Abuse Potential Evaluation with Pharmaco-MRI

- Assessing abuse liability of experimental drugs in man using MRI methods
- Evaluate and mitigate abuse risk of novel Mechanisms-of-Action

Background
Assessment of abuse potential of experimental drugs that engage with novel Mechanisms of Action is required as part of their development. The FDA strongly encourages industry to pay more attention to the risk for drug abuse in experimental drugs to avoid future non-medical use.

Today, a variety of preclinical animal models for drug dependence and abuse exist albeit with varying translational properties. Because of this, innovative drug development faces a significant risk of choosing a suboptimal animal model, dosing and administration regime.

Applications
Novel drugs acting on novel Mechanisms of Action require a comprehensive approach to mitigate risks associated with the MOA and its (ant)agonists.

Pharmaco-MRI methods in humans offer such a comprehensive solution.

Compounds with an established safety and pharmacokinetic record can be evaluated in humans using MRI methods. Accordingly, activation of human brain networks can be recorded and compared with network responses to known drugs of abuse. Moreover, changes in brain responses upon repeated administration such as sensitization or tolerance can be recorded to further assess abuse potential.

Analysis of network activation patterns with reference to those of known drugs.

Dosing and repetitive administration is flexible and can be combined with pharmacokinetics.

Sensitized volunteers may be considered to further establish lack of abuse potential.

MRI platform
The Spinoza Centre for Neuroimaging and the AMC share expertise and MRI infrastructure to address abuse liability issues. These are accessible to all parties engaging in innovative drug development.

Experimental drugs that show no significant activation of abuse networks in the brain after single or repeated administration can be considered safe with regard to illicit use. Moreover, lack of abuse potential of an experimental drug also establishes its Mechanism of Action as unlikely to be involved in abuse.

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Key Publications

