Supporting Information

Synthesis and evaluation of cytotoxic activity and pro-apoptotic effects of novel spiro-4H-pyran derivatives on A549 cancer cells

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The Table of Contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title, author’s name, address and table of contents</td>
<td>1</td>
</tr>
<tr>
<td>Experimental Section; General remarks</td>
<td>2</td>
</tr>
<tr>
<td>Figure 1. Structure of all products 5</td>
<td>3</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass spectrums of 5a</td>
<td>4-7</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and Mass spectrums of 5b</td>
<td>8-10</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and Mass spectrums of 5c</td>
<td>11-13</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass and D$_2$O exchange spectrums of 5d</td>
<td>14-17</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass spectrums of 5e</td>
<td>18-21</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass spectrums of 5f</td>
<td>22-25</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass spectrums of 5g</td>
<td>26-29</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass spectrums of 5h</td>
<td>30-33</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR and Mass spectrums of 5i</td>
<td>34-37</td>
</tr>
<tr>
<td>$^1$H and $^{13}$C NMR and IR spectrums of 5j</td>
<td>38-40</td>
</tr>
</tbody>
</table>
Experimental Section

General remarks:

Melting points were measured on an Electrothermal 9100 apparatus. Mass spectra were recorded with an Agilent 5975C VL MSD with Triple-Axis Detector operating at an ionization potential of 70 eV. $^1$H and $^{13}$C NMR spectra were measured (DMSO) with a Bruker DRX-300 AVANCE spectrometer at 300 and 75 MHz, respectively. IR spectra were recorded on a Bruker Tensor 27, $\bar{\nu}$ in cm$^{-1}$. All NMR spectra at room temperature were determined in DMSO-$d_6$. Chemical shifts are reported in parts per million ($\delta$) downfield from an internal tetramethylsilane reference. Coupling constants ($J$ values) are reported in Hertz (Hz), and spin multiplicities are indicated by the following symbols: s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet). All chemicals were purchased from Merck or Aldrich and were used without further purification.
Figure 1. Structure of all products 5

The structures of all products 5a-j were deduced from their $^1$H NMR, and $^{13}$C NMR, IR and Mass spectra (see the Supporting Information)
\[ 1^1H \text{ NMR of 5a} \]
$^{13}$C NMR of 5a
IR of 5a
Scan 479 (2.917 min): 30000044.D

MS of 5a
$^1$H NMR of 5b
$^{13}$C NMR of 5b
Scan 299 (2.047 min): 30000051.D

MS of 5b
\(^1\text{H NMR of 5c}\)
13C NMR of 5c
Scan 179 (1.677 min): 30000344.D

MS of 5c
$^1$H NMR of 5d

$^1$H-NMR with D2O

DMSO

EtOH

Current Data Parameters
NAME: H.Honey
EXPNO: 237
PROCNO: 1
F2 - Acquisition Parameters
Date: 20170521
Time: 13:40
INSTRUM: spect
PROBHD: 5 mm BBO BD-II
PULPROG: SE
TD: 16384
SOLVENT: DMSO
NS: 6
DS: 0
SWH: 5995.204 Hz
FIDRES: 0.365918 Hz
AQ: 1.3664756 sec
RG: 143.7
DW: 83.400 usec
TE: 6.000 usec
D1: 300.0 K
D1: 6.00000000 sec

CHANNEL 1
H1
PL: 9.00 usec
PL1: 3.00 db
SFO1: 299.8729987 MHz

F2 - Processing parameters
SF: 22768
SF: 299.8700013 MHz
WDW: 0.30 Hz
LB: 0
UC: 0
PC: 1.00
$^{13}$C NMR of 5d
IR of 5d
Scan 384 (2.374 min): 30000043.D

Scn 384 (2.374 min): 30000043.D

MS of 5d

m/z->

Abundance
$^1$H NMR of 5e
$^{13}$C NMR of 5e
IR of 5e
Scan 475 (2.894 min): 30000047.D

MS of 5e
$^1$H NMR of 5f
$^{13}$C NMR of 5f
MS of 5f
$^{13}$C NMR of 5g
IR of 5g
$^1$H NMR of 5h
$^{13}$C NMR of 5h
IR of 5h
$^1$H NMR of 5i
$^{13}$C NMR of 5i
IR of 5i
MS of 5i
$^1$H NMR of 5j
$^{13}$C NMR of 5j
IR of 5j