Docket #: S14-310

Dopamine2 Specific Promoter

Researchers in Prof. Karl Diesseroth's laboratory have discovered a Dopamine receptor type 2 specific promoter (D2SP) that can be used to transfect, identify and isolate Dopamine R2 (D2R)-expressing cells. Because the promoter is highly specific (98.2%) and penetrant (86.8%), it could be used to drive expression of genes in DR2 cells in vitro or in vivo. Potential applications include enriching for D2R-expressing cells through cell sorting techniques and enabling tissue specific expression of optogenetic constructs or gene therapy vectors. Ultimately, this promoter could enhance research and treatment of a wide range of conditions, particularly neuropsychiatric disorders.

Stage of Research
The inventors have used the promoter to drive expression in rat striatal primary neurons and demonstrated its specificity and penetrance.

Applications

- **Tissue specific gene expression** with end-user applications in research and therapeutics such as:
    - cell sorting for D2R-expressing cells that can be further characterized or used for cell therapeutics
    - optogenetic constructs
    - RNA or DNA-based therapies and other gene therapies

Advantages

- **Specific** - 98.2% specific (compared to only 90.5% specificity achieved by the D2R promoter)
- **High penetrance** - 86.8% penetrance (compared to 69% penetrance previously seen with the D2R promoter)

- **Low cost and easy to use**

Patents

- Published Application: WO2016090172
- Published Application: 20170327841
- Published Application: 20200032291
- Issued: 10,435,709 (USA)

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