Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry.

Development of an activity-based chemiluminogenic probe for γ-glutamylcyclotransferase

Yukie Nohara[a], Keiko Taniguchi[b], Hiromi Ii[c], Shun Masuda[a], Hiroko Kawakami[a], Masakatsu Matsumoto[d], Yasunao Hattori[e], Susumu Kageyama[f], Toshiyuki Sakai[b], Susumu Nakata* [c], Taku Yoshiya*[a, g]

[a] Peptide Institute, Inc., 7-2-9 Saito-Asagi, Ibaraki-shi, Osaka 567-0085, Japan.

[b] Department of Drug Discovery Medicine, Kyoto Prefectural University of Medicine, Kajii-cho 465, Kawaramachi-Hirokoji Kamigyo-ku, Kyoto 602-8566, Japan.

[c] Laboratory of Clinical Oncology, Kyoto Pharmaceutical University, Misasagi-Nakauchi-cho 5, Yamashina-ku, Kyoto 607-8414, Japan.

[d] Department of Chemistry, Kanagawa University, 3-27-1 Rokkakubashi, Kanagawa-ku, Yokohama, Kanagawa, 221-8686, Japan.

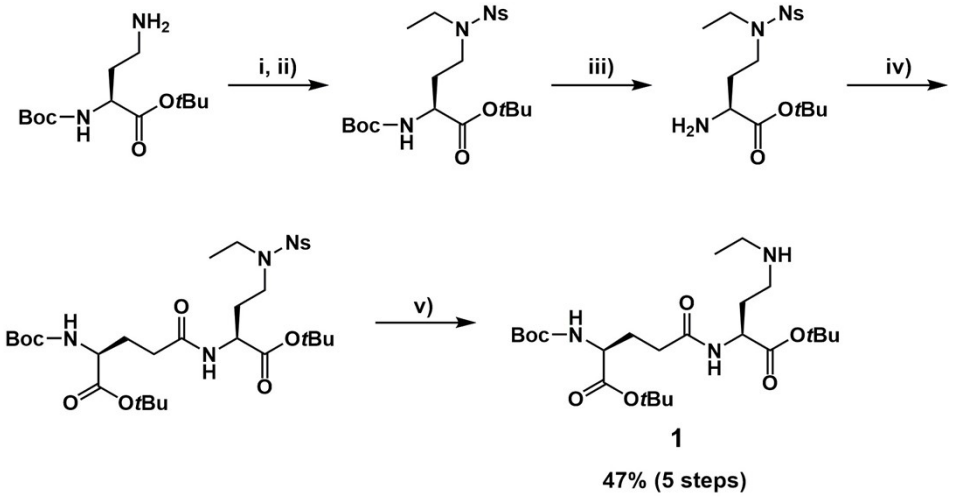
[e] Center for Instrumental Analysis, Kyoto Pharmaceutical University, Misasagi-Schichono-cho 1, Yamashina-ku, Kyoto 607-8412, Japan.

[f] Department of Urology, Shiga University of Medical Science, Seta Tsukinowa-cho, Otsu, Shiga 520-2192, Japan.

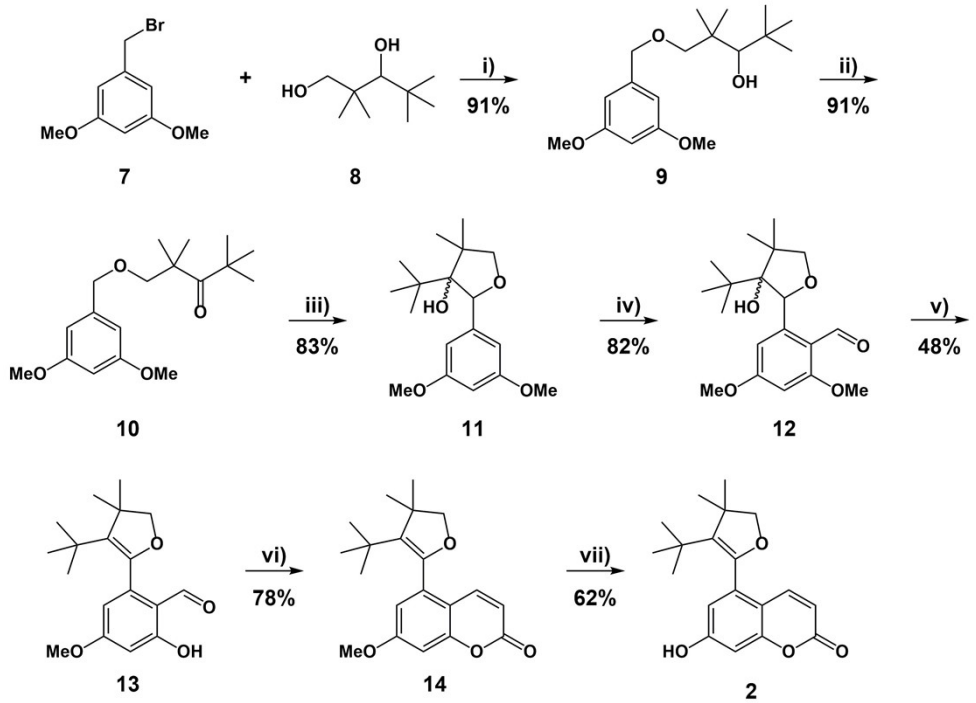
[g] Institute for Protein Research, Osaka University, 3-2 Yamadaoka, Suita-shi, Osaka 565-0871, Japan.

Contents

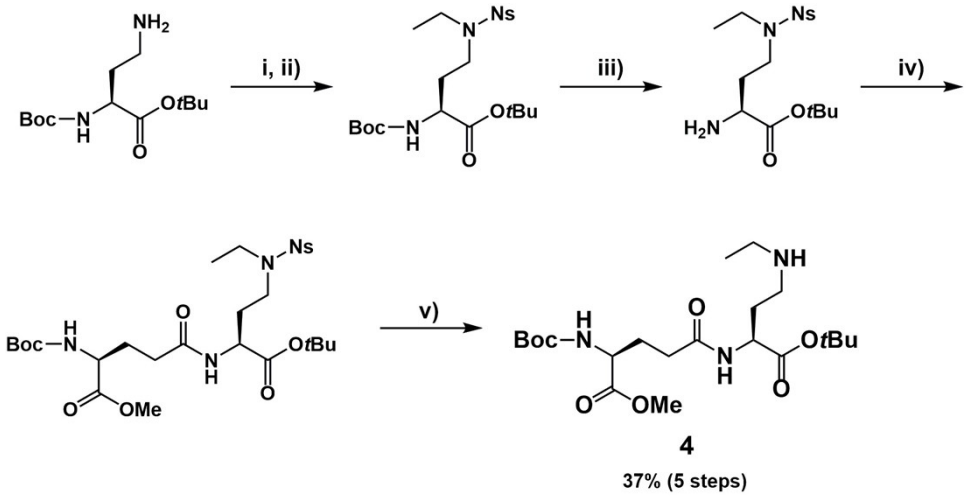
Supplemental synthetic schemes



Scheme S1. Synthesis route of compound **1**. Reagents and conditions: i) NsCl, K_2CO_3, THF/H_2O (2/1), ii) EtI, K_2CO_3, DMF, iii) 4.0 M HCl/dioxane, 0 °C, iv) Boc-Glu-O*t*Bu, EDC•HCl, HOBt, DMF/H_2O (95/5), v) LiOH•H_2O, thioglycolic acid, DMF.



Scheme S2. Synthesis route of compound **2**. Reagents and conditions: i) NaH, THF, ii) PCC, CH_2Cl_2, iii) LDA, THF, iv) Cl_2CHOCH_3, AgOTf, CH_2Cl_2, v) BBr_3, CH_2Cl_2, vi) $PPh_3CHCOOEt$, *N*,*N*-diethylaniline, vii) $AlCl_3$, CH_2Cl_2.



Scheme S3. Synthesis route of compound **4**. Reagents and conditions: i) NsCl, K_2CO_3, THF/H_2O (2/1), ii) EtI, K_2CO_3, DMF, iii) 4.0 M HCl/dioxane, 0 °C, iv) Boc-Glu-OMe, EDC•HCl, HOBt, DMF/H_2O (95/5), v) K_2CO_3, 4-mercaptophenylacetic acid, DMF.

Stability evaluation of MAM-LISA-103

Compared with LISA-103, we noticed unstability of MAM-LISA-103 during storage as a lyophilized powder. After consideration of several conditions, we finally found that co-existence of sucrose as a diluent can prevent decomposition of MAM-LISA-103 while the reason is unclear. As shown in Fig S1, at room temperature (accelerated test), 9% was decomposed after 7 h in the presence of sucrose, while 34% was decomposed without sucrose. Based on these results, MAM-LISA-103 was stored as a lyophilized powder with sucrose. Eventually, only 0.3% was decomposed after 6 months at −20 °C.

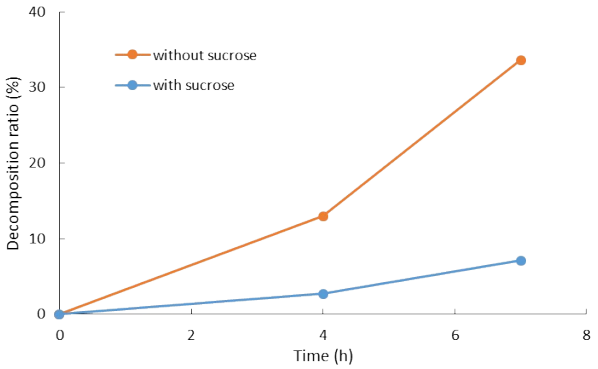
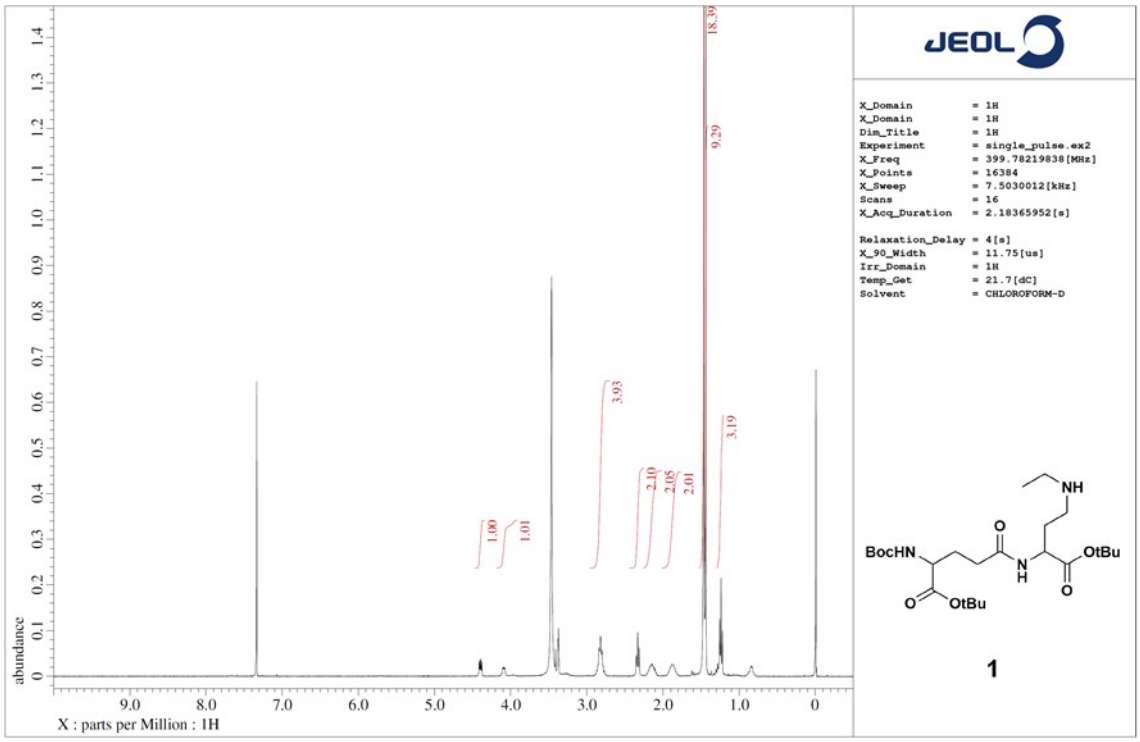


Fig. S1 Stability comparison study of MAM-LISA-103. The decomposition ratio of MAM-LISA-103 in the lyophilized powder with or without sucrose at room temperature was evaluated by HPLC.

NMR spectra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3.93
3.19
2.10
2.05
2.01
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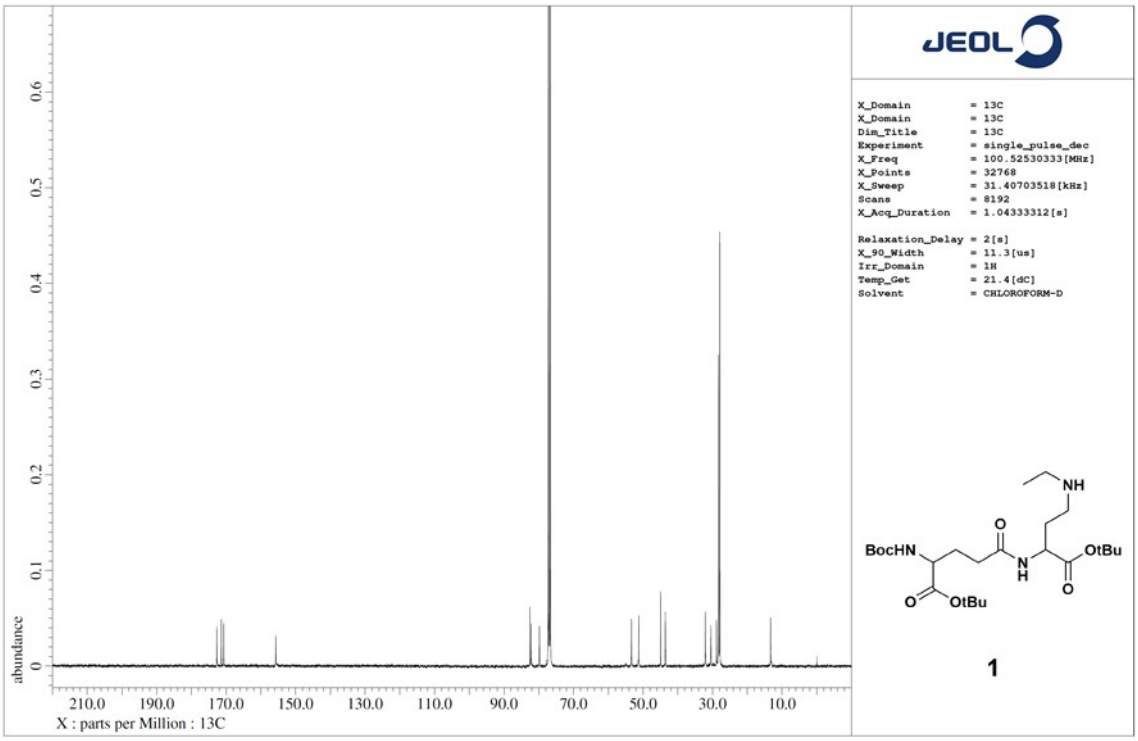
OtBu
NH
OtBu
1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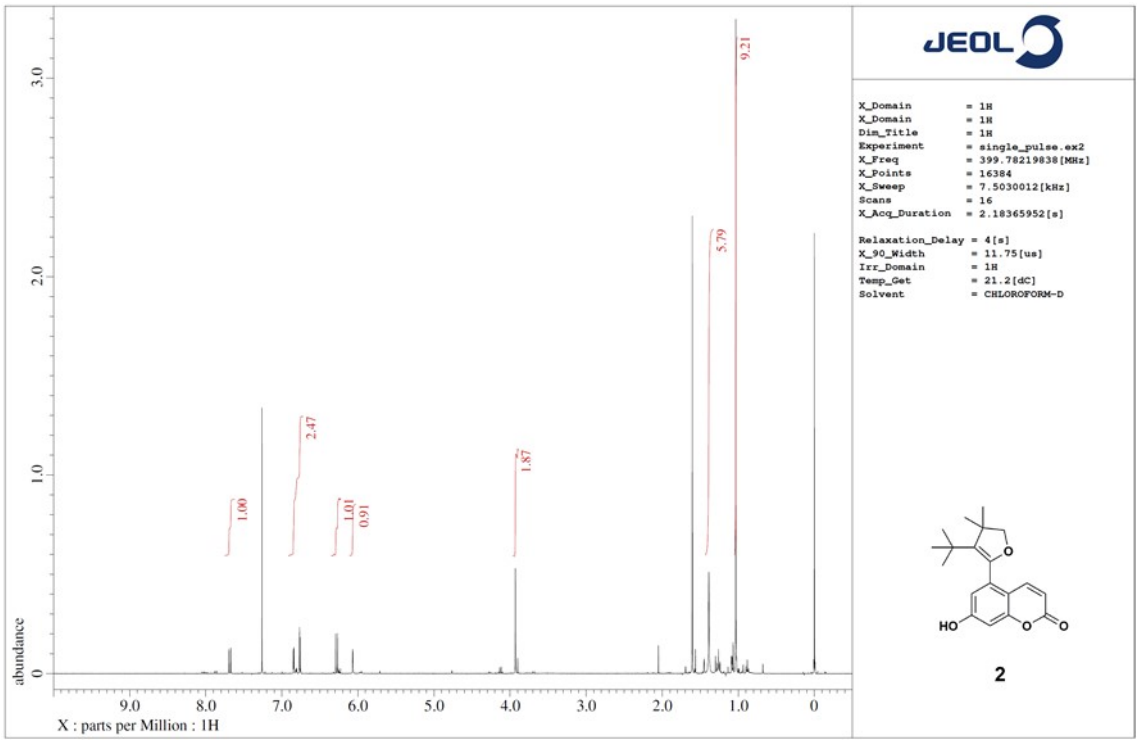
OtBu
NH
OtBu
1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5.79
2.47
1.87
1.00
1.01
0.91
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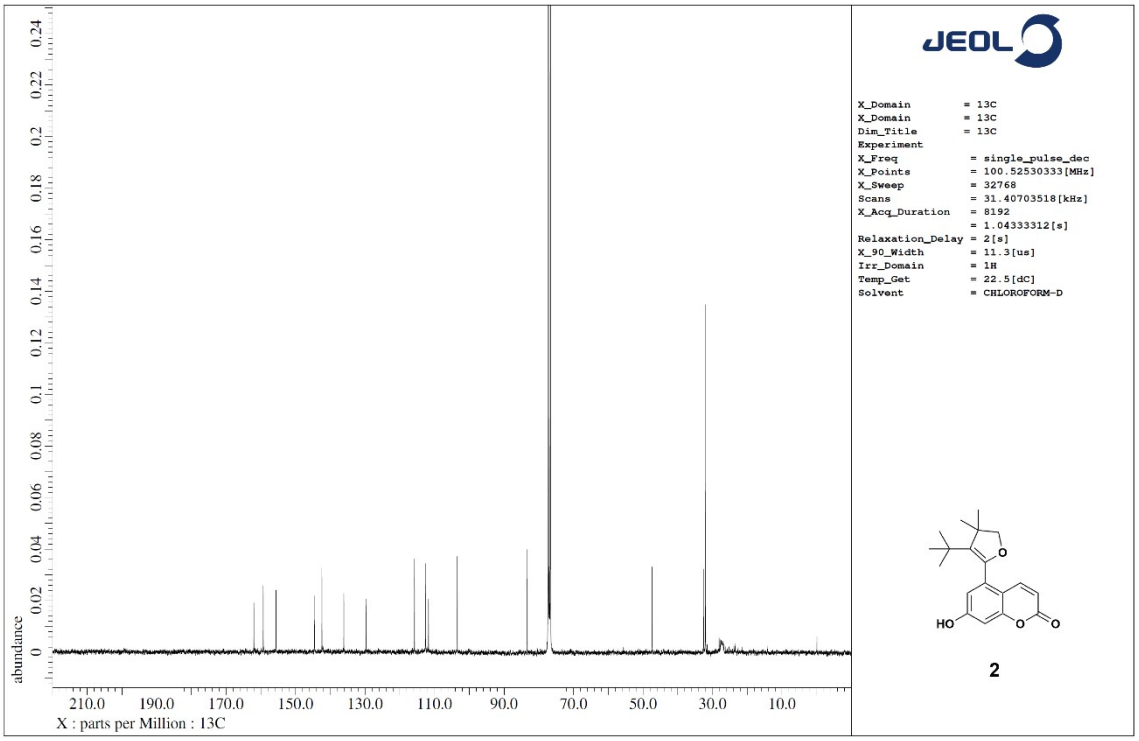
HO
O
O
2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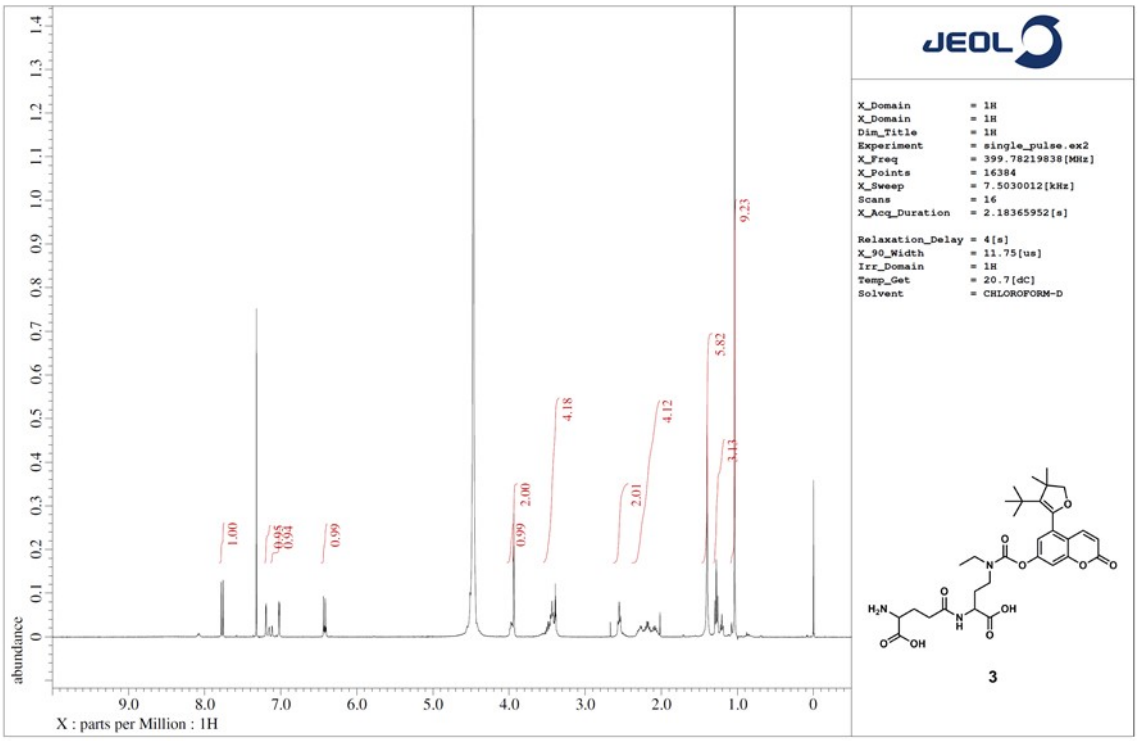
HO
O
O
2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0.95
0.94
0.99
0.99
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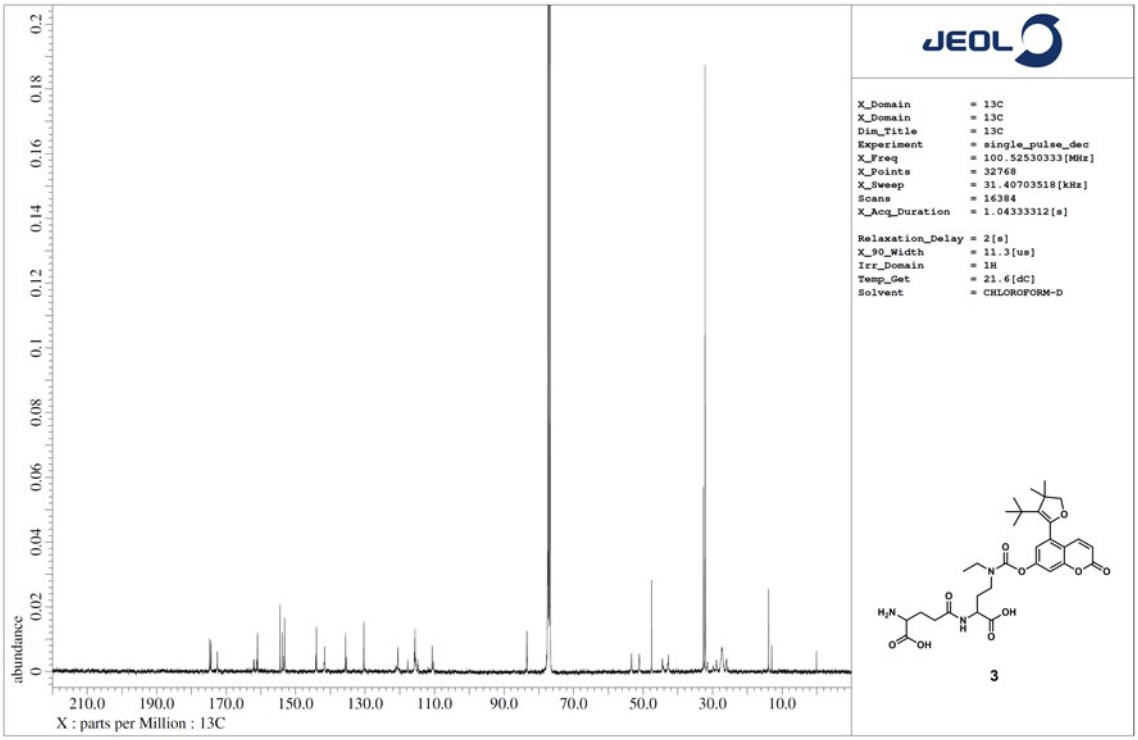
4.18
2.01
4.12
5.82
3.13
9.23
abundance
X : parts per Million : 1H
3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X : parts per Million : 13C
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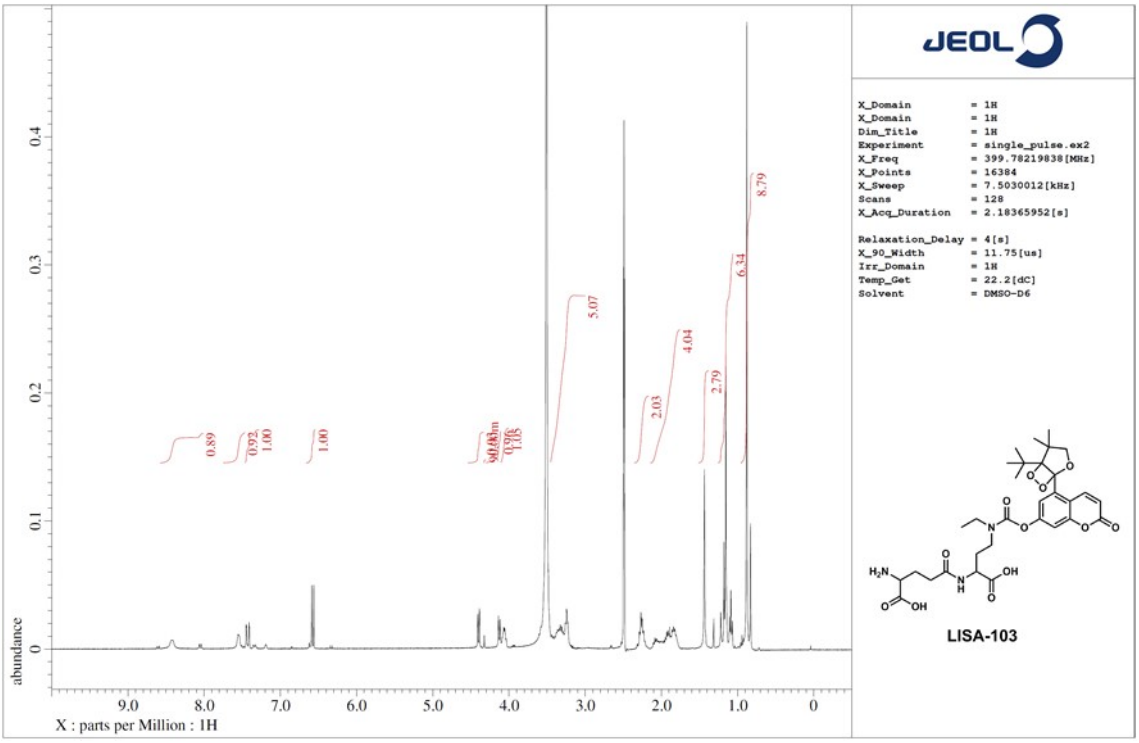
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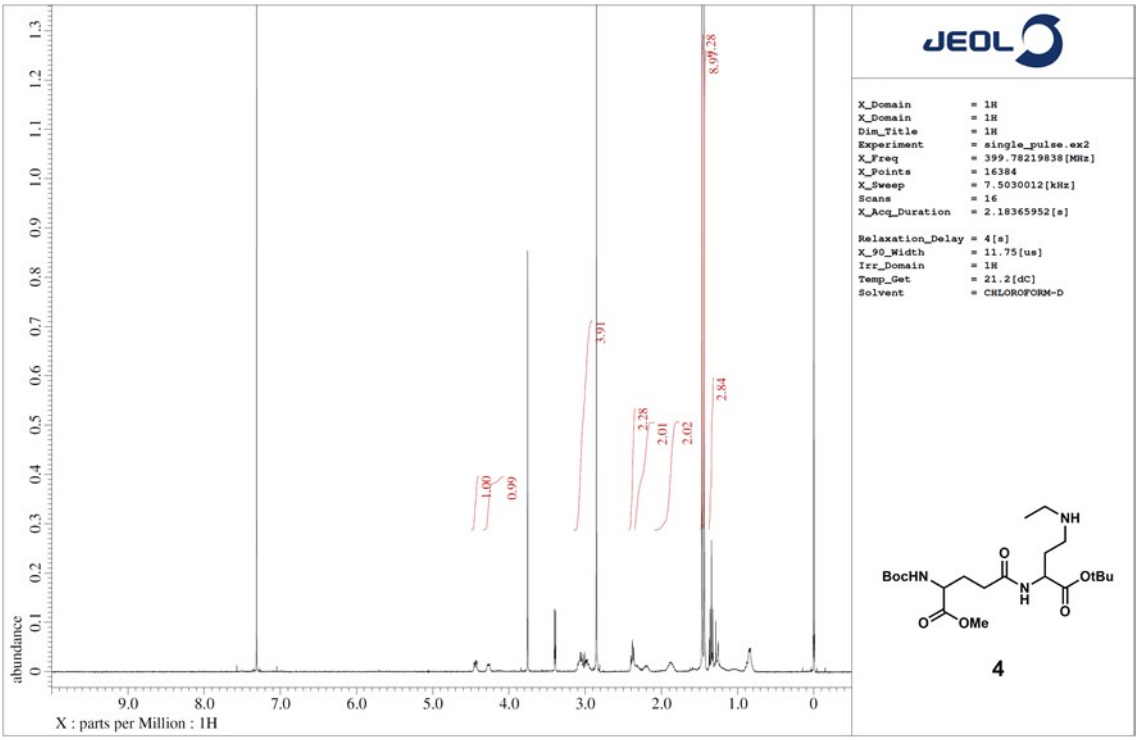
0.89
0.92
1.00
1.00
1.05
5.07
2.03
4.04
2.79
6.34
8.79
abundance
X : parts per Million : 1H
LISA-103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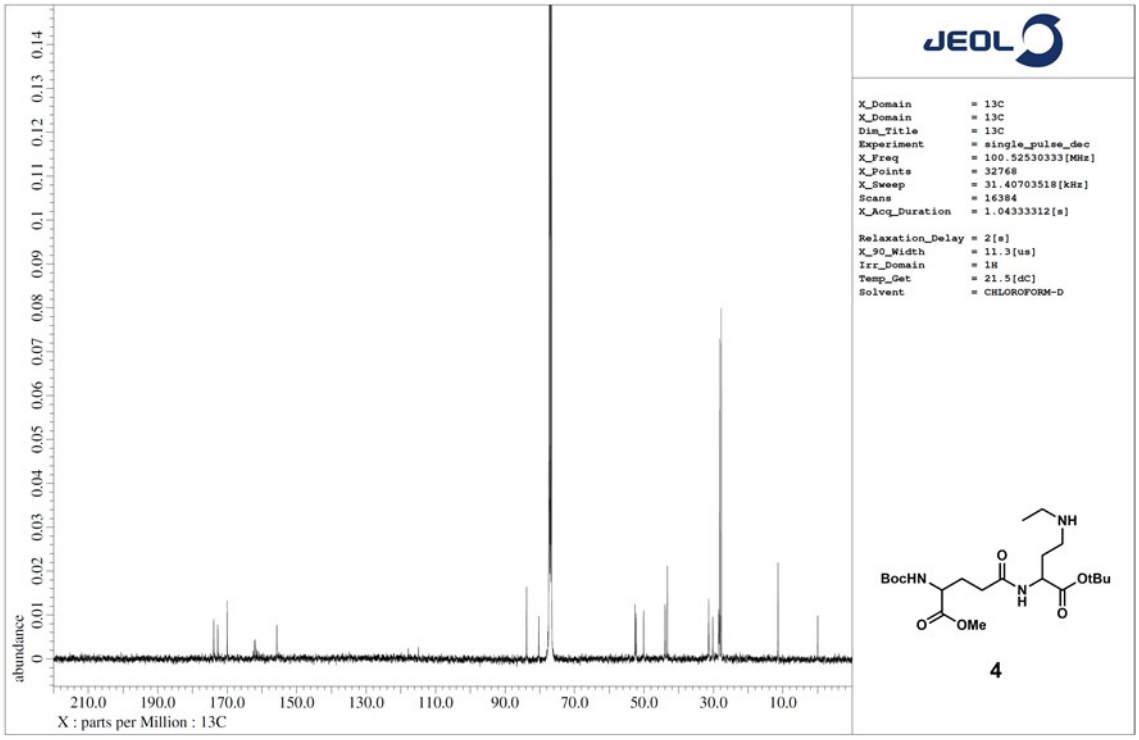
Solvent = CHLOROFORM-D
8.99
3.91
2.84
2.28
2.01
2.02
1.00
0.99
abundance
X : parts per Million : 1H
BocHN
OtBu
OMe
NH
4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OtBu
OMe
NH
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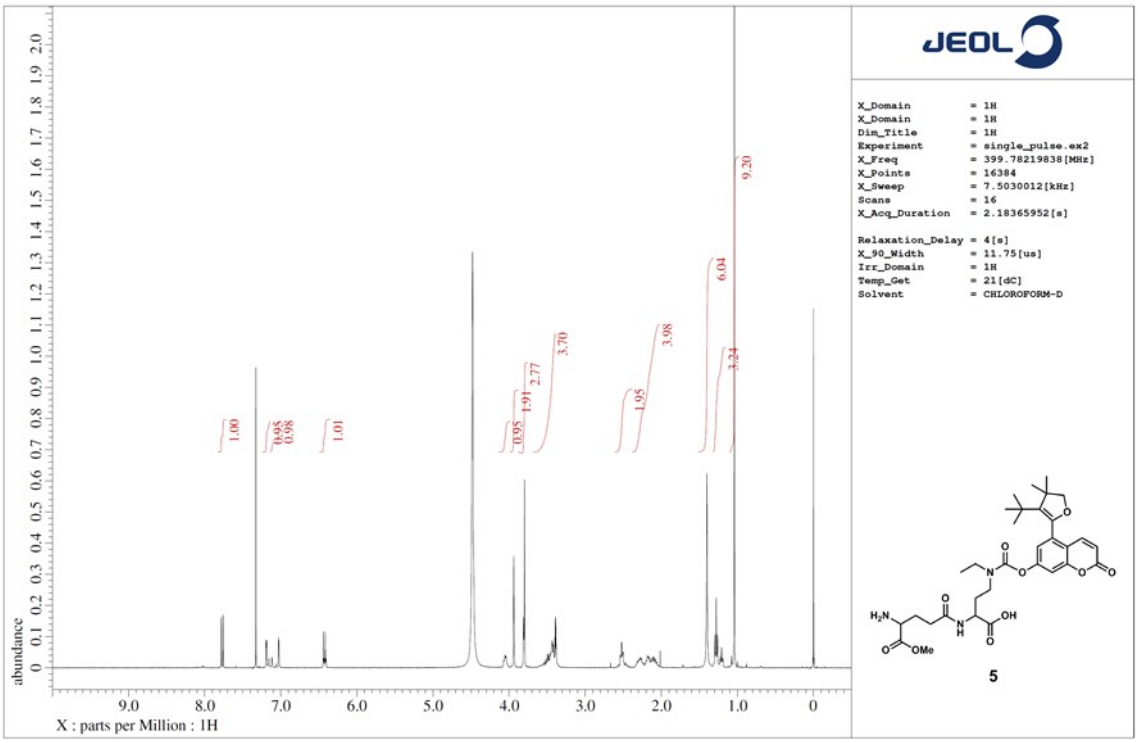
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0.95
0.98
1.01
0.95
1.91
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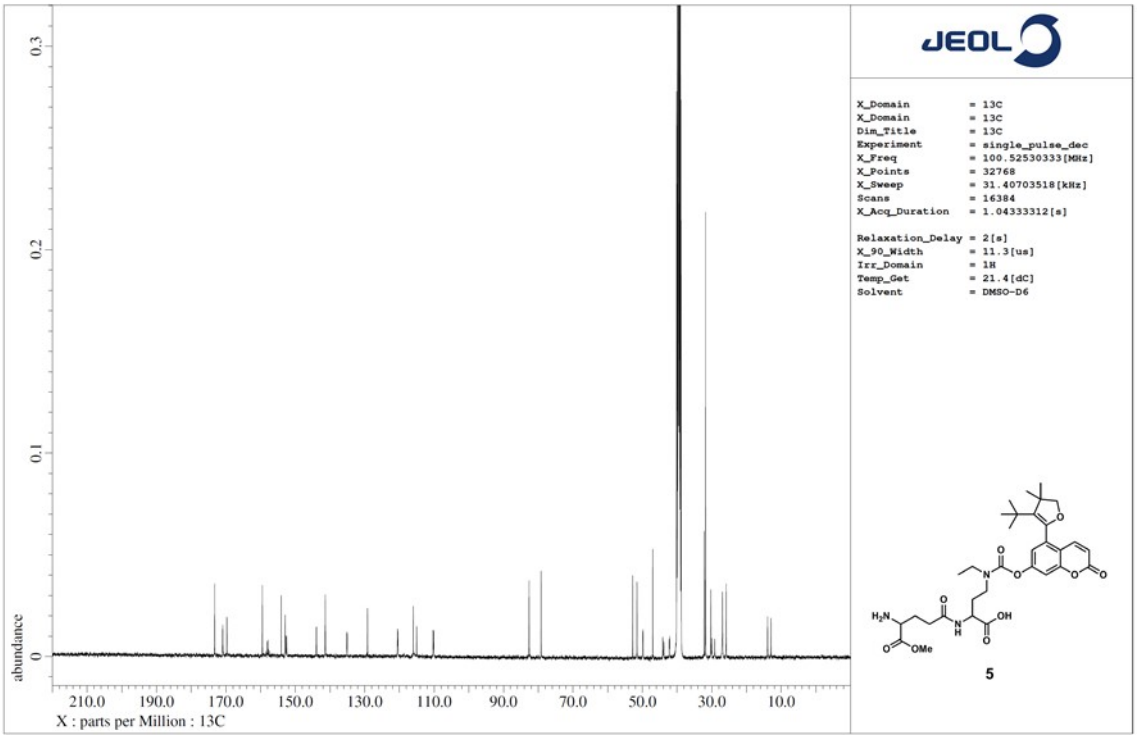
1.95
3.98
6.04
3.24
9.20
abundance
X : parts per Million : 1H
5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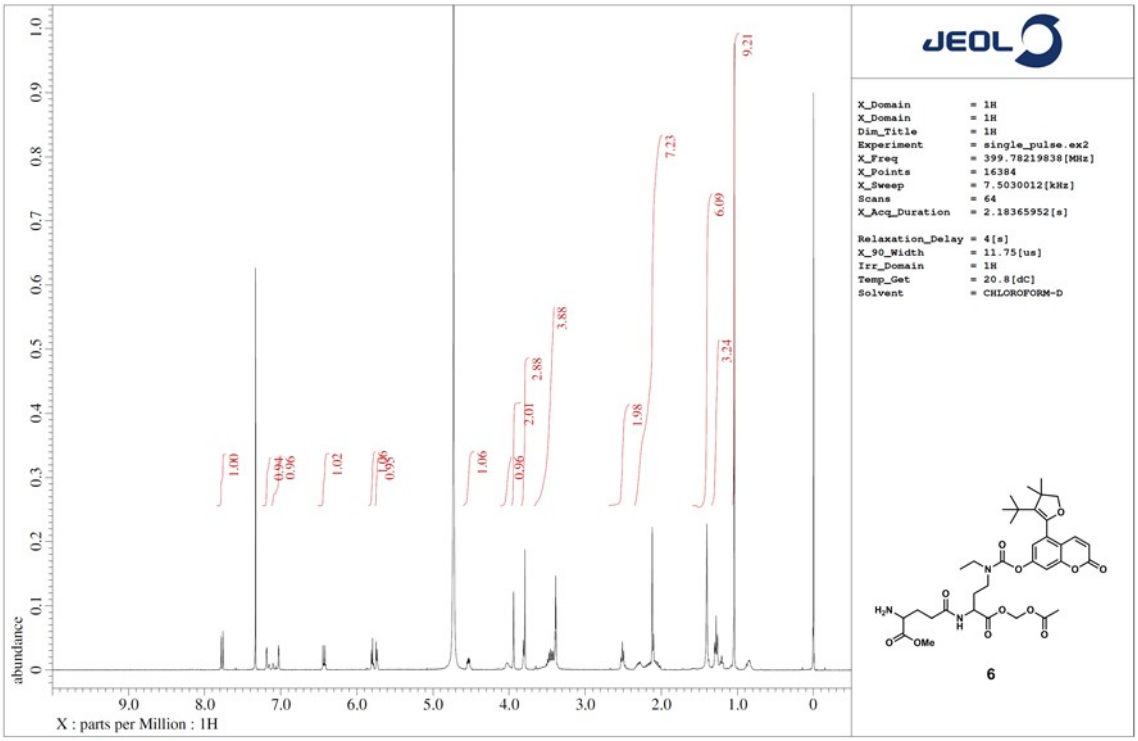
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abundance
X : parts per Million : 1H
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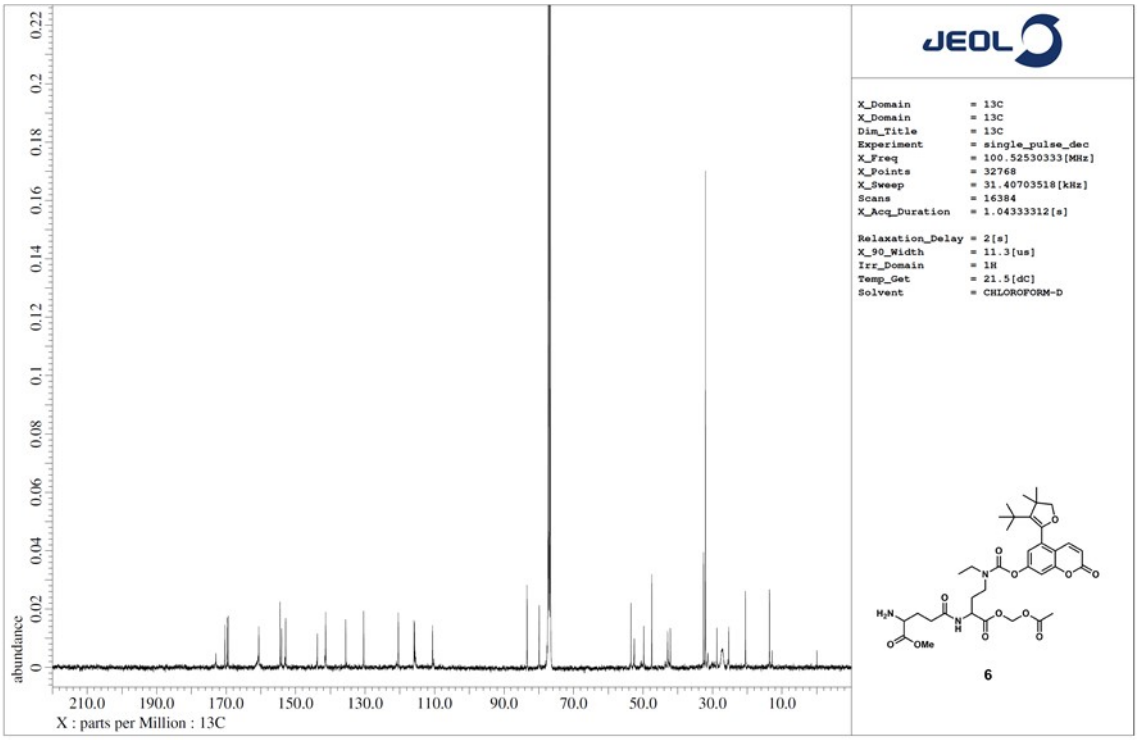
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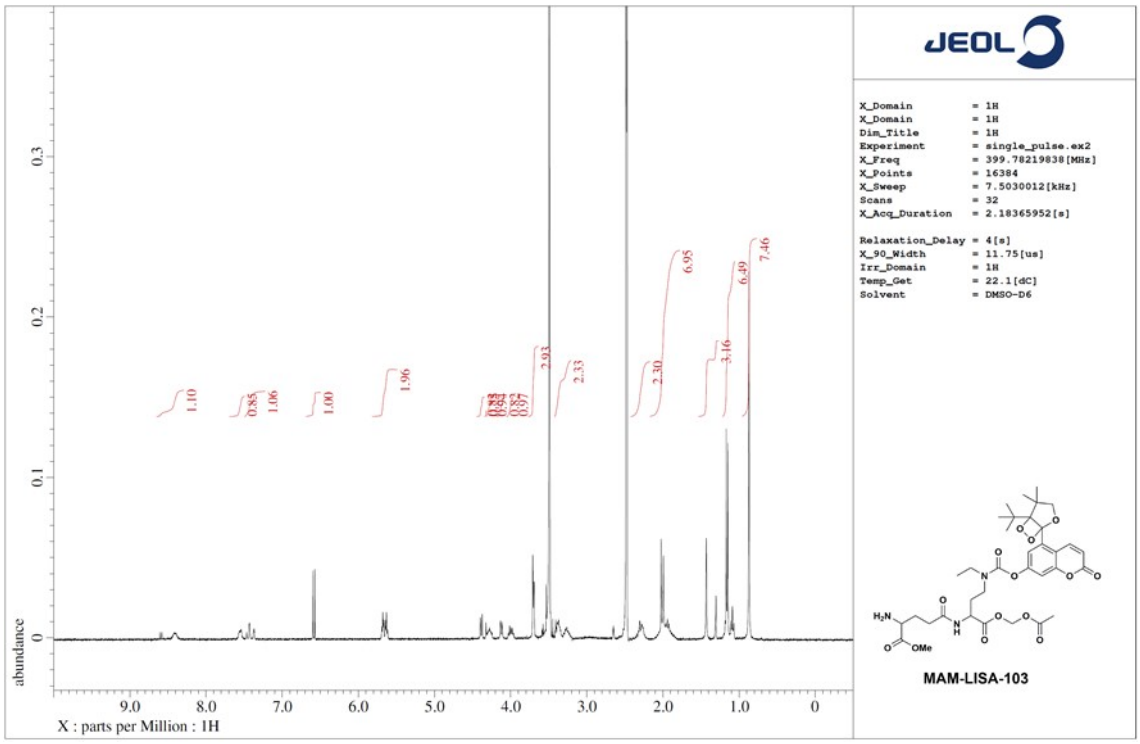
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1.00
1.96
2.93
2.33
2.30
6.95
3.16
6.49
7.46
abundance
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MAM-LISA-103