SHIMADZU

Application Data Sheet

No.25

GCMS

Gas Chromatograph Mass Spectrometer

Analysis of Metabolic Components Contained in Dog Cerebrospinal Fluid

Dog cerebrospinal fluid was analyzed with a GC-MS system after pretreatment and trimethylsilylation (TMS). This analysis was performed in cooperation with Dr. Shigeo Takenaka from the Graduate School of Life and Environmental Sciences, Osaka Prefecture University.

Experiment

Pretreatment

Dog Cerebrospinal fluid was pretreated and underwent trimethylsilylation (TMS)

Instrument

The GCMS-QP2010 Ultra was used for the measurements. Analysis conditions were in conformity with the “Organic Acid and Amino Acid Analysis Method (Trimethylsilyl Derivative)” in the “GC/MS Metabolic Components Database.” The analysis conditions are shown in Table 1.

Table 1: Analysis Conditions - Organic Acid and Amino Acid Analysis Method (Trimethylsilyl Derivative)

GC-MS	: GCMS-QP2010 Ultra
Column	: DB-5 (length: 30 m, 0.25 mm I.D., df=1μm)

[GC]

Injection quantity	: 1μL
Vaporization chamber temperature	: 280℃
Column oven temperature	: 100℃(4min) → (4℃/ min) → 320℃
Control mode	: Constant linear velocity (39 cm/sec)
Injection mode	: Splitless
Sampling time	: 1 min
Carrier gas	: Helium

[MS]

Interface temperature: 280 °C
Ion source temperature: 200 °C
Solvent elution time: 6.5 min
Data sampling time: 7 to 59 min
Measurement mode: Scan
Mass range: m/z 35 to 600
Event time: 0.3 sec

Results

The total ion current chromatogram (TIC) obtained is shown in Fig. 1, and the quantitative results are shown in Table 2. The peak numbers for components 1 to 178 follow the serial numbers in the “GC/MS Metabolic Components Database.”

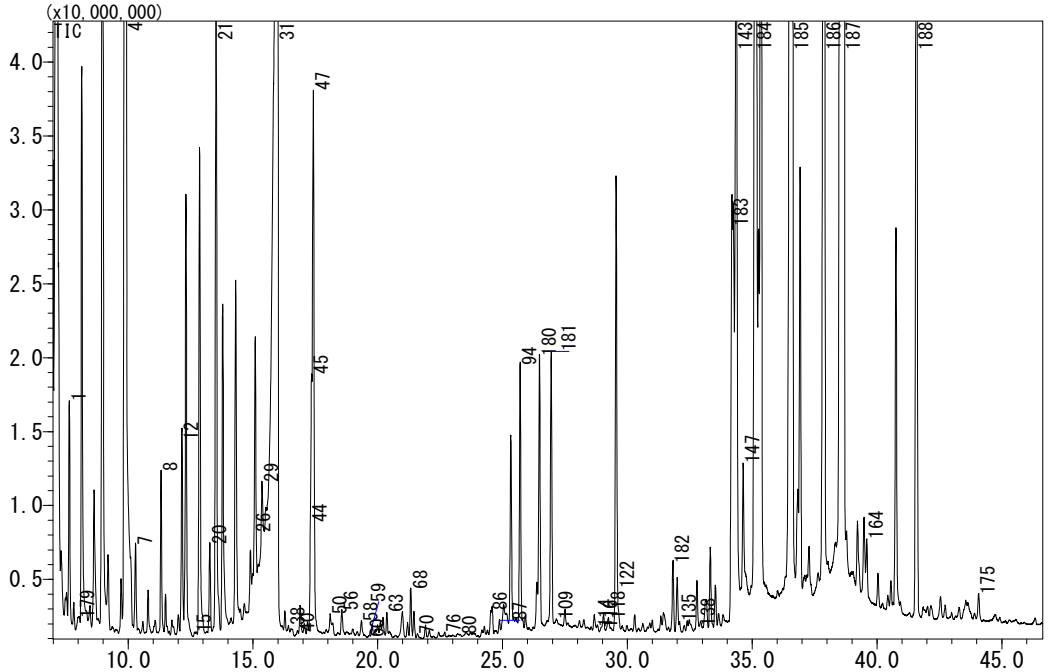

Fig. 1: Total Ion Current Chromatogram (TIC) for Metabolic Components in Dog Cerebrospinal Fluid

Table 2: List of Metabolic Components Detected

1	Boroic acid-3TMS	80	Decanoic acid-TMS
4	Lactic acid-2TMS	86	Malic acid-3TMS
7	Glycolic acid-2TMS	87	Adipic acid-2TMS
8	L-Alanine-2TMS	94	5-Oxoproline-2TMS
12	2-Hydroxybutyric acid-2TMS	109	2-Hydroxyglutaric acid-3TMS
15	3-Hydroxypropionic acid-2TMS	114	4-Hydroxybenzoic acid-2TMS
20	3-Hydroxyisobutyric acid-2TMS	116	L-Phenylalanine-2TMS
21	2-Hydroxyisovaleric acid-2TMS	118	Lauric acid-TMS
26	3-Hydroxyisovaleric acid-2TMS	122	N-Acetylaspartic acid-2TMS
29	L-Valine-2TMS	135	Aconitic acid-3TMS
31	Urea-2TMS	138	Homovanillic acid-2TMS
38	Benzoic acid-TMS	143	Citric acid-4TMS
40	Octanoic acid-TMS	147	Myristic acid-TMS
44	L-Leucine-2TMS	164	Palmitic acid TMS
45	Glycerol-3TMS	175	Stearic acid-TMS
47	Phosphoric acid-3TMS	179	1,2-propanediol-2TMS
50	L-Isoluecine-2TMS	180	Threonic acid-4TMS(1)
56	Succinic acid-2TMS	181	Threonic acid-4TMS(2)
58	Glyceric acid-3TMS	182	pentose sugar alcohol-5TMS
59	Fumaric acid-2TMS	183	monosaccharide-5TMS(1)
60	Uracil-2TMS	184	monosaccharide-5TMS(2)
63	L-Serine-3TMS	185	monosaccharide-5TMS(3)
68	L-Threonine-3TMS	186	Ascorbic acid-4TMS
70	Glutaric acid-2TMS	187	monosaccharide-5TMS(4)
76	2-Deoxytetronic acid-3TMS	188	Inositol-6TMS
77	3-Methylglutaconic acid(E)-2TMS		

Notes

1. The numbers for each component follow the serial numbers in the “GC/MS Metabolic Components Database.”

2. Components 1 to 178 were analyzed utilizing the “GC/MS Metabolic Components Database”, while components 179 to 189 were analyzed utilizing the “NIST Mass Spectral Library”.

Summary

51 metabolic components contained in dog cerebrospinal fluid were identified.
(41 components utilizing the “GC/MS Metabolic Components Database”, and 10 components utilizing the “NIST Mass Spectral Library”)

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