In the following, we show that combinations between ion types other than just *b* and/or *y* ions do occur, even for proteins that underwent *CID*. Most importantly, many of these combinations were present with high abundance across the proteins we analyzed.

Supplementary table 2. Different combinations of multiple ion types present in some of the proteins we used to validate the method proposed. For each protein, we present all combinations involving ion types other than just *b* and/or *y* ions, whose normalized intensity (or abundance) was found to be at least 50% of the highest intensity value measured.

Protein	Disulfide Bonds	Confirmatory matches (each match is presented as a [ion types; abundance measured] pair)
ST8Sia IV	$C^{142}C^{292}$	[$b^{*}_{3}b^{o}_{5}$; 56%], [$b^{*}_{3}a_{7}$; 100%], [$c_{4}b^{o}_{5}$; 80%], [$b_{5}y^{o}_{12}$; 62%]
	$C^{156}C^{356}$	[$z_{7}b^{*}_{5}$; 66%], [$a_{8}b^{*}_{4}$; 75%], [$a_{8}a_{4}$; 69%], [$y_{4}a_{10}$; 63%]
Beta-LG	$C^{82}C^{176}$	[a_{10}; 68%], [c_{11}; 51%], [$x_{5}y^{*}_{6}$; 58%], [$x_{5}y_{14}$; 100%], [$b_{6}c_{13}$; 68%], [$c_{8}y^{*}_{14}$; 66%]
FucT VII	$C^{68}C^{76}$	[y^{*}_{7}; 57%], [$a_{5}a_{15}$; 100%], [$b^{*}_{7}b^{*}_{14}$; 57%]
	$C^{211}C^{214}$	[b^{o}_{9}; 75%]
	$C^{318}C^{321}$	[z_{7}; 100%], [y^{*}_{7}; 95%]
B1,4-GalT	$C^{134}C^{176}$	[a_{18}; 63%], [$b^{*}_{7}a_{18}$; 76%]
	$C^{247}C^{266}$	[$c_{5}c_{24}$; 100%]
C2GnT-I	$C^{59}C^{413}$	[b^{*}_{14}; 100%], [$x_{7}y^{*}_{7}$; 84%], [$z_{3}y^{o}_{11}$; 56%], [$z_{3}y^{*}_{11}$; 79%], [a_{16}; 77%], [$z_{6}c_{16}$; 77%], [$y_{9}c_{18}$; 93%], [$x_{16}y_{13}$; 79%]
	$C^{372}C^{381}$	[$c_{6}x_{8}$; 100%], [x_{23}; 52%], [$c_{9}a_{20}$; 100%], [$c_{6}b^{o}_{22}$; 98%], [$c_{6}b^{*}_{22}$; 50%]
	$C^{151}C^{199}$	[a_{9}; 100%], [$a_{3}c_{9}$; 51%], [$b^{*}_{7}b^{o}_{10}$; 72%], [$b^{*}_{7}y_{9}$; 100%], [$a_{3}b^{*}_{14}$; 65%], [$b^{*}_{4}a_{14}$; 78%]
Lysozyme	$C^{24}C^{145}$	[$x_{3}a_{6}$; 100%]
	$C^{48}C^{133}$	[$x_{2}y^{o}_{4}$; 100%], [a_{11}; 50%]