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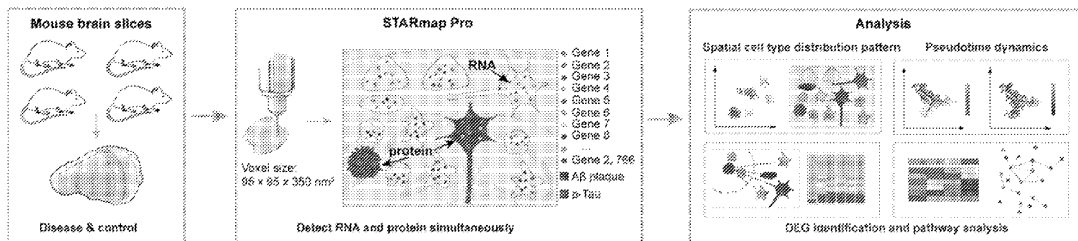


FIG. 1A

(57) **Abstract:** The present disclosure provides methods and systems for mapping gene and protein expression in a cell (*i.e.*, mapping gene and protein expression within the same cell simultaneously). The present disclosure also provides methods for diagnosing a disease or disorder (*e.g.*, a neurological disorder such as Alzheimer's disease) in a subject. Methods of screening for a candidate agent capable of modulating gene and/or protein expression are also provided by the present disclosure. The present disclosure also provides methods for treating a disease or disorder, such as Alzheimer's disease, in a subject in need thereof. A plurality of oligonucleotide probes, which may be useful for performing the methods described herein, are also described by the present disclosure, as well as kits comprising any of the oligonucleotide probes described herein. Additionally, the present disclosure provides methods, apparatuses, and non-transitory computer-readable storage media for identifying spatial variations of cell types in at least one image.

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