

Rabies monoclonal antibodies post exposure prophylaxis

Monoclonal antibodies (mAbs) capable of neutralizing a diverse range of rabies isolates could offer a solution to address the cost, supply and safety issues associated with blood derived Rabies Immunoglobulin (RIG).

WHO, in partnership with WHO Collaborating Centres (CCs) for Rabies, is undertaking a project to facilitate the development of a cocktail of unique combinations of mAbs able to replace RIG. The ultimate goal is to make a safe and effective product which can be used broadly and should be available at the lowest possible reasonable price to the public sector of developing countries. Through its Collaborating Centres for Rabies Research, WHO gained access to a range of rabies mAbs and their hybridomas, which, following evaluation and selection, have been transferred under Material Transfer Agreement to the following manufacturers for further development:

- Zydus Cadila Healthcare Ltd, India (phase 2 complete, phase 3 in planning)
- Council for Scientific and Industrial Research (CSIR), South Africa (late preclinical stage, project on hold due to funding constraints)
- Span Biotherapeutics, India (early preclinical stage, project on hold due to funding constraints)

In addition, there are multiple other mAbs products being developed independent of the WHO project. The first mAb against rabies to be granted a market authorization is Rabishield which was licensed in India in 2016. Rabishield is produced by the Serum Institute of India in partnership with MassBiologics USA. The product will be launched on the Indian market in 2017. Many others are in early preclinical development and some candidates have reached clinical trials. Below is a list of products that have reached clinical trials.

Table: Rabies monoclonal antibody products in clinical trials

Product Name, Manufacturer	Trial stage (location)	Status	Link to trial registration
CL184 Crucell, Johnson & Johnson	Phase I (USA)	Complete	ISRCTN18660493 http://www.controlled-trials.com/ISRCTN18660493
	Phase I/II (India)	Complete	ISRCTN12693237 http://www.controlled-trials.com/ISRCTN12693237
	Phase II (USA)	Complete	NCT00656097 http://clinicaltrials.gov/show/NCT00656097
	Phase II (India)	Complete	CTRI/2011/10/002060 http://www.ctri.nic.in/Clinicaltrials/pmaindet2.php?trialid=3169 NCT01228383 http://clinicaltrials.gov/ct2/show/study/NCT01228383
	Phase II (Philippines)	Complete	NCT00708084 http://clinicaltrials.gov/show/NCT00708084
RMAb Partnership between MassBiologics and Serum Institute of India	Phase I (India)	Complete	CTRI/2009/091/000465 http://www.ctri.nic.in/Clinicaltrials/pmaindet2.php?trialid=680
	Phase II/III (India)	Complete <i>(product licensed in India in</i>	CTRI/2012/05/002709 http://www.ctri.nic.in/Clinicaltrials/pmaindet2.php?trialid=4191

		2016)	
Rabimabs Zydus Cadila	Phase I /II (India)	Complete	CTRI/2012/12/003225 http://www.ctri.nic.in/Clinicaltrials/pmaindet2.php?trialid=5716
SYN023 Synermore Biologics, China	Phase II (USA)	Recruiting	NCT02956746 https://clinicaltrials.gov/ct2/show/NCT02956746