidacloprid (ICP)	New Innovations in Chemistry and Biochemistry 2021, 6, 81.
C18-CX	acetamiprid (ATP) and imidacloprid (ICP)	Curr. Adv. Chem. Biochem., 2021, 10, 14.
C18, ME	Metal ion	Anal. Sci. 2021, 37, 1301.
C18	plant toxins	J. Pharm. Biomed. Anal., 2021, 192, 113676.
C18	Digested peptides	Anim Biosci., 2021, 34, 1532.
C18	urinary eicosanoids	J. Lipid Res., 2021, 62, 100120.
NH2	Veterinary drug	Ann. Rep. Osaka. Inst. Pub. Health, 2021, 5, 48.
Trypsin HP	Alpha-synuclein	J. Chromatogr. B, 2021, 1181, 12288.
Phospholipid	Simultaneous steroids	J. Vet. Med. Sci., 2021, 83, 1634.
C18	Tryspin	Front. Immunol., 2021, April, 01.
C18	Oxidized phospholipids	Cardiovasc. Res., 2021, 117, 96.
C18	Glycated Candidate Biomarkers	Anal. Chem., 2021, 93, 4398.
C18, C18-CX	Digested peptides	Cancers, 2021, 13, 3972.
C18	Digested peptides	FEBS Lett., 2021, 595, 2608.
L C18	Digested peptides	J. Immunother Cancer, 2021, e002549
C18	Digested peptides	Life, 2021, 11, 990.
C18	Digested peptides	https://doi.org/10.1101/2020.03.31.019216
C18-AX	lipid metabolites	STAR Protocols 2021, 2, 100492.
C18	luciferin	Biochem. Biophys. Res. Comm. 2021, 577, 139.
C18	actomyosin complex during	Food Chemistry, 2021, 352, 129398.
C18	peptides	Inter. J. of Biolog. Macromol., 2021, 187, 976.
C18	Digested peptides	Cell Chemical Biology, 2021, 28, 475.
Trypsin, C18	Digested peptides	Molecules, 2021, 26, 315.
C18	Digested peptides	Human gene therapy, 2021, 32, 21.
C18	Digested peptides	Nano Research 2021, 14, 620
C18	Digested peptides	J. Proteome Res. 2021 Jun 3 : acs.jproteome.1c00054.
C18	Digested peptides	Hindawi Neural Plasticity 2021,ID 9983438, 15.
C18	colchicine	Toxicol. Anal. Clin., 2021, 33, 276.
C18	Digested peptides	Biochem. Biophys. Res. Comm., 2021, 548, 155.
AG	The anti-glycation	UPP Wickramasinghe, 2021
C18	peptides	J. Func. Foods, 2021, 87, 104827.
PBA	Catecholamine	Nutrients, 2021, 13, 4214.
C18	attributes, metabolites	Food Chemistry, 2021, 343, 128470.
C18	peptides	J. Chromatography A, 2021, 1652, 462351.
C18	cucurbitacin B and E	J. Insect Phys. 2021, 134, 104294.
C18	Digested peptides	Front. Plant Sci., 2021, 12.
C18	Digested peptides	PeerJ . 2021 Feb 9;9:e10879
C18-AX	Lipid	The FASEB Journal. 2021;35:e21354.
C18	sugars	“Anim Sci J. 2021;92:e13530.
C18	Digested peptides	Exp. Eye Res., 2021, 212, 108794.
C18	peptides	Stem Cell Research & Therapy, 2021, 12, 216.
C18	peptides	J. Venom Anim. Toxins incl Trop Dis, 2021, 27:e20210023.
C18	peptides	Microorganisms, 2021, 9, 593.
C18	Digested peptides	Virology, 2021, 559, 120.
C18	To remove the hydrophobic component	Biosci, Biotech, Biochem, 2021, 85, 1194.
C18	To remove the lipids	J. Immunol., 2021, 206, 1729.
PBA	Catecholamine	JID Innovations, 2021, 1, 100016.
Trypsin, C18	Proteins	Commun. Biology, 2021, 4, 974.
C18	Digested peptides	DOI: https://doi.org/10.21203/rs.3.rs-612007/v1
C18	ralfuranone A	Mol. Plant Pathol., 2021, 22, 1538.
C18	Digested peptides	Biosci. Biotec. Biochem., 2021, 85, 2209.
C18	tomato extract, metabolite	Food Safety, 2021, 9 , 32.
C18	peptides	上原記念生命科学財団研究報告集 35 2021.
C18	Digested peptides	Mol. Pharmaceutics, 2022, 19, 2, 558.
C18-AX	lipids	Scientific Reports, 2021, 11, 10426.
C18	peptides	Neurobiology of Aging, 2021, 106, 241.
C18	peptides	Nature Plants, 2021, 7, 310.
C18	quercetin and carvacrol	J. Food Drug Anal., 2021, 29, 653.
Amide	peptides	Scientifc Reports, 2021, 11, 10723.
C18	peptides	Scientifc Reports 2021, 11, 21516.
C18	peptides	Nat. Commun., 2021, 12, 1028.
C18	Digested peptides	Eur. J. Med. Chem., 2021, 214, 113217.
C18	Digested peptides	iScience, 2021, 24, 102906.
C18	Digested peptides	Sci. Adv., 2021, 7999, 26.
C18	Digested peptides	Molecular Cell, 2021, 81, 1781.
C18	Digested peptides	Cell Metabolism, 2021, 33, 565.
C18	proteins	Cell Chemical Biology, 2021, 28, 67.
C18	peptides	Current Biology, 2021, 31, 3586.
C18	Digested peptides	Nat. Commun., 2021, 12, 5796.
C18	Digested peptides	Science, 2021, 372, 1055.
C18	Digested peptides	Sci. Adv. 2021; 7 : eabi6582.
C18	peptides	Cell Discovery, 2021, 7, 41.
C18	prostaglandin D2	J. Med. Chem. 2021, 64, 21, 15868.
C18	peptides	Nat. Metab., 2021, 3, 1242.
C18	peptides	J. Biol. Chem., 2021, 296, 100477.
C18	peptides	PLOS ONE | https://doi.org/10.1371/journal.pone.0251684
C18 MPEX	peptides	https://doi.org/10.26508/lsa.202000945
C18	peptides	Science 2021 372, 480
C18	peptides	https://doi.org/10.26508/lsa.202101022
C18-AX	Oxylipins	DOI: https://doi.org/10.21203/rs.3.rs-428622/v1
SCX	To remove excess NBD-PZ	DOI: https://doi.org/10.21203/rs.3.rs-48442/v1

MonoSpin	Target	Articles
Phospholipid	serum phospholipid removal	https://doi.org/10.3389/fvets.2022.1014792
PBA	serum	https://doi.org/10.3390/separations9050113
C18	peptide/ serum	Transl Pediatr., 2022, 11, 891.
C18	vitro protein	Food Chem., 2022, 387, 132917.
C18	pepsin/trypsin	Food Chem., 2022, 380, 132183.
C18	peptides	Hindawi Oxidative Medicine and Celluar Longenvity Volume2022 Article ID 1622829 httpsdoi.org10.115520221622829
trypsin	peptides	J. Pharm. Anal., 2022, 12, 852
C18, C18 FF, Ph	urea	Front. Physiol., 2022, 24, 13
C18	iNOS	Phytochem. Lett., 2022, 49, 131.
C18	proteins and nonvolatile salt	Free Radic. Biol. Med., 2022, 187, 29.
C18	serum	Free Radic. Biol. Med., 2022, 184, 196
C18	serum	Free Radic. Biol. Med., 2022, 184, 196
C18	peptides	Int J Biol Sci., 2022; 18, 1795.
C18	leaf	Life, 2022, 12, 115.
C18	serum	Front. Immunol., 2022, 12, 13.
-	tumor-derived exosomes	Front. Bioeng. Biotechnol., 2022, 06 September.
C18	vancomycin ,cerebrospinal fluid	Biol. Pharm. Bull., 2022, 45, 1398.
C18	proteins of mhsecs in urea	Arch. Toxicol., 2022, 96, 2003.
C18	decellularized liver tissue	Cells, 2022, 11, 1258.
TiO,C18	nucleotide,trypsin	iScience, 2022, 25, 104889.
C18	proteins	Acta Biochim. Biophys. Sin, 2022, 54, 1453.
C18-AX	lipidomics	he FASEB Journal, 2022, 36, 12.
C18	peptides	Trans. Vision Sci. Tech., 2022, 11, 7.
Phospholipid	leaves and shoot tissues	J. Experimen. Botany, 2022, 73, 3044
C18	peptides	Adv. Anim. Vet. Sci., 2022, 10, 1775.
Phospholipid	pirarubicin	Front. Pharmacol., 2022, 3, 18.
ProG	serum thyroglobulin	Europ. Thyroid Jouenal, 11:1,e210041
C18	peptides	Front. Med., 2022, 03 May.
PBA	catecholamines in urine	Nutrients, 2022, 14, 905.
-	-	Environ. Sci. Pollut. Res., 2022, 29, 9011
-	polypeptides	Ecotoxicol. Environ. Saf., 2022, 243, 113983.
C18	protein	FEBS Open Bio, 2022, 12, 1206.
PBA	l-dopa and da	PLoS ONE, 17(8): e0271697
C18	protein γ-8	Zool Res., 2022, 43, 851.
C18	sorafenib and lenvatinib	Int. J. Cancer, 2022, 150, 1640.
C18	metabolite extraction and metabolome	Biosci. Biotech. Biochem., 2022, 86, 502.
C18	metabolite extraction and metabolome	Sci. Rep., 2022, 12, 4319.
AX-C18	fatty acid metabolites	Med. Mass Spect.,“Lipidomics“” Vol. 6 No. 2.
C18	oral and perioral soft tissue	Int. J. Mol. Sci.. 2022, 23, 2987.
C18	proteins	Plants, 2022, 11, 1508.
C18	peptides	Jextracell Vesicles, 2022, 11 e12205.
C18	peptides	Plants, 2022, 11, 1508.
C18	peptides	Nat. Commun., 2022, 13, 1369.
C18	peptides	ASM J. Microbiol. Spect., 2022, 10, 5.
C18	serum,urine	Biochim. Biophys. Acta, 2022, 1870, 140736.
C18	extracellular vesicles	Scientifc Reports, 2022, 12, 13330.
C18	peptides	Int. J. Mol. Sci., 2022, 23, 7415.
C18	digested peptides	Front. Immunol., 13 October 2022 Sec.
C18	tryptic peptides	Plants, 2022, 11, 910.
C18	acidified peptides	Nature, 2022, 606, 188
C18	peptides	Nat. Commun., 2022, 13, 4652.
C18	protein digests	Scientifc Reports, 2022, 12, 4182 .
C18	digested peptides	Cell Death and Disease. 2022, 13, 466.
C18	digested peptides	Nat. Commun., 2022, 13, 1548.
C18	peptides	npj Regen. Med., 2022, 7, 18.
C18	peptides	Molecules, 2022, 27(21), 7652.
C18	digested tryptic peptide	Science, 2022, 378, 370.
C18	peptides	npj Sci. Food, 2022, 6, 27.
C18	peptides	Cell Reports, 2022, 47, 7.
C18	peptides	Front. Cell. Infect. Microbiol., 2022, 27 September.
PBA	urine	TrAC Trend. Anal. Chem., 2022, 157, 116786.
C18	digested peptides	Antioxid. Redox Signal.,2022, 00
C18	peptides	Nat. Plants, 2022, 8, 1245.
C18	peptides	Nat. Commun., 2022, 13, 2928.
NH2, SAX	doxil, an anticancer nanomedicine, and exosomes, as typical nanoparticles	J. Chromatogr. A, 2022, 1664, 462802.
C18	phosphopeptides	Nature Commun., 2022, 13, 5715.
C18	peptides	Cell Stem Cell, 2022, 29, 1703.

MonoSpin	Target	Articles
-	safrole, myristicin, and elemicin) of nutmeg in human serum	J. Pharm. Biomed. Anal., 2023, 234, 115565.
TiO	o-phosphoethanolamine (PEA)	Chem. Pharm. Bull., 2023, 71, 10.
Phospholipid	protein in serum	Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP Thandar_Oo.pdf
Amide	glycans	Ana. Chim. Acta, 2023, 1264, 341269.
Ph	urine Vancomycin	AAPS Open, 2023, 9, number: 2
C18-CX	peptides	J. Clini. Endo. & Metabo. Dgad315.
CBA	derivatized polycarboxylic acids	FUKUOKADAI
Phospholipid	Diazinon ,2-isopropyl-6-methyl-4-pyrimidinol (IMP)	Toxics, 2023, 11, 361.
	phosphopeptide	Anal. Chem. 2023, 95, 10703.
C18	peptides	doi: https://doi.org/10.1101/2023.05.25.542030
C18	Plasma Lipids	Metabolites, 2023, 13, 558.
C18	peptides	doi: 10.1038/s41522-023-00373-9.
C18	Peptides	Front. Nutr., 2023, 10, 1139836.
C18	peptides	Biochem. Biophys. Res. Comm., 2023, 640, 97.
NH2	glycans	Anal. Sci., 2023, 39, 1041.
SCX	succinylated peptides	Analyst, 2023, 148, 95.
C18	peptide	Front. Microbiol., 2023, 13, 2022.
C18	peptides	Phytomedicine, 2023, 114, 154796.
C-18-AX	Lipids	Biochim. Biophys. Acta, 2023, 1868, 159275.
C18	peptide	Digestive properties of β-CN and α-La in different milk 2 protein ingredients
C18	protein	"Aspartyl protease in the secretome of honey bee trypanosomatid parasite is 2 essential for the efficient infection of host "
NH2	N-Glycan Release from Serum Proteins	Int. J. Mol. Sci., 2023, 24, 6203.
-	Peptide	DOI: 10.21203/rs.3.rs-1673468/v1
amide	Human plasma	Biomolecules, 2023, 13, 296.
C18	peptides	doi: 10.3389/fphar.2023.1160665.
C-18-AX	LTB4, LTC/D/E4	Biomed. Pharm., 2023, 162, 114592.
phospholipid	steroid hormones	J. Vet. Med. Sci., 2023, 85, 497.
PBA	urine	https://dx.doi.org/10.2139/ssrn.4369429
C18	polypeptides	Food Sci. Hum. Well., 2023, 12, 1192.
C18	Highly hydrophobic compunds in potao tuber	Food Safety, 2023, 11, 1.
-	peptides	Colloids Surf. A Physicochem. Eng. Asp., 2023, 658, 130743.
-	peptide	Materials & Design, 2023, 230, 111960.
C18	peptide	Cancer. Res. Commun., 2023, 3, 202.
C18	peptides	Scientific Reports, 2023, 13, 8802.
C18-AX	lipids	Scientific Reports, 2023, 13, 8903.
C18	peptide	Egypt. J. Chem., 2023, 66, 335.
C18	digested peptides	PeerJ 11:e15075
C18	digested peptides	Cancer Res., 2023, 83, 1264.
phospholipid	methapyrilene in plasma	J. Toxicol. Sci., 2023, 48, 1.
C18	toxin in Cultured Strains	Toxins, 2023, 15, 318.
NH2	Galactinol	Plants, 2023, 12, 1732.
C18	peptide	Data in Brief, 2023, 48, 109036.
C18	peptide	PNAS Nexus, 2023, 2, 1.
-	Peptides	DOI: 10.21203/rs.3.rs-2810278/v1
C18	peptide	Cell Death & Disease, 2023, 14, 15.
C18	protein from moso bamboo seedlings	Int. J. Mol. Sci., 2023, 24, 5103.
C18	peptides	https://dx.doi.org/10.2139/ssrn.4332105
C18	Digested peptides	Nat. Commun., 2023, 14, 729.
C18	peptides	Nat. Commun., 2023, 14, 2050.
C18	peptides	Nat. Commun., 2023, 14, 1978.
C18	peptides	https://doi.org/10.1101/2023.02.04.527154
C18	Digested peptides	Adv. Sci., 2023, 2206540.
C18	Digested peptides	Open Biol., 13, 220220.
C18	peptides	DOI:10.1038/s41522-023-00373-9
C18	peptides	Nat. Commun., 2023, 14, 3893.
C18	peptides	Sci. China Life Sci., 2023, 14, 1.
C18	urine	TrAC Trends Anal. Chem., 2023, 164, 117065.
C18	serum, urine	Molecules, 2023, 28, 684.

Order Information

MonoSpin type S

Description	Qty.	Cat.No.
MonoSpin C18	50	5010-21700
	100	5010-21701
MonoSpin C18 FF	50	5010-21670
	100	5010-21671
MonoSpin Ph	50	5010-21733
	100	5010-21734
MonoSpin C18-AX	50	5010-21735
	100	5010-21736
MonoSpin C18-CX	50	5010-21731
	100	5010-21732
MonoSpin SAX	50	5010-21720
	100	5010-21721
MonoSpin SCX	50	5010-21725
	100	5010-21726
MonoSpin NH2	50	5010-21710
	100	5010-21711
MonoSpin CBA	50	5010-21729
	100	5010-21730
MonoSpin Amide	50	5010-21727
	100	5010-21728
MonoSpin PBA	50	5010-21715
	100	5010-21716
MonoSpin TiO	50	5010-21705
	100	5010-21706
MonoSpin Trypsin HP [KEEP COOL]	30	7510-11302
MonoSpin ME	50	5010-21737
	100	5010-21738
MonoSpin Phospholipid	50	5010-21698
	100	5010-21699

MonoSpin Type S

Recovery tube (1.7 mL)

Liquid waste tube (2 mL)

MonoSpin type S Trial kit

Trial and custom kits are shipped with various columns packaged for initial method development.

Description	Content	Cat.No.
MonoSpin Trial Kit 1	C18, TiO, SCX, SAX 10 each	5010-21740
MonoSpin Trial Kit 2	C18, Amide, CBA, NH2 10 each	5010-21741
MonoSpin Trial Kit 3	SCX, SAX, CBA, NH2 10 each	5010-21742

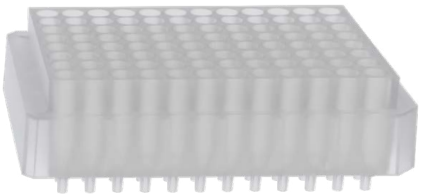
MonoSpin type L

Description	Qty.	Cat.No.
MonoSpin L C18	30	7510-11320
MonoSpin L SAX	30	7510-11321
MonoSpin L SCX	30	7510-11322
MonoSpin L NH2	30	7510-11323
MonoSpin L CBA	30	7510-11324
MonoSpin L ME	30	7510-11325
MonoSpin L Phospholipid	30	7510-11326

MonoSpin type L

MonoSpin 96 well plate

Description	Qty.	Cat.No.
MonoSpin 96WP C18	1	5010-21900
MonoSpin 96WP NH2	1	5010-21901
MonoSpin 96WP PBA	1	5010-21902
MonoSpin 96WP SAX	1	5010-21903
MonoSpin 96WP SCX	1	5010-21904
MonoSpin 96WP Amide	1	5010-21905
MonoSpin 96WP CBA	1	5010-21906
MonoSpin 96WP C18-CX	1	5010-21907
MonoSpin 96WP C18-AX	1	5010-21908



MonoSpin ProA, MonoSpin ProG

Description		Qty.	Cat.No.
MonoSpin ProA column	[KEEP COOL]	10	7510-11310
MonoSpin ProG column	[KEEP COOL]	10	7510-11311
MonoSpin ProA 96 well plate	[KEEP COOL]	1	7510-11312
MonoSpin ProG 96 well plate	[KEEP COOL]	1	7510-11313
MonoSpin L ProA	[KEEP COOL]	4	7510-11314
MonoSpin L ProG	[KEEP COOL]	4	7510-11315
MonoSpin ProA/G buffer kit	[KEEP COOL]	–	7510-11316
MonoSpin ProL	[KEEP COOL]	6	7510-11317

96 Deep Well Plate

96 Deep Well Plate

【Features】

- Plate dimensions conform to SBS standards for the automatic operation of dispensing machines
- V-bottom well geometry reduces sample loss
- Made of polypropylene with outstanding heat, cold, and solvent resistance
- Low adsorption (LB type) suppresses non-specific adsorption of proteins and peptides by super hydrophilic surface treatment

Description	Material	Qty.	Cat.No.
MS Plate	Polypropylene	50	6045-00201
MS Plate Low adsorption (LB type)	Polypropylene (hydrophobic polymer)	15	6045-00203

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