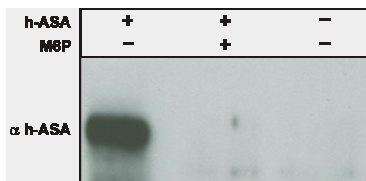


## Technology Offer

## Recombinant antibody for easy detection of mucopolipidosis type II and III and selective purification of proteins with mannose 6-phosphate residues for ERT

Reference Number: TO 14-00022

### Background



Immunoprecipitation of recombinant human arylsulfatase A (h-ASA) from medium of cultured cells overexpressing h-ASA using antibody M6P-1. h-ASA was visualized by immunoblot using a specific antibody ( $\alpha$  h-ASA). The precipitation could be inhibited by addition of Man6P (M6P).

Lysosomal enzymes are glycoproteins modified by mannose 6-phosphate (Man6P) residues. The recognition of Man6P by Man6P-receptors is required for the efficient intracellular transport of these enzymes from the Golgi apparatus to lysosomes. Importantly, also extracellular glycoproteins containing Man6P residues can be internalised via Man6P-receptors and transported to lysosomes.

Inherited defects in the formation of Man6P residues lead to severe diseases namely mucopolipidosis (ML) type II and type III characterized by the cellular deficiency of multiple lysosomal enzymes. ML II and ML III belong to a group of more than 50 lysosomal storage disorders caused by the deficiency of mostly single lysosomal enzymes. For some

of those diseases enzyme replacement therapies (ERT) are available.

### Challenge

Currently, the diagnosis of ML II and III can only be carried out in a few specialized laboratories throughout the world due to a complex procedure. In addition, purification of enzymes for ERT requires expensive chromatographic procedures which do not discriminate between therapeutically active and inactive forms, i.e. with or without Man6P modification.

### Technology

The inventors have generated a recombinant antibody (M6P-1) specifically binding to Man6P. They have shown on a laboratory scale that it allows

- **easy diagnosis** of ML II and III by western blots
- **selective purification** in a one-step procedure of recombinant high-affinity uptake forms of lysosomal enzymes on affinity media (see figure)
- **histological staining** of lysosomes.

The protein expresses well in a prokaryotic host, can be purified to homogeneity, is stable over several months at 4 °C and can be immobilized on affinity media without loss of activity.

### Commercial Opportunity

The technology is offered for co-development of a diagnostic kit and an optimized cost-efficient purification procedure or for in-licensing.

### Patent Situation

A European patent application has been filed in August 2008.

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## Further Reading

Schröder et al (2010) Site-specific analysis of N-linked oligosaccharides of recombinant lysosomal arylsulfatase A produced in different cell lines. *Glycobiology* 20(2):248-259

Müller-Loennies et al (2010) A Novel Single-Chain Antibody Fragment for Detection of Mannose 6-Phosphate-Containing Proteins. Application in Mucopolipidosis Type II Patients and Mice. *American Journal of Pathology* 177 (1) DOI: 10.2353/ajpath.2010.090954