

## BDG SYNTHESIS

### Certificate of Analysis

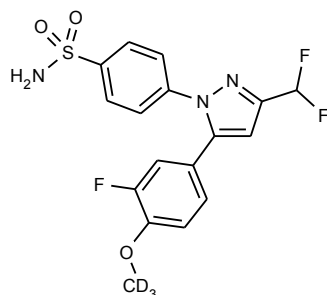
BDG Synthesis certifies that this reference material meets or exceeds the specifications stated herein.

*Neil Beare*

Neil Beare, PhD, Director  
9 November 2016

**Name:** Deracoxib-d<sub>3</sub>  
**CAS Number:** 169590-41-4 (unlabelled)

**Structure:**



**Molecular Weight:** C<sub>17</sub>H<sub>11</sub>D<sub>3</sub>F<sub>3</sub>N<sub>3</sub>O<sub>3</sub>S = 400.39  
**Lot Number:** BDG 5872  
**Appearance:** Pale tan, crystalline solid  
**Corrected Purity:** 99.8 % (HPLC) - 0.5 % (water) = 99.3 %  
**Isotopic Purity:** Under 0.5 % d<sub>0</sub>  
**Re-test Date:** 9 November 2021

**Storage and Handling:** Temperature: refrigerate for prolonged storage; may be handled and shipped at ambient temperature.  
Humidity: not believed to be hygroscopic; may be handled in normal laboratory atmosphere.  
Light: protect from strong sunlight.  
Caution: only experienced laboratory personnel should handle the material.

## Identity and Purity

### Proton NMR Spectrum

Identity: the signals are consistent with the proposed structure and in accord with literature where available.

Isotopic Labelling: signals at the site of deuteration are absent, compared with the spectrum of unlabelled material, indicating clean deuteration.

Residual Solvents: no residual solvents are observed.

Impurities: no significant impurities are evident in the spectrum.

### Carbon-13 NMR Spectrum

Identity: the signals are consistent with the proposed structure and in accord with literature where available.

Isotopic Labelling: signals at the site of deuteration have collapsed to small multiplets compared with the spectrum of unlabelled material, indicating clean deuteration.

### High-resolution Mass Spectrum (ESI+)

Found  $m/z$  423.0776.  $C_{17}H_{11}D_3F_3N_3NaO_3S$   $[M+Na]^+$  requires  $m/z$  423.0788. The deviation of 3.0 ppm is within normally accepted limits for the establishment of identity by HRMS. No signal for  $d_0$  material was seen (detection limit about 0.5 %).

### HPLC

A sharp, symmetrical peak is observed (99.8 %). Note: in the absence of reference materials for preparing calibration curves, it is assumed that all peaks have the same detector response. Where possible, the conditions of analysis follow a pharmacopeial or literature method, or have been adapted from same.

### Elemental Analysis

|   |           |                                    |
|---|-----------|------------------------------------|
|   | Found:    | C 50.51, H 2.73, D 1.51, N 10.43 % |
| $C_{17}H_{11}D_3F_3N_3O_3S \cdot 0.2H_2O$ | Requires: | C 50.54, H 2.84, D 1.50, N 10.40 % |
| $C_{17}H_{11}D_3F_3N_3O_3S$               | Requires: | C 51.00, H 2.77, D 1.51, N 10.49 % |

The elemental analyses fall slightly outside those expected for anhydrous material; the presence of water is reasonably expected from the method of purification and/or the type of material, and the "best-fit" hydrated molecular formula is given.

### Karl-Fischer Analysis

|   |           |                        |
|---|-----------|------------------------|
|   | Found:    | H <sub>2</sub> O 0.5 % |
| $C_{17}H_{11}D_3F_3N_3O_3S \cdot 0.2H_2O$ | Requires: | H <sub>2</sub> O 0.9 % |

Of necessity, only a small sample could be used and only a single or duplicate analysis performed. We are unable to state what the errors in the reported water content are, but recommend that the result be used, as the best available, when determining corrected purity.

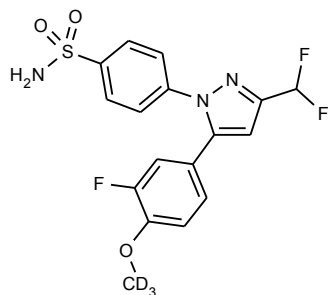
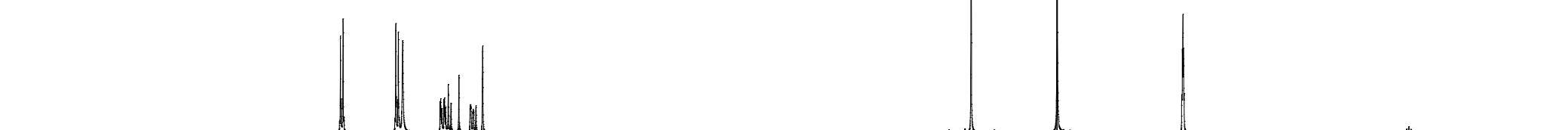
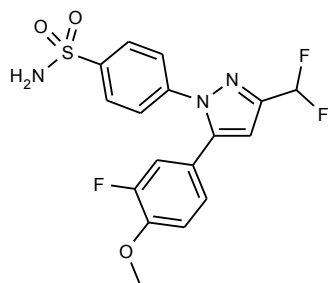
The available quantity of custom-synthesised material is always small, and this limits the extent and type of analytical data which can be obtained. This Certificate is presented in descriptive format for use by analytical chemists who are trained in the use of custom-synthesised materials. Custom materials often contain higher levels of residual solvents and/or water, and we urge you to use the corrected purity where needed rather than the raw HPLC purity. This compound is intended for use as an analytical reference material and it is not for human administration. Structures are shown with relative stereochemistry unless otherwise specified.

The re-test date is assigned from experience gained with the material in the laboratory and/or on storage. It is not possible to perform formal storage studies because of the small amount of material available.

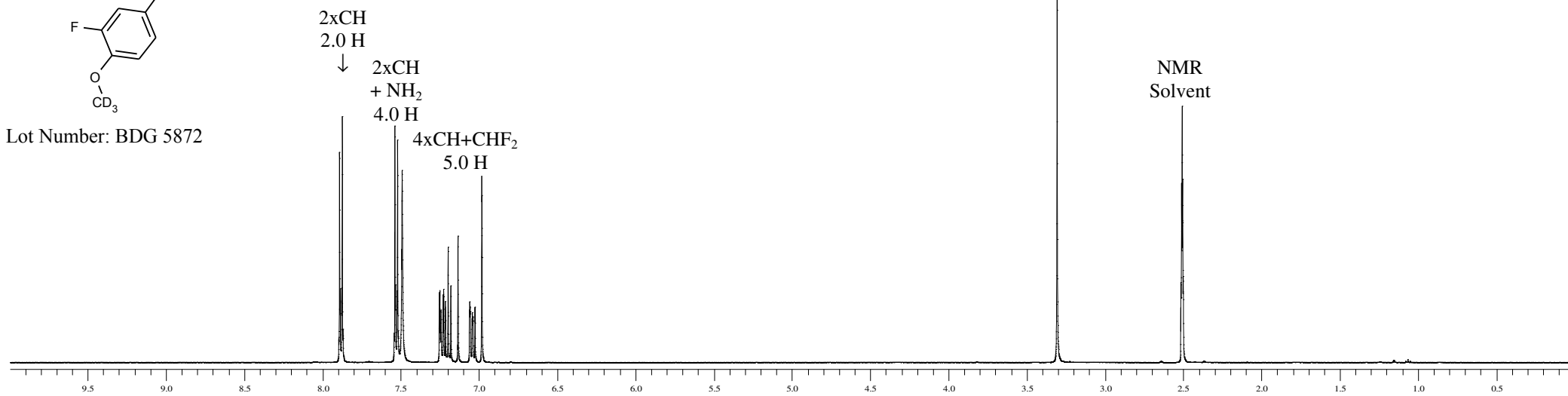


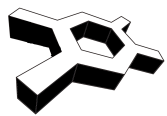
Proton NMR Spectrum of Deracoxib (top) and Deracoxib-d<sub>3</sub> (bottom) in DMSO-d<sub>6</sub>

**BDG SYNTHESIS**



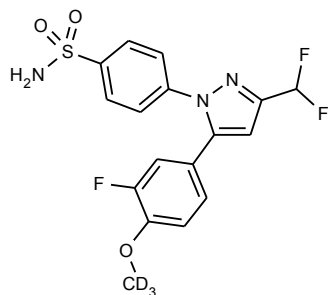
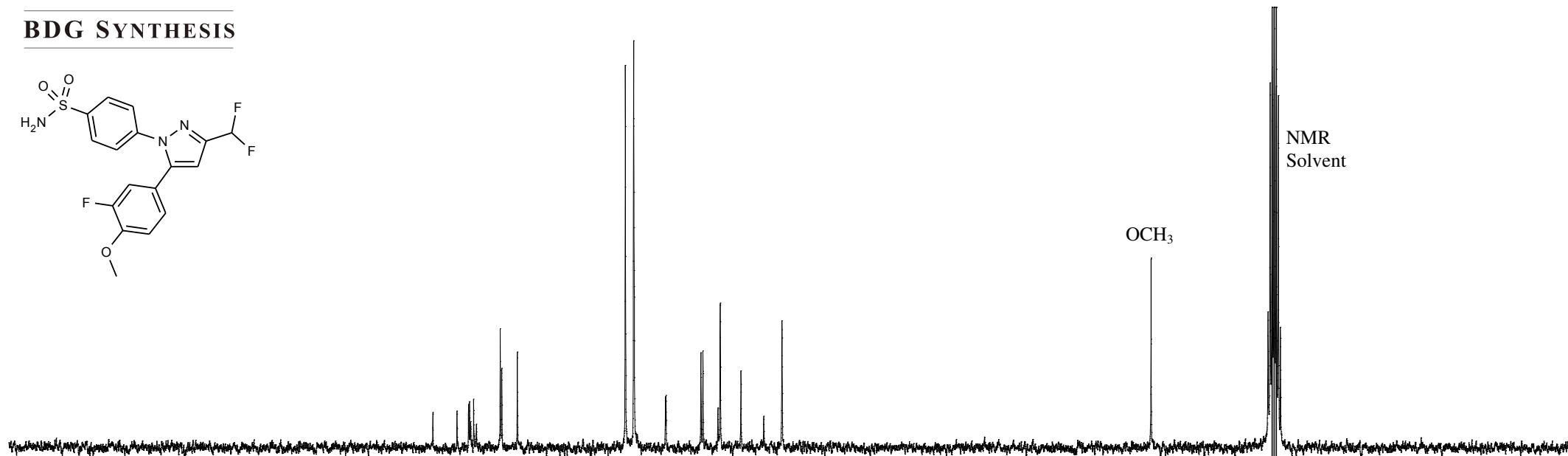
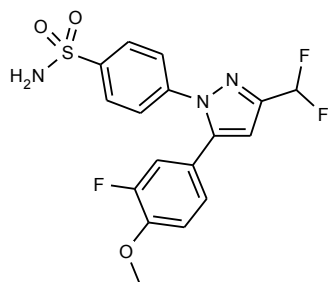
Lot Number: BDG 5872



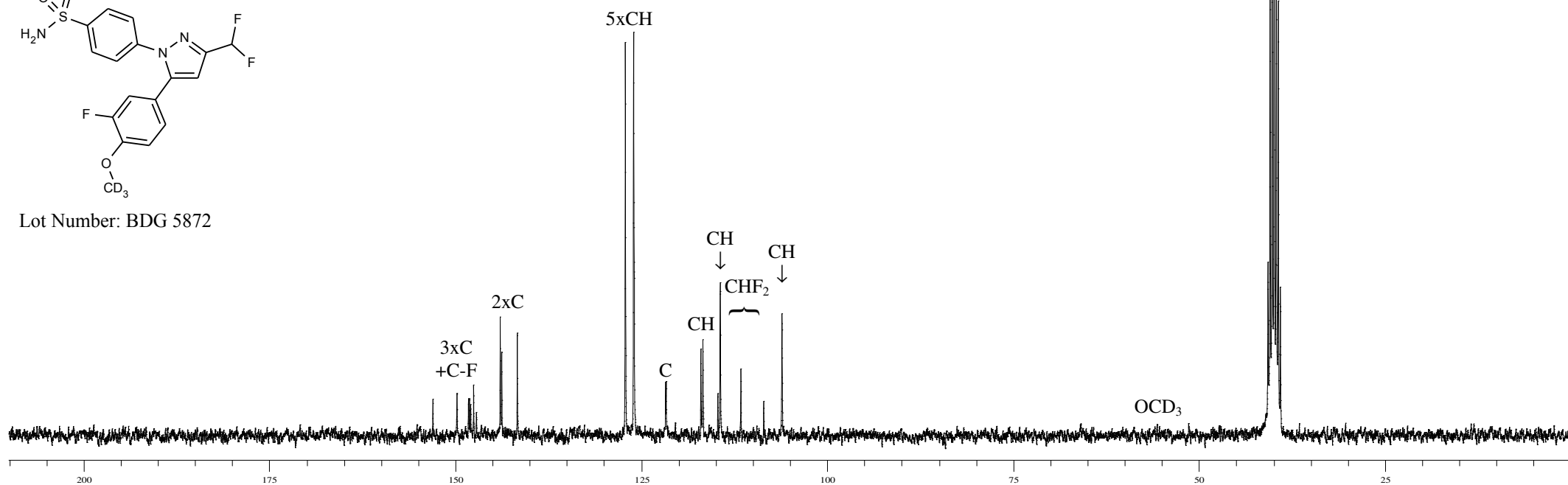


Carbon-13 NMR Spectrum of Deracoxib (top) and Deracoxib-d<sub>3</sub> (bottom) in DMSO-d<sub>6</sub>

**BDG SYNTHESIS**



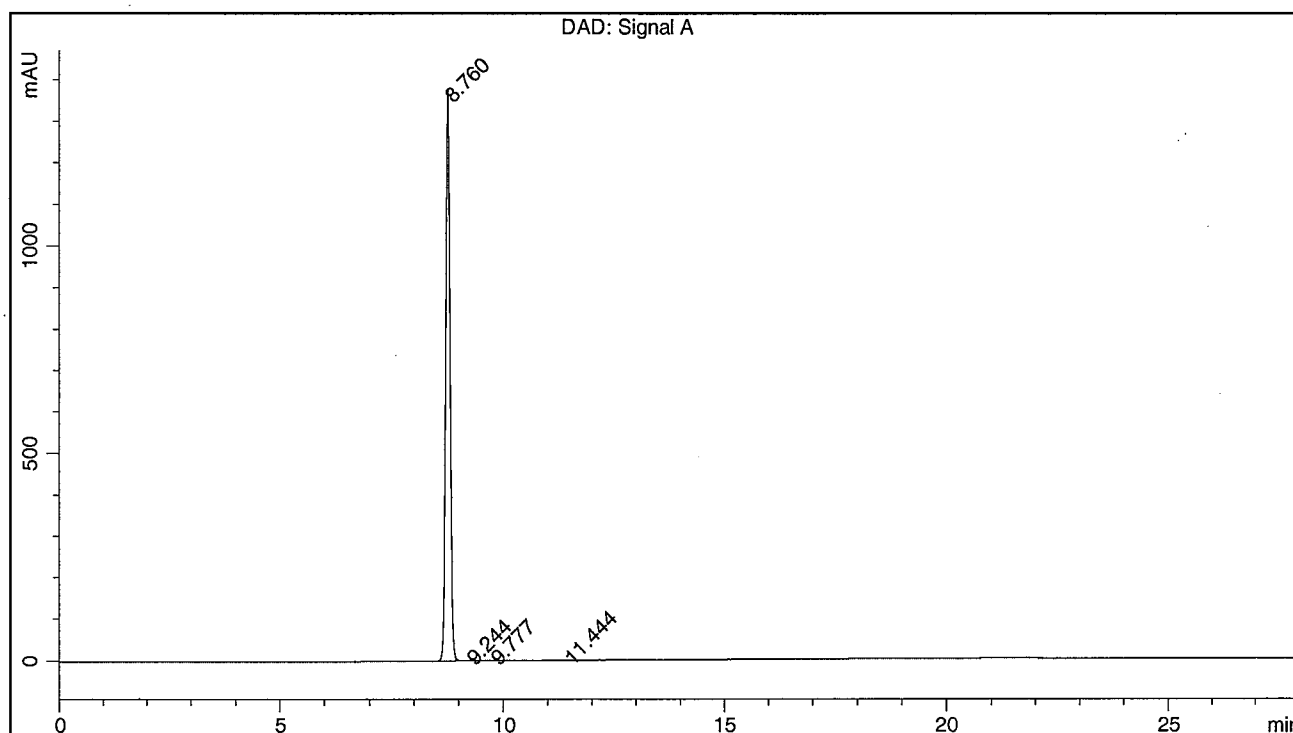
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BDG- Analysis of Deracoxib-d3

Column : Phenomenex Luna C18(2) 5um 250 x 4.6 mm  
 Guard : Phenomenex Security Guard C18 RP 4 x 3 mm  
 Mobile Phase A : 50:50 Water : Acetonitrile  
 Mobile Phase B : Acetonitrile  
 Gradient ( A:B) : T0=100:0, T20=0:100, T24=0:100, T26=100:0, T30=100:0  
 Flow Rate : 1.0 mL/min  
 Sample Solvent : 50:50 Water : Acetonitrile  
 Column Temperature : 20 C  
 Injection Volume : 10 uL  
 Detection : UV at 250 nm

|                    |                              |                      |                |
|--------------------|------------------------------|----------------------|----------------|
| <b>Sample Name</b> | BDG 5872                     | <b>Instrument</b>    | AnalyticalLC01 |
| <b>Acquisition</b> | 09/11/2016, 18:32:12         | <b>Method (rev.)</b> | LC10485b ( 3)  |
| <b>Sequence</b>    | BDG_09Nov2016a - Reprocessed | <b>Vial Position</b> | 1              |
| <b>Operator</b>    | solvation010\cerityadmin     | <b>Injection</b>     | 1 of 1         |



Area Percent Report

| Peak# | RT        | Peak Height | Peak Area | Width      | Area %   |
|-------|-----------|-------------|-----------|------------|----------|
| 1     | 8.76 min  | 1378.5047   | 9395.2347 | 0.1055 min | 99.849 % |
| 2     | 9.24 min  | 1.0752      | 6.6792    | 0.0945 min | 0.071 %  |
| 3     | 9.78 min  | 0.2740      | 3.0243    | 0.1628 min | 0.032 %  |
| 4     | 11.44 min | 0.2733      | 4.5087    | 0.2245 min | 0.048 %  |