

Table 1 Human milk oligosaccharides

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
Neutral oligosaccharides			
2'-FL	Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-4)Glc		1
3-FL	Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		2
$\beta$ 3'-GL	Gal( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		3
$\beta$ 4'-GL	Gal( $\beta$ 1-4)Gal( $\beta$ 1-4)Glc		4
$\beta$ 6'-GL	Gal( $\beta$ 1-6)Gal( $\beta$ 1-4)Glc		5
LNTri-II	GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		6
DF-L(LDFT)	Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		7
LNT	Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		8
LNnT	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		9
LNFP-I	Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		10
LNFP-II	Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-4)		11
LNFP-III	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		12
LNFP-V	Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		13
LNDFH-I	Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-4)		14
LNDFH-II	Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-4)        Fuc( $\alpha$ 1-3)		15
LNDFH-III	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)        Fuc( $\alpha$ 1-3)		3
LNH	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3) /		16
LNnH	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3) /		17
<i>Para</i> LNH	Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		18
<i>Para</i> LNnH	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		18

(continued)

Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
F-LNH-I	Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3) /		19
F-LNH-II	Fuc(α1-3)   Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3) /		20
F-LNH-III	Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3)   Fuc(α1-4)		21
F-LNnH-II	Fuc(α1-3)   Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3) /		18
F-LNnH-I	Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3)   Fuc(α1-3)		18
F-para-LNH-I	Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc   Fuc(α1-3)		22
F-para-LNH-II	Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc   Fuc(α1-4)		23
F-para-LNH-III	Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc		18
F-para-LNnH-I	Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc   Fuc(α1-3)		18
F-para-LNnH-II	Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc   Fuc(α1-3)		18
DF-LNH-II	Fuc(α1-3)   Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3) /   Fuc(α1-4)		16
DF-LNH-I	Fuc(α1-3)   Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3) /		19

(continued)

Table 1 (continued)

Oligosaccharide	Structure	Symbols	Ref.
DF-LNnH	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \quad \backslash \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \quad \swarrow \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-3)  \end{array}  $		24
DF-para-LNH	$  \begin{array}{c}  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3)  \end{array}  $		25
DF-para-LNH-II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		18
DF-para-LNH-III	$  \begin{array}{c}  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-3)  \end{array}  $		18
DF-para-LNnH	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-3) \qquad \qquad \text{Fuc}(\alpha 1-3)  \end{array}  $		25
TF-LNH -I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \quad \backslash \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \swarrow \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		26
TF-LNH -II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \quad \backslash \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \swarrow \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		21
TF-para-LNH-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3)  \end{array}  $		27
TF-para-LNH-II	$  \begin{array}{c}  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \qquad \qquad \qquad   \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3) \qquad \qquad \text{Fuc}(\alpha 1-3)  \end{array}  $		23
TF-para-LNnH	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \qquad \qquad \qquad   \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-3) \qquad \qquad \text{Fuc}(\alpha 1-3) \qquad \qquad \text{Fuc}(\alpha 1-3)  \end{array}  $		23
iso-LNO	$  \begin{array}{c}  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \quad \backslash \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \swarrow \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		18

(continued)

Table 1 (continued)






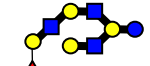




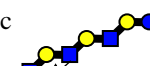

Oligosaccharide	Structure	Symbols	Ref.
<i>novo</i> -LNnO	Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3) /		18
F-LNO-I	Fuc(α1-3) Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3) /		28
F-LNO-II	Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3) / Fuc(α1-4)		21
F-LNO-III	Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3) /		21
F-LNnO	Fuc(α1-3) Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3) /		29
F-LNnO-II	Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3) /		18
F-iso-LNO	Fuc(α1-3) Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3) /		30
F-iso-LNnO-I	Fuc(α1-3) Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3) /		18
F-novo-LNO	Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc Gal(β1-3)GlcNAc(β1-3) / Fuc(α1-4)		18
F-novo-LNnO	Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-3) / Fuc(α1-3)		18
F-para-LNO	Gal(β1-3)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc Fuc(α1-3)		18
DF-iso-LNnO	Fuc(α1-3) Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-6) \ Gal(β1-4)Glc Gal(β1-4)GlcNAc(β1-6) / Fuc(α1-3)		18



Table 1 (continued)

Oligosaccharide	Structure	Symbols	Ref.
DF- <i>iso</i> -LNO-IV	$  \begin{array}{c}  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \text{Fuc}(\alpha 1-4) \quad    \end{array}  $		18
DF- <i>iso</i> -LNO-V	$  \begin{array}{c}  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \quad \quad \quad    \end{array}  $		18
DF- <i>iso</i> -LNO-VI	$  \begin{array}{c}  \text{Fuc}(\alpha 1-4) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \quad \quad \quad    \end{array}  $		18
DF- <i>iso</i> -LNO-VII	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \quad \quad \quad    \end{array}  $		18
DF- <i>para</i> -LNnO	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\  \text{Fuc}(\alpha 1-3) \quad \quad \quad \text{Fuc}(\alpha 1-3) \\    \quad \quad \quad    \end{array}  $		18
TF-LNO-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \quad \quad \quad \text{Fuc}(\alpha 1-3) \\    \quad \quad \quad   \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \text{Fuc}(\alpha 1-4) \quad    \end{array}  $		29
TF-LNO-II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \text{Fuc}(\alpha 1-4) \quad    \end{array}  $		18
TF-LNnO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-4) \quad \quad \quad \text{Fuc}(\alpha 1-3) \\    \quad \quad \quad   \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \backslash \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\  \text{Fuc}(\alpha 1-3) \quad    \end{array}  $		26

(continued)

Table 1 (continued)

Oligosaccharide	Structure	Symbols	Ref.
TF- <i>iso</i> -LNO-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		32
TF- <i>iso</i> -LNO-II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3) \\    \qquad \qquad \qquad   \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		30
TF- <i>iso</i> -LNO-III	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		18
TF- <i>iso</i> -LNO-IV	$  \begin{array}{c}  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		18
TF- <i>iso</i> -LNnO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \qquad \qquad \text{Fuc}(\alpha 1-3) \\    \qquad \qquad \qquad   \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-3)  \end{array}  $		18
Tetra-F- <i>iso</i> -LNO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		24
Tetra-F- <i>para</i> -LNO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \qquad \qquad \qquad   \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3) \qquad \qquad \qquad \text{Fuc}(\alpha 1-3)  \end{array}  $		24
Penta-F- <i>iso</i> -LNO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3) \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \qquad \qquad \qquad   \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \qquad \qquad \qquad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		24

(continued)



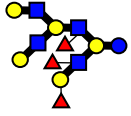
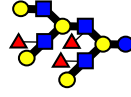
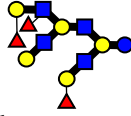
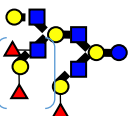
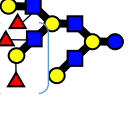
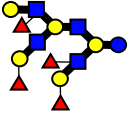
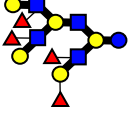


Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
DF-LND-VI	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4) \quad \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3/4)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4/3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3/4)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4/3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
TriF-LND-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
TriF-LND-II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
TriF-LND-III	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
TriF-LND-IV	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4) \quad \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34

(continued)

Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
TriF-LND-V	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		21
TriF-LND-VI	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		21
TriF-LND-VII	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		21
	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3/4)\text{GlcNAc}(\beta 1-3) \\  \text{Fuc}(\alpha 1-4/3) \quad \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3/4)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4/3)  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
TetraF-LND-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34
TetraF-LND-II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4) \quad \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\    \\  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		34

(continued)



Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
Acidic oligosaccharides			
3'-SL	Neu5Ac( $\alpha$ 2-3)Gal( $\beta$ 1-4)Glc		36
6'-SL	Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)Glc		37
F-SL	Neu5Ac( $\alpha$ 2-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		38
LST a	Neu5Ac( $\alpha$ 2-3)Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		39
LST b	Neu5Ac( $\alpha$ 2-6)   Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		39
LST c	Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		39
LST d	Neu5Ac( $\alpha$ 2-3)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		38
F-LST a	Neu5Ac( $\alpha$ 2-3)Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-4)		38
F-LST b	Neu5Ac( $\alpha$ 2-6)   Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		40
F-LST c	Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3)		41
S-LNH-I	Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3) /		16
S-LNH-II	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc Gal( $\beta$ 1-3)GlcNAc( $\beta$ 1-3) /   Neu5Ac( $\alpha$ 2-6)		42
S-LNnH-I	Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3) /		17
S-LNnH-II	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3) /		43
S-para-LNnH	Neu5Ac( $\alpha$ 2-6)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc		44

(continued)

Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
FS-LNH	$\begin{array}{c} \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$		45
FS-LNH-I	$\begin{array}{c} \text{Fuc}(\alpha 1-3) \\   \\ \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$ $\text{Neu5Ac}(\alpha 2-6)$		46
FS-LNH-II	$\begin{array}{c} \text{Fuc}(\alpha 1-3) \\   \\ \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$		47
FS-LNH-III	$\begin{array}{c} \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$ $\text{Fuc}(\alpha 1-4)$		48
FS-LNH-IV	$\begin{array}{c} \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$ $\text{Fuc}(\alpha 1-4)$		49
FS-LNnH-I	$\begin{array}{c} \text{Fuc}(\alpha 1-3) \\   \\ \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$		50
FS-LNnH-II	$\text{Fuc}(\alpha 1- \left[ \begin{array}{c} \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \end{array} \right] \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$		17
FS- <i>para</i> -LNnH-I	$\begin{array}{c} \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\ \text{Fuc}(\alpha 1-3) \end{array}$		44
FS- <i>para</i> -LNnH-II	$\begin{array}{c} \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\ \text{Fuc}(\alpha 1-3) \end{array}$		44
DFS-LNH-I	$\begin{array}{c} \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$ $\text{Fuc}(\alpha 1-4)$ $\text{Fuc}(\alpha 1-3)$		46
DFS-LNH-II	$\begin{array}{c} \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\ \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \end{array} \begin{array}{l} \diagdown \\ \diagup \end{array} \text{Gal}(\beta 1-4)\text{Glc}$ $\text{Fuc}(\alpha 1-4)$		47

(continued)



Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
DFS-LNO-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \setminus \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		49
DFS-LNO- II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \setminus \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		44
DFS-LNO- III	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \setminus \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		44
TFS-LNO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \setminus \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		44
TFS- <i>iso</i> -LNO	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \setminus \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		48
DS-LNT	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6) \\    \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		50
FDS-LNT-I	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6) \\    \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  $		51
FDS-LNT-II	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6) \\    \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\    \\  \text{Fuc}(\alpha 1-3)  \end{array}  $		52
DS-LNH-I	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \setminus \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \quad \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		51

(continued)




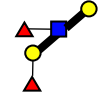

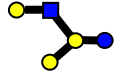
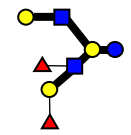
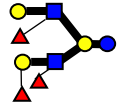


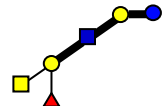
Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
DS-LNH-II	$  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Neu5Ac}(\alpha 2-6)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		51
DS-LN $n$ H	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		46
FDS-LNH-I	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Neu5Ac}(\alpha 2-6)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		53
FDS-LNH-II	$  \begin{array}{c}  \text{Fuc}(\alpha 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Neu5Ac}(\alpha 2-6)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		53
FDS-LNH-III	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-4)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		47
FDS-LN $n$ H	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-3/\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-3/\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Fuc}(\alpha 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		53
TS-LNH	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Neu5Ac}(\alpha 2-6)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		54
SLN $n$ D	$  \begin{array}{c}  \text{Neu5Ac}(\alpha 2-6)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3) \\    \\  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\  \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)  \end{array}  \begin{array}{l}  \diagdown \\  \diagup  \end{array}  \begin{array}{c}  \text{Gal}(\beta 1-4)\text{Glc}  \end{array}  $		44
-	$  \begin{array}{c}  \text{Fuc}(\alpha 1-4) \\    \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}  \end{array}  $		55
-	$  \begin{array}{c}  \text{Fuc}(\alpha 1-4) \\    \\  \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}  \end{array}  $		55

(continued)



Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
H-Tri	Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-4)GlcNAc		56
Le <sup>x</sup> Tri	Gal( $\beta$ 1-4)GlcNAc   Fuc( $\alpha$ 1-3)		56
Le <sup>a</sup> Tri	Fuc( $\alpha$ 1-4)GlcNAc   Gal( $\beta$ 1-3)		56
Le <sup>b</sup> Penta	Fuc( $\alpha$ 1-4) GlcNAc( $\beta$ 1-3)Gal / Fuc $\alpha$ 1-2 Gal( $\beta$ 1-3)		56
GalLNT	Gal( $\beta$ 1-4)GlcNAc $\beta$ 1-3Gal $\beta$ 1-4Glc / Gal( $\beta$ 1-3)		56
novoLNP	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc / Gal( $\beta$ 1-3)		56
DF-LNH-III	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc / Fuc( $\alpha$ 1-4)GlcNAc( $\beta$ 1-3) / Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-3)		56
TF-LNnH-III	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-6) \ Gal( $\beta$ 1-4)Glc   Fuc( $\alpha$ 1-3) / Fuc( $\alpha$ 1-2)Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3) / Fuc( $\alpha$ 1-3)		56
LNFP-IV	Gal( $\beta$ 1-4)GlcNAc( $\beta$ 1-3)Gal( $\beta$ 1-4)Glc / Fuc( $\alpha$ 1-3)		57
A-Tetra	GalNAc $\alpha$ 1-3Gal $\beta$ 1-4Glc   Fuc( $\alpha$ 1-2)		58
A-Hexa	GalNAc( $\alpha$ 1-3)Gal $\beta$ 1-3GlcNAc $\beta$ 1-3Gal $\beta$ 1-4Glc   Fuc( $\alpha$ 1-2)		58

(continued)

Table 1 (continued)

<i>Oligosaccharide</i>	<i>Structure</i>	<i>Symbols</i>	<i>Ref.</i>
3'-SLN	Neu5Ac(α2-3)Gal(β1-4)GlcNAc		56
6'-SLN	Neu5Ac(α2-6)Gal(β1-4)GlcNAc		56
F-LSTd	Neu5Ac(α2-6)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc Fucα1-2 Gal(β1-3)		56
FS-LNH-V	Neu5Ac(α2-6)Gal(β1-4)GlcNAc(β1-6)Gal(β1-4)Glc Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3)		56
FS-para-LNnH-III	Neu5Ac(α2-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)GlcNAc(β1-3)Gal(β1-4)Glc Fuc(α1-3)		56
-	Gal(β1-4) Glc   Gal(β1-2)		59
-	Gal(β1-4) Glc   Glc(α1-2)		59
-	GalNAc(β1-4)GlcNAc(β1-6)Gal(β1-4)Glc		59
-	Gal(β1-4)Glc(β1-4)Glc		59
-	Gal(β1-6)Gal(β1-?)Gal(β1-4)GlcNAc(β1-6)Gal(β1-4)Glc Fuc(α1-2)Gal(β1-3)GlcNAc(β1-3)		60

(continued)

Table 1 (continued)

Oligosaccharide	Structure	Symbols	Ref.
FS-novo-LN- I	$\begin{array}{c} \text{Fuc}(\alpha 1-3) \\   \\ \text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-6) \\   \\ \text{Neu5Ac}(\alpha 2-3)\text{Gal}(\beta 1-3) \end{array} \begin{array}{l} \backslash \\ / \\ \text{Gal}(\beta 1-4)\text{Glc} \end{array}$		40
DF-para-LNH sulfate I	$\begin{array}{c} \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\   \\ \text{Fuc}(\alpha 1-3) \end{array}$		50
DF-para-LNH sulfate II	$\begin{array}{c} \text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\   \qquad \qquad \qquad   \\ \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3) \end{array}$		50
TF-para-LNH sulfate	$\begin{array}{c} \text{Fuc}(\alpha 1-2)\text{Gal}(\beta 1-3)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{GlcNAc}(\beta 1-3)\text{Gal}(\beta 1-4)\text{Glc} \\   \qquad \qquad \qquad   \\ \text{Fuc}(\alpha 1-4) \qquad \qquad \text{Fuc}(\alpha 1-3) \end{array}$		50

F, fucose; L, lactose; S, sialyl; DF, difucosyl; DS, disialyl; TS, trisialyl; FS, fucosyl sialyl; DFS, difucosyl sialyl; TFS, trifucosyl sialyl; FDS, fucosyl disialyl; DGal, digalactosyl; FL fucosyllactose; GL, galactosyllactose; LDFT, lacto difucotetraose; LNT, lacto-*N*-tetraose; LN*n*T, lacto-*N*-neotetraose; LNFP, lacto-*N*-fucopentaose; LNP, lacto-*N*-pentaose; LNDFH, lacto-*N*-difucohexaose; LNH, lacto-*N*-hexaose; LN*n*H, lacto-*N*-neohexaose; LNO, lacto-*N*-octaose; LN*n*O, lacto-*N*-neooctaose; LND, lacto-*N*-decaos; LN*n*D, lacto-*N*-neodecaose

CFG symbols are used to express individual monosaccharides with different colors, whereas different glycosidic linkages are shown by different bond angles in a clockwise format; i.e., 1-2 linkage (6:00 O'clock), 1-3(7:30), 1-4(9:00), and 1-6(10:30). On the other hand,  $\alpha$  and  $\beta$  anomers are represented by thin and thick lines, respectively.

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