



## Advancing precision medicine for brain disorders

**Issue:** Traditional approaches to treating brain disorders often fail to account for individual variability, leading to ineffective treatments and adverse effects. Precision medicine offers a promising alternative but faces unique challenges when applied to brain disorders.

**Background:** Precision medicine, which takes into account individual variability in genes, environment, and lifestyle, has shown promise in oncology. However, applying it to brain disorders requires considering life experience and development in addition to lifestyle factors. Precision medicine aims to tailor treatments to maximize effectiveness and minimize adverse reactions by classifying patients.

### What are the challenges in applying precision medicine to brain disorders?

- **Complexity of brain disorders:** Life experience and development play a key role
- **Data complexity:** Requires integrating diverse data types ("omics" & "connectomics")
- **Psychosocial factors:** Difficult to quantify and integrate into treatment strategies
- **Individual variability:** Treatment must be applied to a person, not just a disease

### Policy Recommendations:

- Promote *interdisciplinary research* between neuroscientists and scientists from a large set of basic and clinical disciplines.
- Invest in *digital data infrastructure* for the integration and analysis of diverse data types.
- Fund and develop *personalized treatment strategies* considering genetic, environmental, lifestyle & psychosocial factors.
- Support *education and training* on data-informed approaches and personalized medicine techniques.
- Consider *social and economic impacts* of brain health through conferences and policy initiatives.

### Advancements in precision medicine for brain disorders present significant opportunities:

By classifying patients based on comprehensive data, treatments can be tailored to individual needs, enhancing effectiveness and minimizing adverse effects. A data-informed approach can lead to predictive and preventive actions. Then, research on resting-state brain networks offers valuable insights into cognitive and mental activities and their alterations in disorders like depression. Finally, the integration of digital data has the potential to improve diagnostic and prognostic accuracy and guide more effective treatment decisions.