

# Antibody Nomenclature

The nomenclature of monoclonal antibodies is a naming scheme for assigning generic, or nonproprietary, names to a group of medicines called monoclonal antibodies. This scheme is used for both the World Health Organization's International Nonproprietary Names (INN) and the United States Adopted Names (USAN). In general, word stems are used to identify classes of drugs, in most cases placed word-finally. All monoclonal antibody names end with the stem *-mab*. Unlike most other pharmaceuticals, monoclonal antibody nomenclature uses different preceding word parts (morphemes) depending on structure and function. These are officially called substems and sometimes erroneously *infixes*.

This nomenclature is also used for fragments of monoclonal antibodies, such as antigen binding fragments and single-chain variable fragments.

## Complete List of Stems for Monoclonal Antibody Nomenclature

Target substem				Target substem		
PREFIX	OLD	NEW	MEANING	OLD	NEW	MEANING
	-anibi-	-	angiogenesis (inhibitor)	-toxa-	-tox(a)-	toxin
	-ba(c)-	-b(a)-	bacterium	-co(l)-		colonic tumor
	-ci(r)-	-c(i)-	circulatory system	-go(t)-		testicular tumor
	fu(ng)-	-f(u)-	fungus	-go(v)-		ovarian tumor
	-ki(n)-	-k(i)-	interleukin	-ma(r)-	-t(u)-	mammary tumor
	-le(s)-	-	inflammatory lesions	-me(l)-		melanoma
	-li(m)-	-l(i)-	immune system	-pr(o)-		prostate tumor
	-mu(l)-	-	musculoskeletal system	-tu(m)-		miscellaneous tumor
	-ne(u)(r)-	-n(e)-*	nervous system	-vi(r)-	-v(i)-	virus
variable	-o(s)-	-s(o)-	bone			

Source substem		Source substem		Suffix
MEANING		MEANING		
-a-	rat	-xi-	chimeric (human/foreign)	
-e-	hamster	-zu-	humanized	
-i-	primate	-xizu-*	chimeric/humanized hybrid	
-o-	mouse	-axo-	rat/mouse hybrid	-mab
-u-	human			

\*under discussion as of February 2010

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## COMPONENTS

### Substem for origin/source

The substem preceding the *-mab* suffix denotes the animal from which the antibody is obtained. The first monoclonal antibodies were produced in mice (substem *-o-*, yielding the ending *-omab*; usually *Mus musculus*, the house mouse), primates (*-i-*, yielding *-imab*; usually *Macaca irus*, the Crab-eating Macaque) or other non-human organisms.

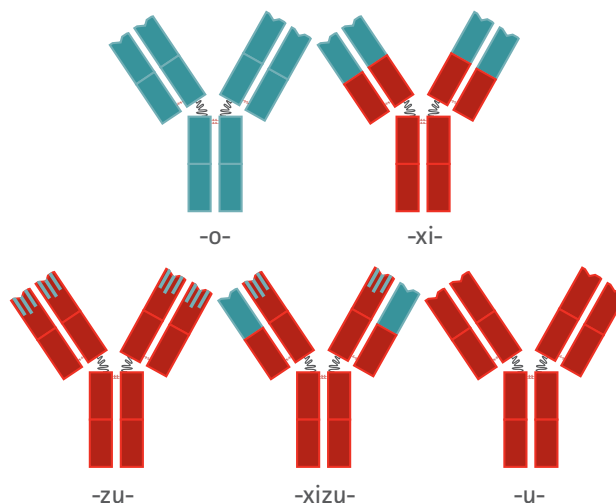
These non-human antibodies are recognized as foreign by the human immune system and may be rapidly cleared from the body, provoke an allergic reaction, or both. To avoid this, parts of the antibody can be replaced with human sequences, or pure human antibodies can be engineered. If the constant region is replaced with the human form, the antibody is termed chimeric and the substem used is *-xi-*. Part of the variable regions, typically everything but the complementarity determining regions, may also be substituted, in which case it is called humanized and *-zu-* is used. Partly chimeric and partly humanized antibodies use *-xizu-*. These three substems do not indicate the foreign species used for production. Thus, the human/mouse chimeric antibody basiliximab ends in *-ximab* just as the human/macaque antibody gomiliximab. Pure human antibodies use *-u-*.

Rat/mouse hybrid antibodies can be engineered with binding sites for two different antigens. These drugs, termed trifunctional antibodies, have the substem *-axo-*.

## Components

### Substem for origin / source

Source substems: mouse (top left), chimeric (top right), humanized (bottom left), chimeric/humanized (bottom middle), and human (bottom right) monoclonal antibodies. Human parts are shown in red, non-human parts in blue.



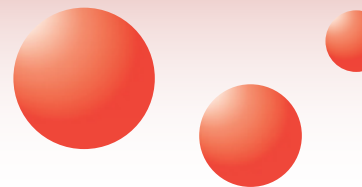
### Substem for target

The substem preceding the source of the antibody refers to the medicine's target. Examples of targets are tumors, organ systems like the circulatory system, or infectious agents like bacteria or viruses. The term *target* does not imply what sort of action the antibody exerts. Therapeutic, prophylactic and diagnostic agents are not distinguished by this nomenclature.

In the naming scheme as originally developed, these substems mostly consist of a consonant, a vowel, then another consonant. For ease of pronunciation and to avoid awkwardness, the final consonant may be dropped if the following source substem begins with a consonant (such as *-zu-* or *-xi-*). Examples of these include *-ci(r)-* for the circulatory system, *-li(m)-* for the immune system (*lim* stands for lymphocyte) and *-ne(r)-* or *-neu(r)-* for the nervous system. This results in endings like *-limumab* (immune system, human) or *-ciximab* (circulatory system, chimeric, consonant *r* dropped).

In 2009, new and shorter target substems were introduced. They mostly consist of a consonant, plus a vowel which is omitted if the source substem begins with a consonant. For example, human antibodies targeting the immune system receive names ending in *-lumab* instead of the old *-limumab*. Some endings like *-ciximab* remain unchanged.

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### Prefix

The prefix carries no special meaning and should be unique for each medicine.

### Additional words

A second word may be added if there is another substance attached or linked. If the drug contains a radioisotope, the name of the isotope precedes the name of the antibody.

### EXAMPLES

#### New Convention

**Olaratumab** is an antineoplastic. Its name is composed of olara- + -t- + -u- + -mab. This shows that the drug is a human monoclonal antibody acting against tumors.

The name of **benralizumab**, a drug designed for the treatment of asthma, has the components benra- + -li- + -zu- + -mab, marking it as a humanized antibody acting on the immune system.

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