Addendum¹ 3 to
"The use of stems in the selection of International Nonproprietary names (INN) for pharmaceutical substances"
WHO/EMP/QSM/2009.3

Programme on International Nonproprietary Names (INN)

Quality Assurance and Safety: Medicines (QSM)

World Health Organization, Geneva

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Addendum 3 to "The use of stems in the selection of International Nonproprietary Names (INN) for pharmaceutical substances" - WHO/EMP/QSM/2009.3

1 This addendum is a cumulative list of all new stems (in bold) selected by the INN Expert Group since the publication of "The use of stems in the selection of International Nonproprietary Names (INN) for pharmaceutical substances" 2009.

* already existing stem whose definition has been amended

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- **bradine*** sinus node inhibitors

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- **capone** catechol-O-methyltransferase (COMT) inhibitors

  entacapone (65), nebicapone (96), nitecapone (62), opicapone (103), tolcapone (66)

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- **ciguat*** guanylate cyclase activators

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- **dipine*** calcium channel blockers, 1,4-dihydropyridine derivatives

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- **fentanil*** opioid receptor agonists, fentanyl derivatives

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**gli** antihyperglycaemics

**-gliflozin** sodium glucose co-transporter inhibitors, phlorizin derivatives

  atigliflozin (100), canagliflozin (102), dapagliflozin (97), empagliflozin (104), ipragliflozin (103), luseogliflozin (104), remogliflozin etabonate (98), sergliflozin etabonate (98), tofogliflozin (103)

**-glitazar*** peroxisome proliferator activating receptor-γ (PPAR-γ) agonists
-glitazone*  peroxisome proliferator activating receptor-γ (PPAR-γ) agonists, thiazolidinedione derivatives

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-glutide  see -tide

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-imibe*  acyl CoA: cholesterol acyltransferase (ACAT) inhibitors, antihyperlipidaemics

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-irudin*  thrombin inhibitors, hirudin derivatives

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-isomide*  class I antiarrhythmics, disopyramide derivatives

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mab*  Please see below for general policies

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-motide  see -tide

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-nab*  cannabinoid receptors agonists

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-nal-  opioid receptor antagonists/agonists related to normorphine

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-orph-  opioid receptor antagonists/agonists, morphinan derivates

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-oxetine*  serotonin and/or norepinephrine reuptake inhibitors, fluoxetine derivatives

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-pamil* calcium channel blocker, verapamil derivatives

-parib poly-ADP-Ribose polymerase inhibitors
iniparib (103), olaparib (94), veliparib (102)

-previr see -vir

-rubicin* antineoplastics, daunorubicin derivatives

tide peptides and glycopeptides
-glutide Glucagon-Like Peptide (GLP) analogues
albiglutide (97), dulaglutide (103), elsiglutide (104),
liraglutide (87), semaglutide (101), taspoglutide (99),
teduglutide (90)

-motide immunological agents for active immunization
disomotide (94), elpamotide (103), ovemotide (94),
tertmotide (98), tiplimotide (82)

-vir antivirals (undefined group)
-previr Hepatitis Virus C (HVC) protease inhibitors
boceprevir (97), ciluprevir (90), danoprevir (102),
narlaprevir (102), telaprevir (94), vaniprevir (103)

-virine non-nucleoside reverse transcriptase inhibitors (NNRTI)
capravirine (83), dapivirine (86), emivirine (92),
etravirine (88), fosdevirine (103), rilpivirine (82),
lersivirine (101)
General policies for monoclonal antibodies

• INN for monoclonal antibodies (mAbs) are composed of a prefix, a substem A, a substem B and a suffix.

• The common stem for mAbs is -mab, placed as a suffix.

• The stem -mab is to be used for all products containing an immunoglobulin variable domain which binds to a defined target.

• Substem B indicates the species on which the immunoglobulin sequence of the mAb is based:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>rat</td>
</tr>
<tr>
<td>axo (pre-sub-stem)</td>
<td>rat/mouse</td>
</tr>
<tr>
<td>e</td>
<td>hamster</td>
</tr>
<tr>
<td>i</td>
<td>primate</td>
</tr>
<tr>
<td>o</td>
<td>mouse</td>
</tr>
<tr>
<td>u</td>
<td>human</td>
</tr>
<tr>
<td>xi</td>
<td>chimeric</td>
</tr>
<tr>
<td>xizu</td>
<td>chimeric/humanized</td>
</tr>
<tr>
<td>zu</td>
<td>humanized</td>
</tr>
</tbody>
</table>

The distinction between chimeric and humanized antibodies is as follows:

A chimeric antibody is one that contains contiguous foreign-derived amino acids comprising the entire variable domain of both heavy and light chains linked to heavy and light constant regions of human origin.

A humanized antibody has segments of foreign-derived amino acids interspersed among variable domain segments of human-derived amino acid residues and the humanized variable heavy and variable light domains are linked to heavy and light constant regions of human origin.

The –xizu- infix is used for an antibody having both chimeric and humanized chains.

The -axo- infix is used for an antibody having both rat and mouse chains.
• Substem A indicates the target (molecule, cell, organ) class:

<table>
<thead>
<tr>
<th>Substem</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-b(a)</td>
<td>bacterial</td>
</tr>
<tr>
<td>-c(i)</td>
<td>cardiovascular</td>
</tr>
<tr>
<td>-f(u)</td>
<td>fungal</td>
</tr>
<tr>
<td>-k(i)</td>
<td>interleukin</td>
</tr>
<tr>
<td>-l(i)</td>
<td>immunomodulating</td>
</tr>
<tr>
<td>-n(e)</td>
<td>neural</td>
</tr>
<tr>
<td>-s(o)</td>
<td>bone</td>
</tr>
<tr>
<td>-tox(a)</td>
<td>toxin</td>
</tr>
<tr>
<td>t(u)</td>
<td>tumour</td>
</tr>
<tr>
<td>-v(i)</td>
<td>viral</td>
</tr>
</tbody>
</table>

In principle, a single letter, e.g. -b- for bacterial is used as substem A. Whenever substem B starts with a consonant (e.g. x or z), to avoid problems in pronunciation, an additional vowel indicated in the table, e.g. -ba- is inserted.

Prefix
The prefix should be random, e.g. the only requirement is to contribute to a euphonious and distinctive name.

Second word
If the product is radiolabelled or conjugated to another chemical, identification of this conjugate is accomplished by use of a separate, second word or acceptable chemical designation. For instance, for mAbs conjugated to a toxin, the suffix -tox can be used in the second word.

If the monoclonal antibody is used as a carrier for a radioisotope, the latter will be listed first in the INN, e.g. technetium (99mTc) nofetumomab merpentan (81)(42). The prefix peg- can be used for pegylated mAbs, but this should be avoided if it leads to over-long INN. In most cases, it is best to adopt two-word INN for pegylated mAbs, with the first word describing the mAb and the second being pegol or a related designation.

References
2. World Health Organization. International Nonproprietary Names (INN) for biological and biotechnological substances (a review), INN Working Document 05.179, update November 2009*

* These documents are available on the INN Programme Website at: [http://www.who.int/medicines/services/inn/en/index.html](http://www.who.int/medicines/services/inn/en/index.html)

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