Synthesis and in vitro Anticancer Activities of Substituted \(N\)-(4'-Nitrophenyl)-L-prolinamides

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SUPPORTING INFORMATION

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$^{13}$C-NMR spectrum of $N$-(4'-Nitrophenyl)-L-proline (3a)
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$^{13}$C-NMR spectrum of $N$-(4’-Cyanophenyl)-l-proline (3b)
$^1$H-NMR spectrum of 4-Hydroxy-N-(4'-nitrophenyl)-L-proline (3c)

$^{13}$C-NMR spectrum of 4-Hydroxy-N-(4'-nitrophenyl)-L-proline (3c)
$^1$H-NMR spectrum of $N',N'$-Dibutyl-$N$-(4'-nitrophenyl)-L-prolinamide (4a)

$^{13}$C-NMR spectrum of $N',N'$-Dibutyl-$N$-(4'-nitrophenyl)-L-prolinamide (4a)
$^{1}$H-NMR spectrum of $N'$-Butyl-$N$-(4'-nitrophenyl)-L-prolinamide (4b)

$^{13}$C-NMR spectrum of $N'$-Butyl-$N$-(4'-nitrophenyl)-L-prolinamide (4b)
**$^1$H-NMR spectrum of $N$-(4'-Nitrophenyl)-$N'$-propyl-$L$-prolinamide ($4c$)**

| δ (ppm) | 3.87 | 3.83 | 3.13 | 2.88 | 2.71 | 2.69 | 2.68 | 2.66 | 2.43 | 2.28 | 1.98 | 1.92 |
|---------|------|------|------|------|------|------|------|------|------|------|------|------|

![H-NMR spectrum image]

**$^{13}$C-NMR spectrum of $N$-(4'-Nitrophenyl)-$N'$-propyl-$L$-prolinamide ($4c$)**

| δ (ppm) | -171.72 | -151.84 | -138.26 | -125.10 | -111.77 | -83.38 | -83.2 | -84.34 | -83.35 | -84.13 | -79.71 | -79.66 |
|---------|----------|----------|----------|----------|----------|--------|--------|--------|--------|--------|--------|--------|

![C-NMR spectrum image]
$^1$H-NMR spectrum of $N$-(4'-Nitrophenyl)-$N'$-(1''-prop-1''-ynyl)-l-prolinamide (4d)

$^{13}$C-NMR spectrum of $N$-(4'-Nitrophenyl)-$N'$-(1''-prop-1''-ynyl)-l-prolinamide (4d)
$^1$H-NMR spectrum of $N'$-Cyclohexyl-$N$-(4'-nitrophenyl)-l-prolinamide (4e)

$^{13}$C-NMR spectrum of $N'$-Cyclohexyl-$N$-(4'-nitrophenyl)-l-prolinamide (4e)
$^{1}$H-NMR spectrum of $N$-(4’-Nitrophenyl)-$N'$-(phenylsulphonyl)-$l$-prolinamide (4f)

\[
\begin{array}{c}
\text{O}_2\text{N}&&\text{O}&&\text{SO}_2
\\
\text{H}&&\text{N}&&\text{H}
\end{array}
\]

\[
\begin{array}{c}
1.00 & 1.01 & 3.24 & 3.32 & 3.36 & 3.76 & 3.80 & 3.84 & 4.36 & 4.42 & 4.46 & 4.50
\\
7.72 & 7.74 & 7.78 & 7.82 & 7.86 & 7.90 & 7.94 & 7.98 & 8.02 & 8.06 & 8.10 & 8.55
\end{array}
\]

$^{13}$C-NMR spectrum of $N$-(4’-Nitrophenyl)-$N'$-(phenylsulphonyl)-$l$-prolinamide (4f)

\[
\begin{array}{c}
\text{O}_2\text{N}&&\text{O}&&\text{SO}_2
\\
\text{H}&&\text{N}&&\text{H}
\end{array}
\]

\[
\begin{array}{c}
-17.46 & -192.32 & -69.36 & -76.48 & -75.61 & -42.68 & -41.27 & -31.34 & -20.36
\\
-111.76 & -63.39 & -40.57 & -31.34 & -20.36
\end{array}
\]
$^1$H-NMR spectrum of $N'$-(tert-Butyl)-$N$-(4’-nitrophenyl)-l-prolinamide (4g)

$^{13}$C-NMR spectrum of $N'$-(tert-Butyl)-$N$-(4’-nitrophenyl)-l-prolinamide (4g)
\(1^H\)-NMR spectrum of \(N\)-(4'-Nitrophenyl)-\(N'\)-(4''-tosyl)-l-prolinamide (4h)

\[
\text{Diagram of the molecule}
\]

\(1^C\)-NMR spectrum of \(N\)-(4'-Nitrophenyl)-\(N'\)-(4''-tosyl)-l-prolinamide (4h)

\[
\text{Diagram of the molecule}
\]
$^{1}$H-NMR spectrum of 4'-Morpholinyl N-(4'-nitrophenyl)-2-pyrrolidinyl ketone (4i)

$^{13}$C-NMR spectrum of 4'-Morpholinyl N-(4'-nitrophenyl)-2-pyrrolidinyl ketone (4i)
$^1$H-NMR spectrum of $N',N'$-Diisopropyl-$N$-(4'-nitrophenyl)-l-prolinamide (4j)

$^{13}$C-NMR spectrum of $N',N'$-Diisopropyl-$N$-(4'-nitrophenyl)-l-prolinamide (4j)
$^1$H-NMR spectrum of $N$-(4$'$-Nitrophenyl)-$N'$-(4$''$-tolyl)-$L$-prolinamide (4k)

$^{13}$C-NMR spectrum of $N$-(4$'$-Nitrophenyl)-$N'$-(4$''$-tolyl)-$L$-prolinamide (4k)
$^1$H-NMR spectrum of $N$-(4'-Cyanophenyl)-$N'$-(4''-tolyl)-L-prolinamide (4l)

$^{13}$C-NMR spectrum of $N$-(4'-Cyanophenyl)-$N'$-(4''-tolyl)-L-prolinamide (4l)
$^{1}$H-NMR spectrum of trans-4-Hydroxy-N-(4'-nitrophenyl)-N’-(4’’-tolyl)-L-prolinamide (4m)

$^{13}$C-NMR spectrum of trans-4-Hydroxy-N-(4'-nitrophenyl)-N’-(4’’-tolyl)-L-prolinamide (4m)
$^1$H-NMR spectrum of $2''$-Isoindolinyl $N$-($4''$-nitrophenyl)-2-pyrrolidinyl ketone (4n)

$^1$H-NMR spectrum of $2''$-Isoindolinyl $N$-($4''$-nitrophenyl)-2-pyrrolidinyl ketone (4n)

$^{13}$C-NMR spectrum of $2''$-Isoindolinyl $N$-($4''$-nitrophenyl)-2-pyrrolidinyl ketone (4n)
$^1$H-NMR spectrum of $N$-(4'-Nitrophenyl)-$N',N'$-dipropyl-$l$-prolinamide (4o)

$^{13}$C-NMR spectrum of $N$-(4'-Nitrophenyl)-$N',N'$-dipropyl-$l$-prolinamide (4o)
$^1$H-NMR spectrum of N-(4'-Nitrophenyl)-N'-(2''-pyridinyl)-L-prolinamide (4p)

![H-NMR Spectrum](image)

$^{13}$C-NMR spectrum of N-(4'-Nitrophenyl)-N'-(2''-pyridinyl)-L-prolinamide (4p)

![C-NMR Spectrum](image)
$^1$H-NMR spectrum of $N'$-Benzyl-$N$-(4'-nitrophenyl)-L-prolinamide (4q)

$^{13}$C-NMR spectrum of $N'$-Benzyl-$N$-(4'-nitrophenyl)-L-prolinamide (4q)
$^1$H-NMR spectrum of $N'^\prime$(2''-Cyanophenyl)-N-(4''-nitrophenyl)-L-prolinamide (4r)

$^{13}$C-NMR spectrum of $N'^\prime$(2''-Cyanophenyl)-N-(4''-nitrophenyl)-L-prolinamide (4r)
$^1$H-NMR spectrum of $N^\prime$-Methyl-$N$-(4$^\prime$-nitrophenyl)-$N^\prime$-phenyl-$l$-prolinamide (4s)

$^{13}$C-NMR spectrum of $N^\prime$-Methyl-$N$-(4$^\prime$-nitrophenyl)-$N^\prime$-phenyl-$l$-prolinamide (4s)
$^1$H-NMR spectrum of N'-(2''-(Hydroxymethyl)phenyl)-N-(4'-nitrophenyl)-L-prolinamide (4t)

$^{13}$C-NMR spectrum of N'-(2''-(Hydroxymethyl)phenyl)-N-(4'-nitrophenyl)-L-prolinamide (4t)
$^1$H-NMR spectrum of $N,N'$-bis(4'-Nitrophenyl)-L-prolinamide (4u)

$^{13}$C-NMR spectrum of $N,N'$-bis(4'-Nitrophenyl)-L-prolinamide (4u)
$^1$H-NMR spectrum of $N'$-Isopropyl-$N$-(4'-nitrophenyl)-l-prolinamide (4v)

$^1$C-NMR spectrum of $N'$-Isopropyl-$N$-(4'-nitrophenyl)-l-prolinamide (4v)
$^1$H-NMR spectrum of $N',N'$-Dicyclohexyl-$N$-(4'-nitrophenyl)-L-prolinamide (4w)

13C-NMR spectrum of $N',N'$-Dicyclohexyl-$N$-(4'-nitrophenyl)-L-prolinamide (4w)
