Cleveland Clinic Innovations

PRODUCT
Transgenic mouse model to study neuronal cell re-generation and re-myelination

INDICATIONS
Nervous system disorders

VALUE PROPOSITION
- GFP tagged to the PLP gene in the myelin sheath (neuronal cells) expressed during development.
- Validation studies for therapeutics that target the neuronal re-generation and re-myelination processes.

DEVELOPMENT STAGE
Available for Licensing

PUBLICATION
Mallon, Barbara S et al. "Proteolipid promoter activity distinguishes two populations of NG2-positive cells throughout neonatal cortical development." The Journal of neuroscience: vol. 22,3 (2002): 876-85.

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Mouse model to study re-myelination and neuronal cell regeneration.

Inventor: Wendy Macklin, PhD

OPPORTUNITY

Re-myelination and neuronal regeneration are key biological processes that are becoming increasingly important in the development of novel therapeutics in many central and peripheral nervous system disorders such as multiple sclerosis, optic neuritis, transverse myelitis, etc.. The current challenge lies in the scarcity of viable *in vivo* models to study the myelination process. This results in a significant challenge in conducting pre-clinical and early validation studies for emerging therapeutic approaches forre-myelination and neuronal regeneration. There is an unmet need for research tools that can enable and support the development of novel therapeutics.

SOLUTION

Researchers at Cleveland Clinic have developed a transgenic PLP-EGFP mouse model. The transgenic mice express an enhanced green fluorescent protein (EGFP) in oligodendrocytes, Schwann cells and the enteric glia of the gut. Expression occurs in embryonic and postnatal cells. This transgenic mouse strain may be useful in visualizing all stages of oligodendrocyte differentiation.

The PLP-EGFP transgene uses the mouse proteolipid protein (myelin) 1 (Plp1) promoter to direct expression of enhanced green fluorescent protein (EGFP) in oligodendrocytes, Schwann cells and the enteric glia of the gut. EGFP expression occurs in embryonic tissue from at least E10.5 and postnatal tissue and mimics the endogenous promoter expression pattern. PLP1 is the predominant component of myelin. Mice hemizygous for the transgene are viable and fertile. This mutant mouse strain allows visualization of all stages of the oligodendrocyte lineage (Fig 1).

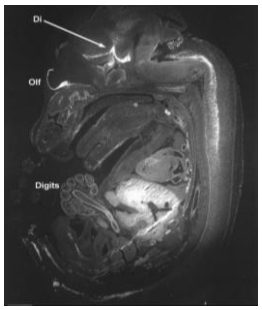

Fig 1: GFP expression in the oligodendrocyte lineage during development.

This transgenic mouse strain serves as a platform for researchers to investigate various aspects of neuronal cell regeneration, including the study of potential drugs, mechanisms involved in remyelination, and the intricate processes through which neuronal cells regenerate following damage. The development of the current research tool not only expands our understanding of these critical biological processes but also provides a means to validate leading therapeutic candidates, contributing to advancements in the field of neurobiology and potential treatments for neurological disorders.