C190-E161

SHIMADZU
Excellence in Science

Integrated Protein Digestion HPLC

Perfinity iDP

PERFINITY

Perfinity iDP, a new platform for protein analysis, automates the protein digestion process

The Perfinity iDP (Integrated Digestion Platform) automates the protein analysis workflow from protein digestion to HPLC separation and MS detection, significantly reducing sample preparation times and enhancing reproducibility.

Manual Method

Protein digestion 18-24 hours → Solid phase extraction → Re-suspension → HPLC or LC/MS analysis

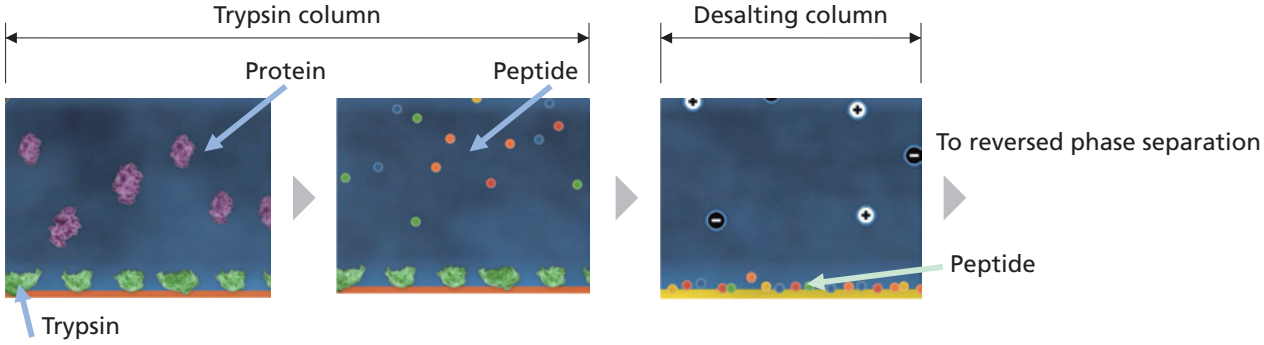
Perfinity iDP

Protein digestion (1-4minutes) → Desalting → HPLC or LC/MS analysis

Perfinity iDP reduces the entire sample preparation workflow down to **20** minutes

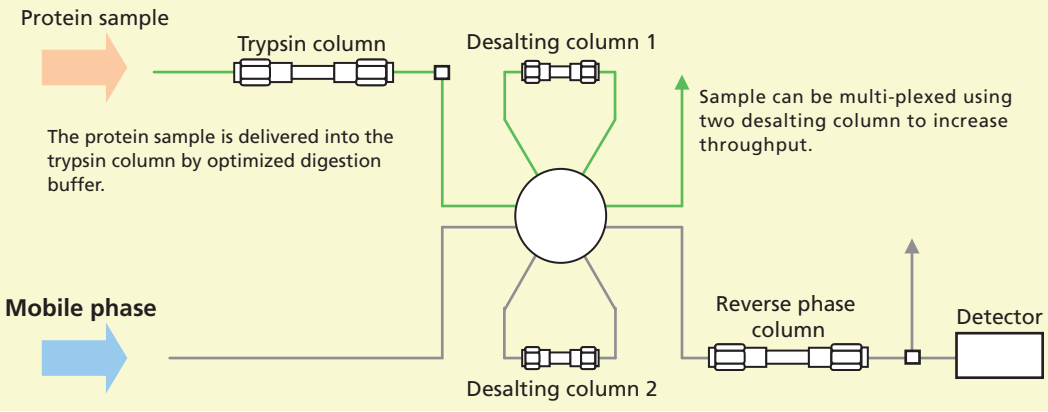
Reduce trypsin digestion time to **1-4** minutes

Automated Digestion Workflow



Digestion
Proteins are rapidly digested by trypsin immobilized onto the stationary phase of the column.

Desalting
Tryptic peptides are concentrated and desalted on the desalting column.



Features

- High-efficiency trypsin column provides fast on-line trypsin digestion in 1-4 minutes
- Perfinity iDP Software provides a user-friendly interface
- Full automation enables reproducible results
- Coupling with LC/MS products opens a wide range of protein applications

PERFINITY

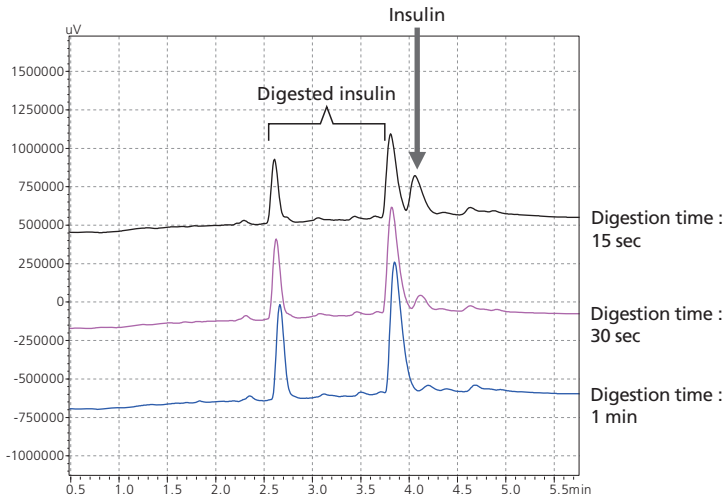
Fast On-Line Trypsin Digestion

1-4 minutes trypsin digestion using a high-efficiency trypsin column

The benefits of using Perfinity iDP with the immobilized trypsin column are:

1. Fast trypsin digestion in 1 to 4 minutes
2. Continuous sample analysis on reusable trypsin column
3. Reduced chymotrypsin activity and deamidation

Insulin was digested within 1 minute using the trypsin column as shown in the figure at right.
* Optimal digestion time depends on proteins.

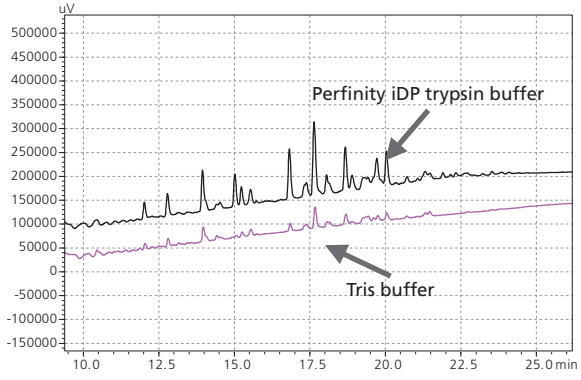


Digestion of insulin (5 µg)

Optimized Perfinity iDP digestion buffer

The optimized trypsin digestion buffer in combination with the trypsin column enables highly efficient digestion.

The figure to the right shows a comparison between the optimized digestion buffer and the commonly used tris buffer. The optimized digestion buffer provided a higher peptide recovery rate with a short digestion time.

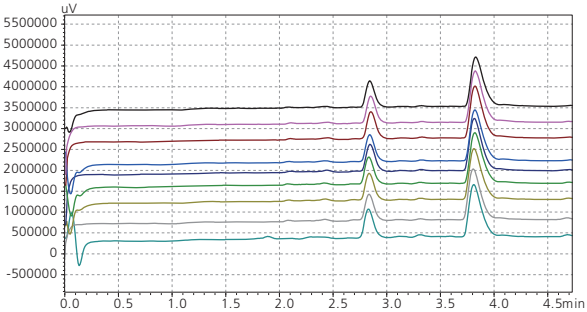


Increased digestion efficiency by the Perfinity iDP digestion buffer

Increased throughput by parallel sample processing with two desalting columns

Two desalting columns allow parallel processing of samples. One desalting column is used to trap digested peptides, while peptides from the previously injected sample are eluted from the other desalting column. This parallel sample processing allows analysis of up to 200 samples/day.

The figure to the right is an example of parallel sample processing, which increases throughput while maintaining reproducibility.



Parallel process by two desalting column

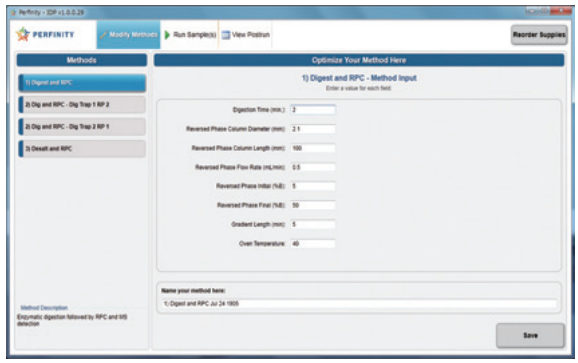
Easy Operation by Perfinity iDP Software

The Perfinity iDP software supports the total workflow from method development to analysis of samples

Step 1

Method settings

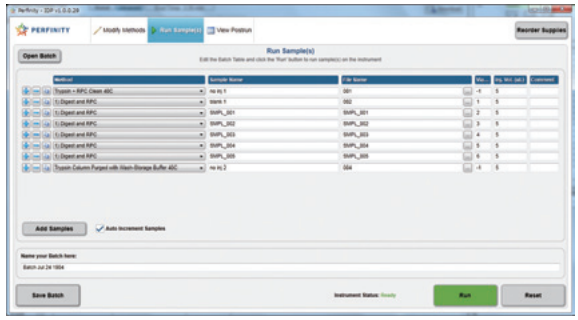
After selecting a method, users can quickly create and optimize methods by entering a few parameters, such as digestion time, column dimensions, and gradient time. Perfinity iDP methods are then automatically generated for running samples.



Step 2

Batch file creation

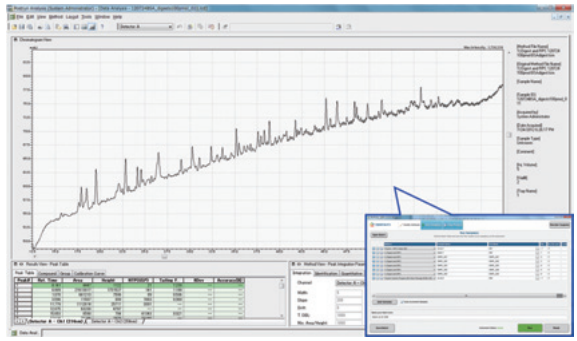
Batch files for sample analysis are quickly generated. Users enter minimal information such as methods, data file names, and injection volumes.



Step 3

Seamless connection with LabSolutios

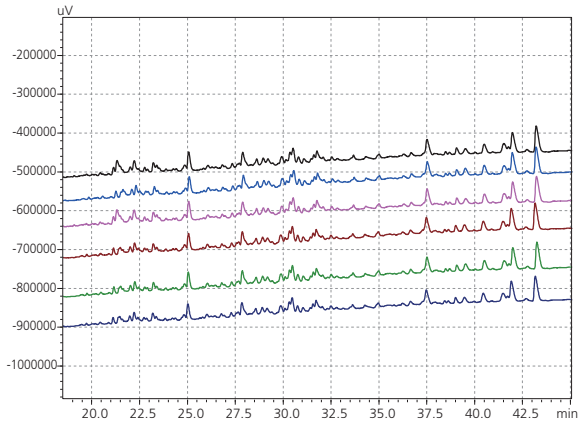
Analysis results can be viewed in the LabSolutions post-run window, which can be accessed through the Perfinity iDP software.



Full Automation Enables Reliable Analysis

Increased reproducibility by automation of workflow

Perfinity iDP minimizes human error by automating all steps from digestion to desalting to LC/MS analysis. The figure at right shows reproducible chromatograms of reduced and alkylated transferrin analysis.



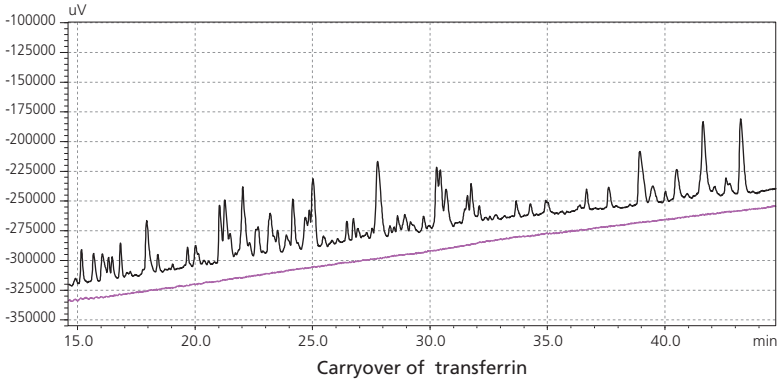
Analysis of reduced and alkylated transferrin

Time	Run 1	Run 2	Run 3	Average	StDev	CV(%)
20	77551	72199	80057	76602.33	4014	5.24
20.4	123633	106875	121037	117181.7	9020	7.7
20.9	101131	108713	105673	105172.3	3816	3.63
21.1	164803	168049	167296	166716	1699	1.02
21.5	261128	236951	234215	244098	14812	6.07
22.2	290171	290735	288299	289735	1275	0.44
22.4	186600	178884	178861	181448.3	4461	2.46
22.7	143964	144298	142517	143593	947	0.66
22.9	104212	114875	110346	109811	5352	4.87
23.2	267686	255772	249757	257738.3	9125	3.54
23.4	130573	124909	129993	128491.7	3116	2.43
23.5	53220	48288	49150	50219.33	2634	5.25
23.6	31610	32296	31467	31791	443	1.39
23.8	102430	105401	101824	103218.3	1914	1.85
24	49022	56231	53091	52781.33	3614	6.85
24.2	91279	86549	78148	85325.33	6650	7.79
24.4	85161	85883	82149	84397.67	1981	2.35
24.8	241992	243983	250666	245547	4544	1.85
25	483586	471184	467367	474045.7	8480	1.79
25.5	34326	36274	31764	34121.33	2262	6.63

Reproducibility of 20 peptides that was produced by digestion of reductive alkylated transferrin

Minimized carryover

Reliable instrumentation and optimized methods result in very low levels of carryover. The figure at right shows a blank injection after a transferrin injection to illustrate minimized carryover with reliable results using Perfinity iDP.

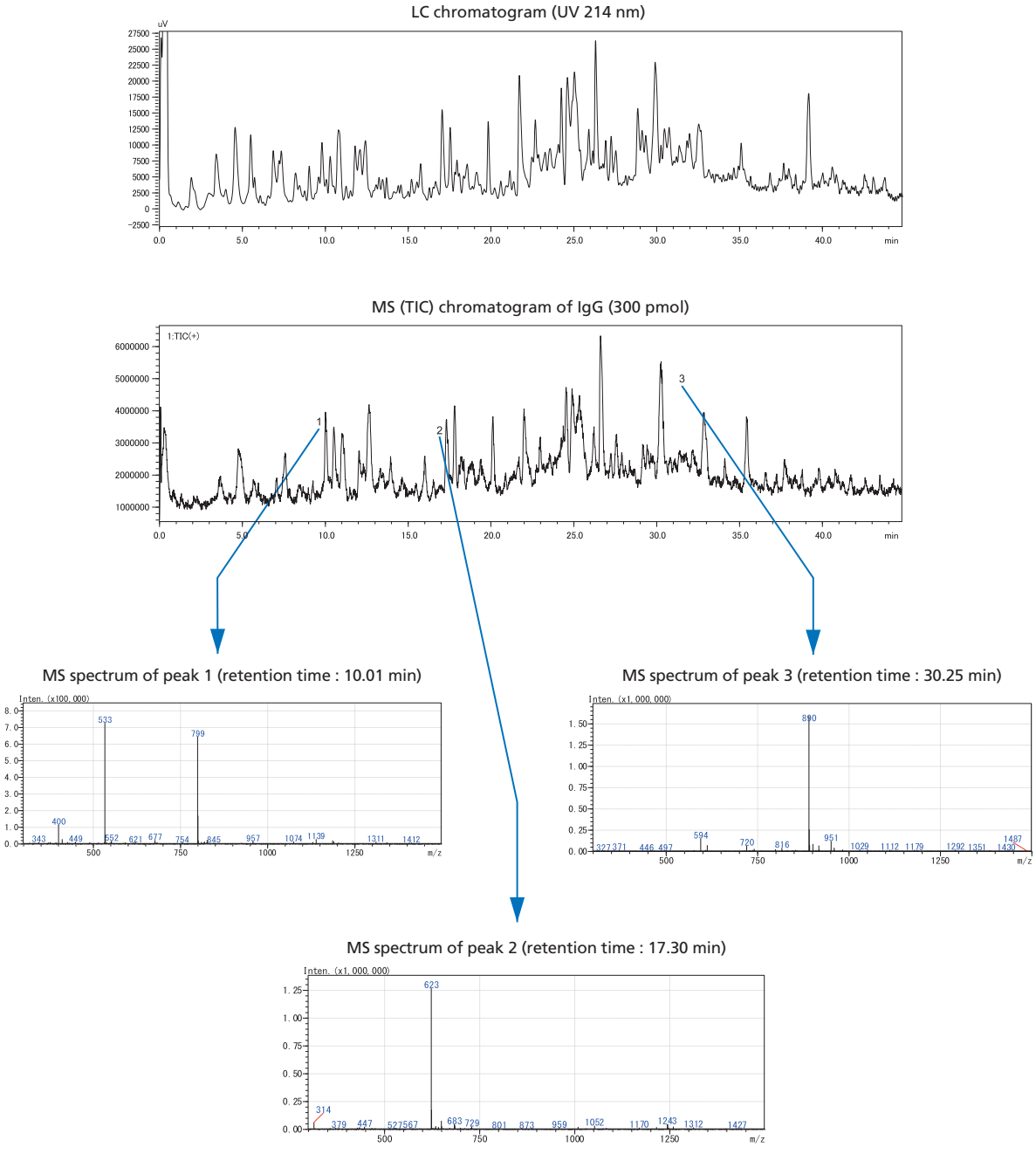


Carryover of transferrin

Wide application range with LC/MS

Application : Detection of IgG digested peptides by LCMS-2020

IgG was analyzed Perfinity iDP with LCMS-2020, Main peptide fragments were easily confirmed after 4 minutes digestion.



System configuration

Item	Quantity
CBM-20A	1
Reservor tray	2
DGU-20A5R	1
LC-20ADXR	2
LC-20AD	1
LPGE unit	1
Rinse kit for 20AD	1
SIL-20ACHT UFLC	1
Mixer MR 100 mL	1
CTO-20AC	1
SPD-20A	1
FCV-36AH	2
Startup kit	1

Columns and Consumables

Item	P/N
Trypsin column	228-56951-10
Mobile phase kit	228-56951-60
Pretreatment kit	228-56951-64

Startup kit

Item	Quantity	Remarks
Piping kit	1	
Data process	1	LabSolutions and a dongle
Perfinity iDP software	1	Perfinity iDP software and a dongle
Manual	1	

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