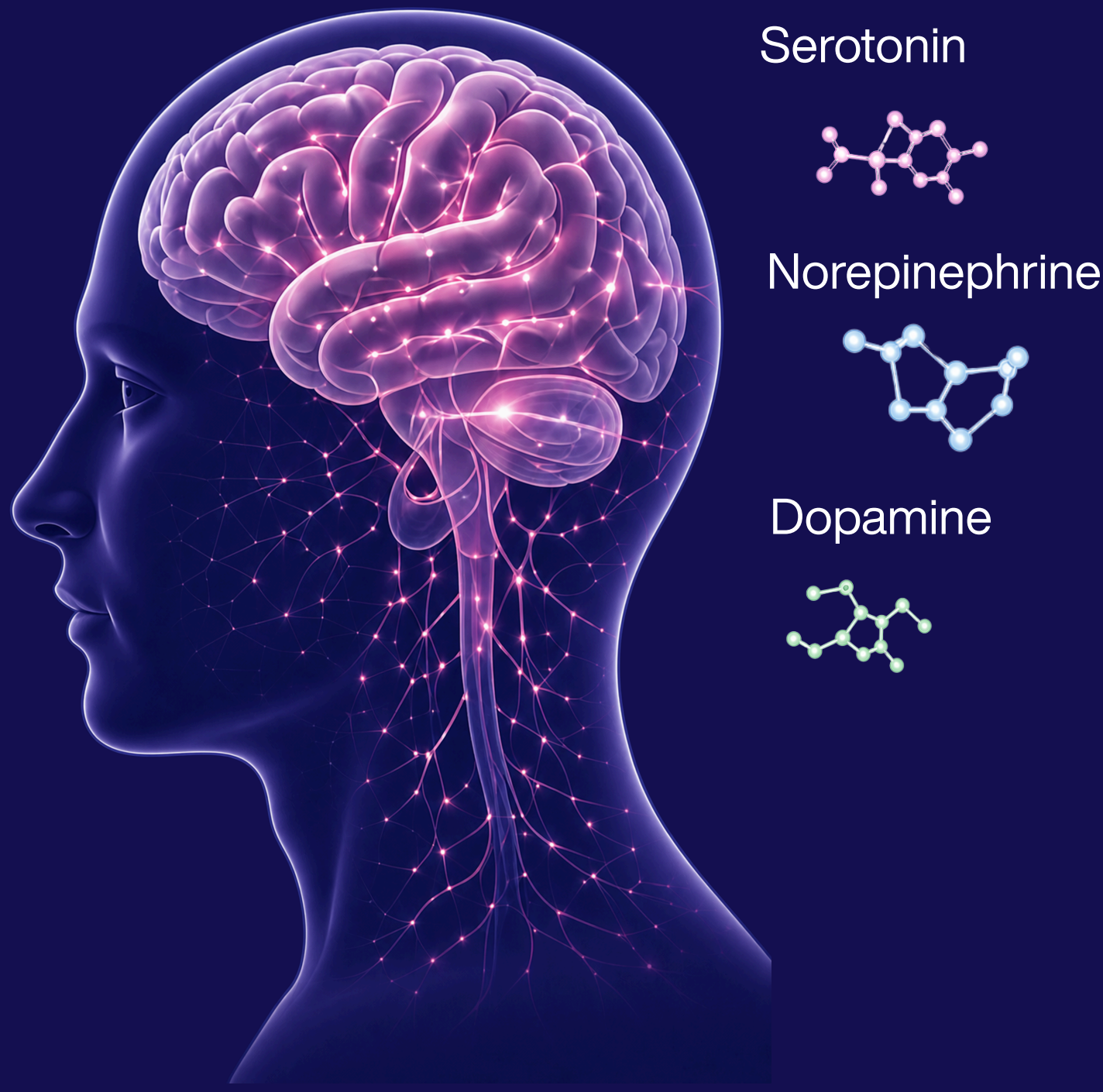


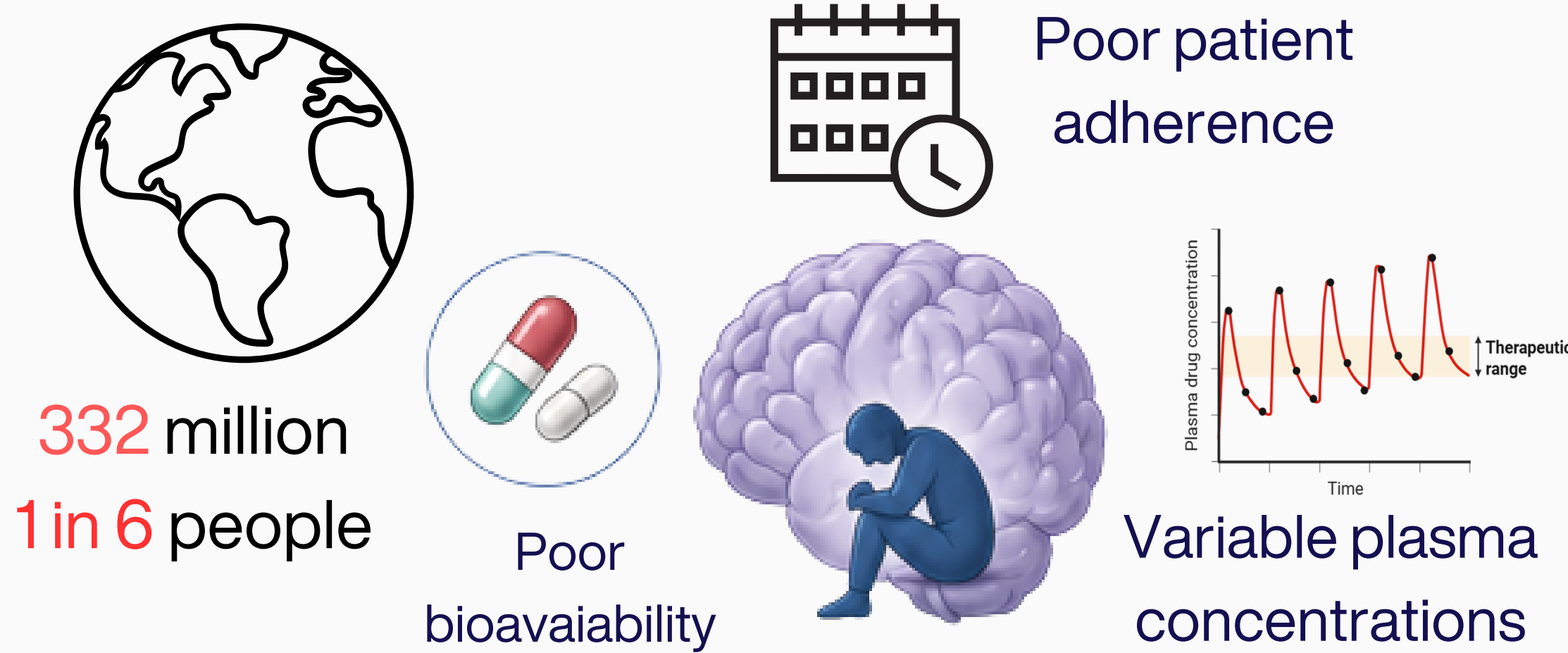
Engineering Long-Acting Injectable *In situ* forming Implants for Effective Treatment of Depression

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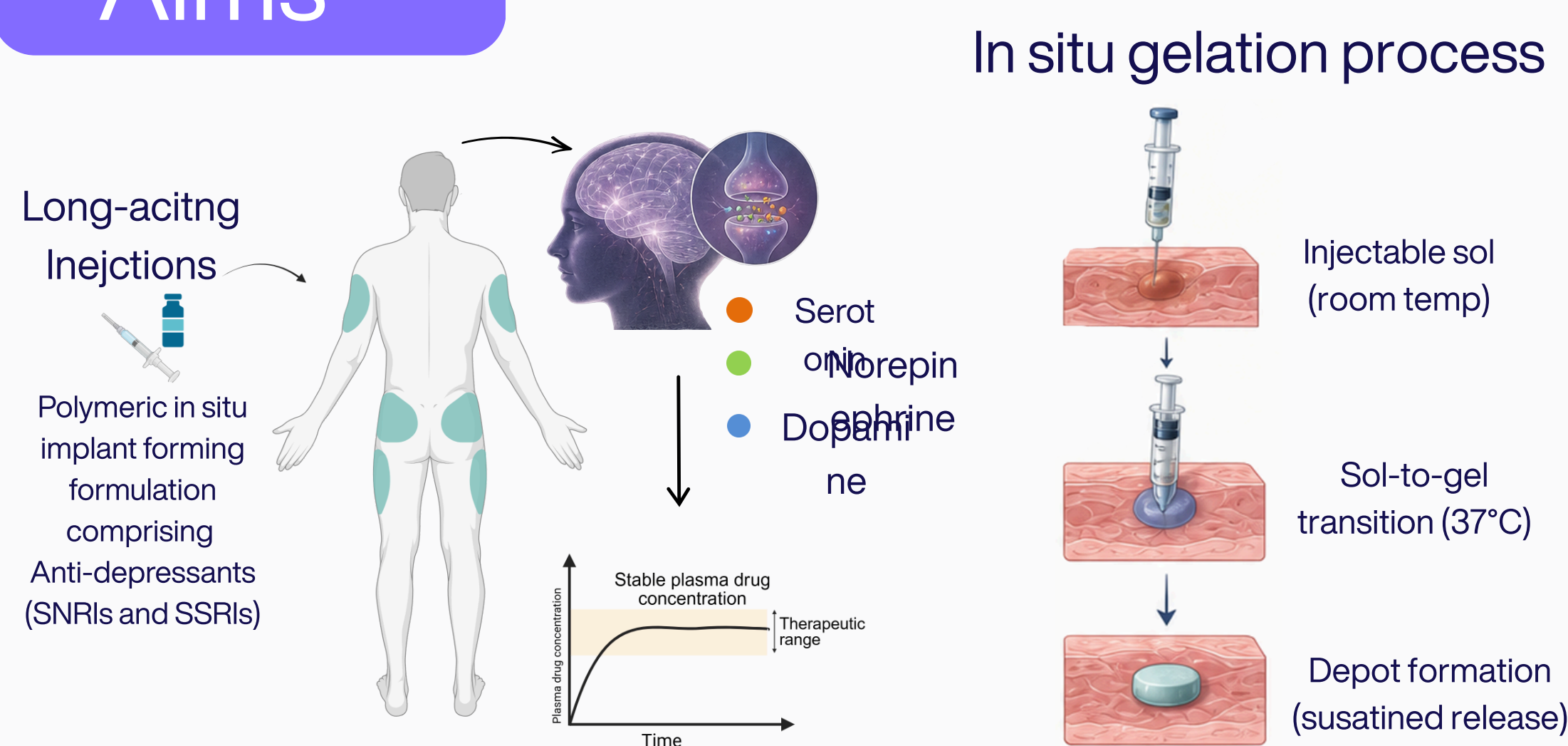


Introduction

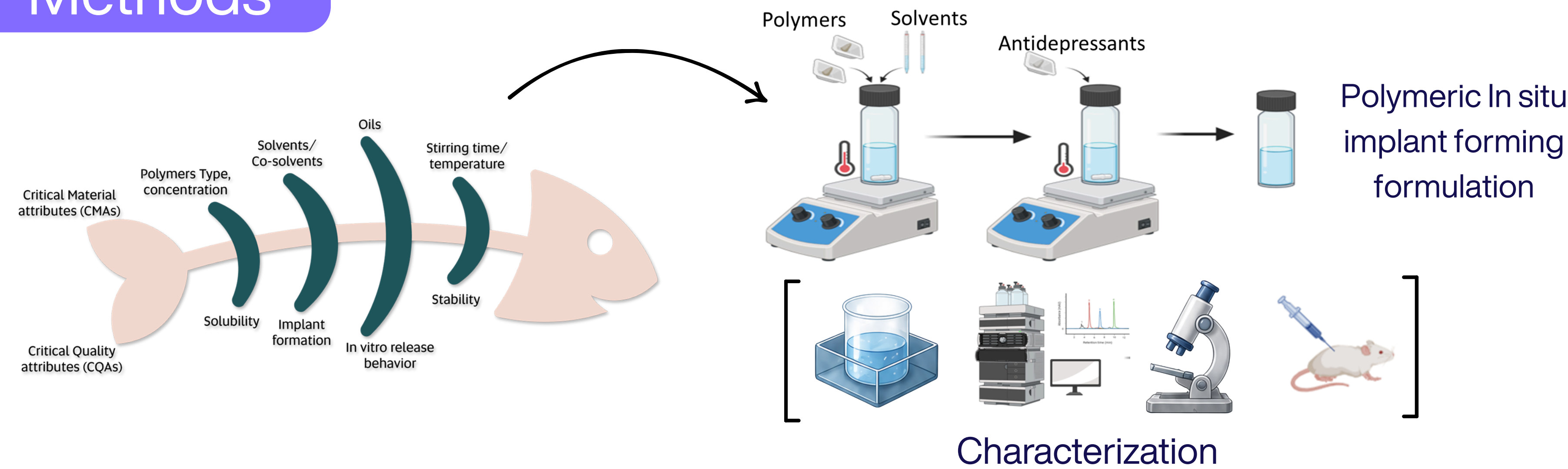
- ➔ According to WHO, depression is the most common mental disorder, affecting people of all ages and genders.
- ➔ Symptoms include loss of pleasure, depressive mood, and loss of interest in activities for long periods.
- ➔ Although depression is psychological, it is linked to imbalances in neurotransmitters such as serotonin, norepinephrine, and dopamine in the brain's emotional centres.
- ➔ Traditional antidepressants
 - ➔ Selective serotonin reuptake inhibitors (SSRIs)
 - ➔ Serotonin & norepinephrine reuptake inhibitors (SNRIs)



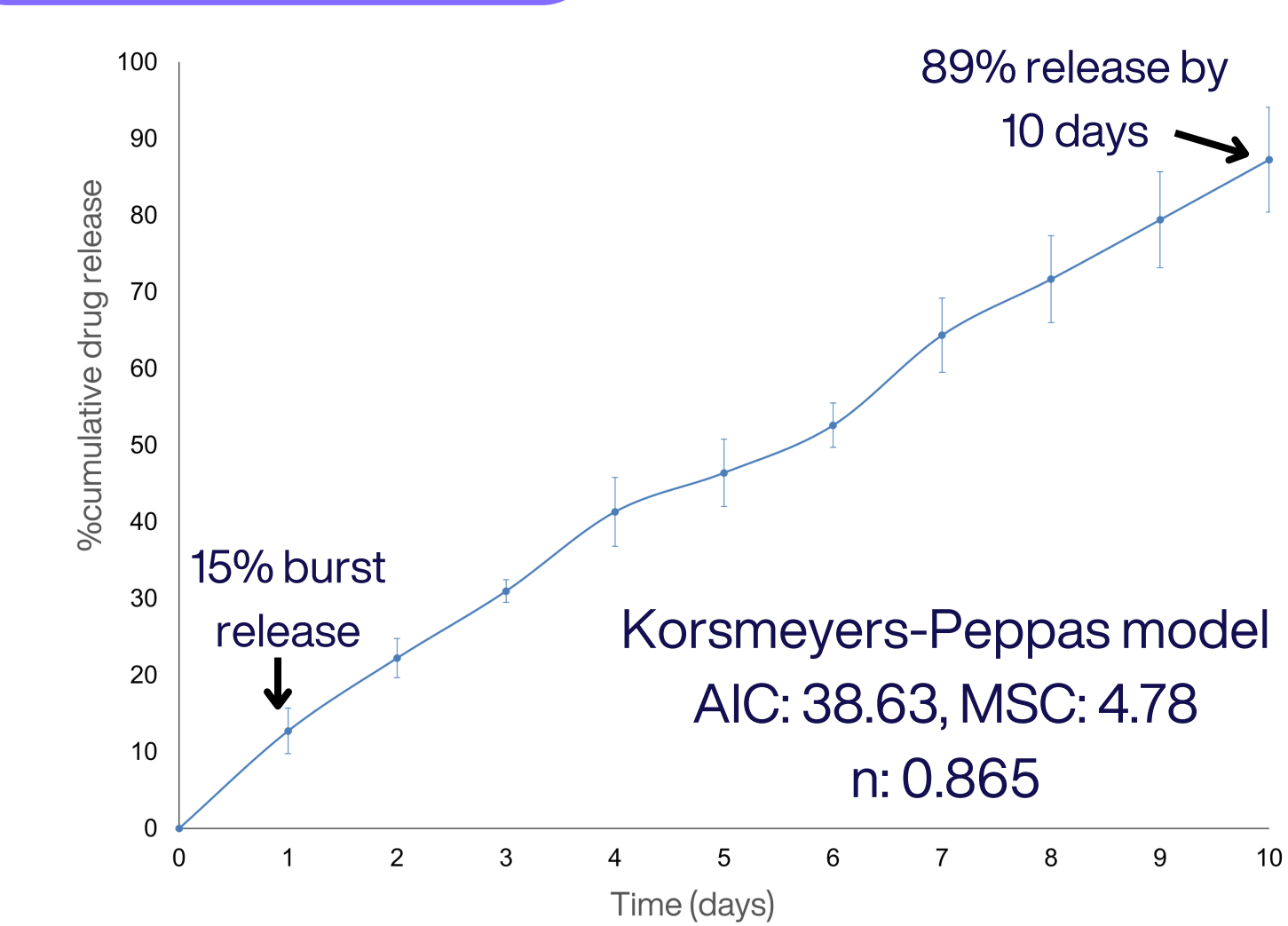
Aims



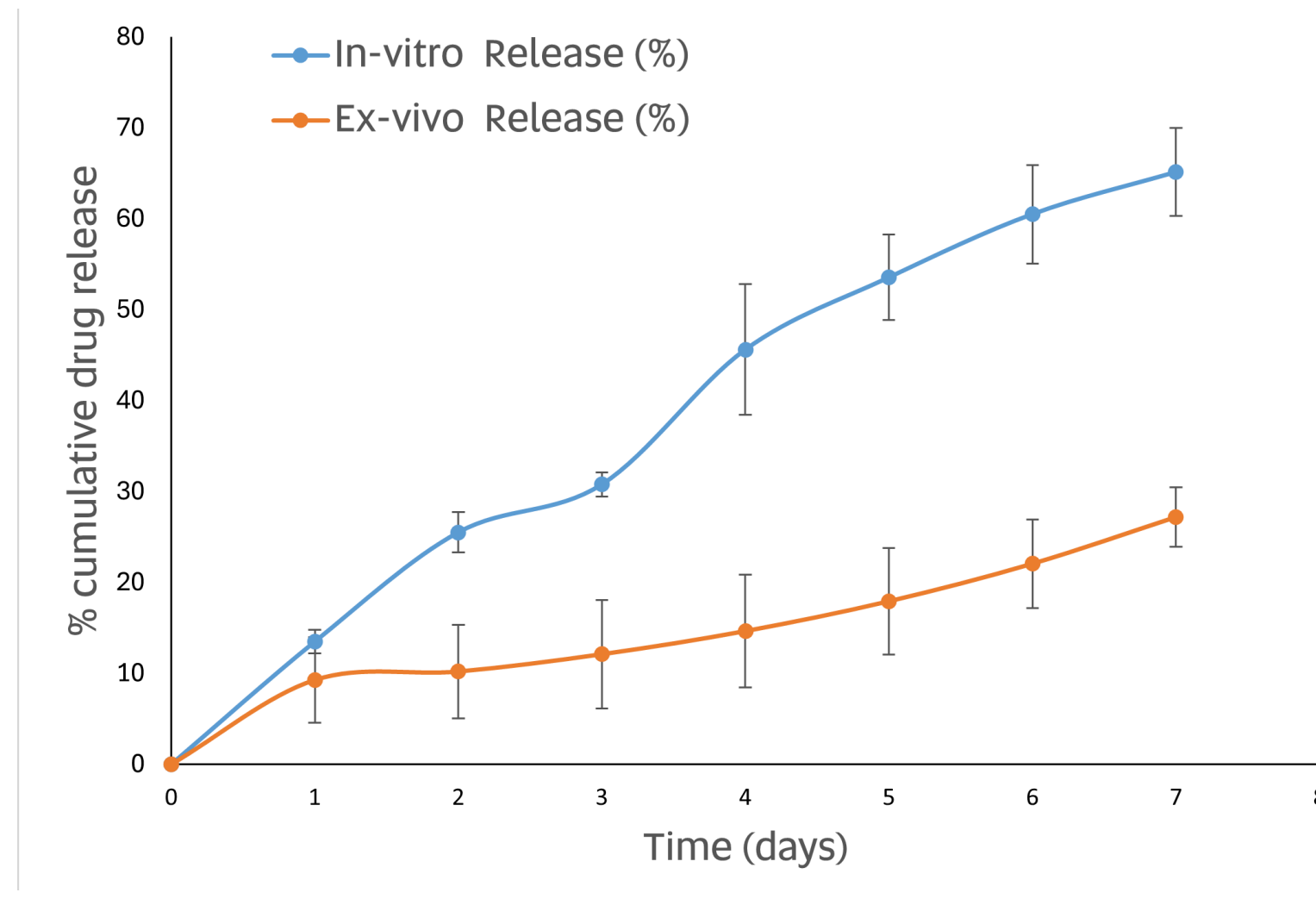
Methods



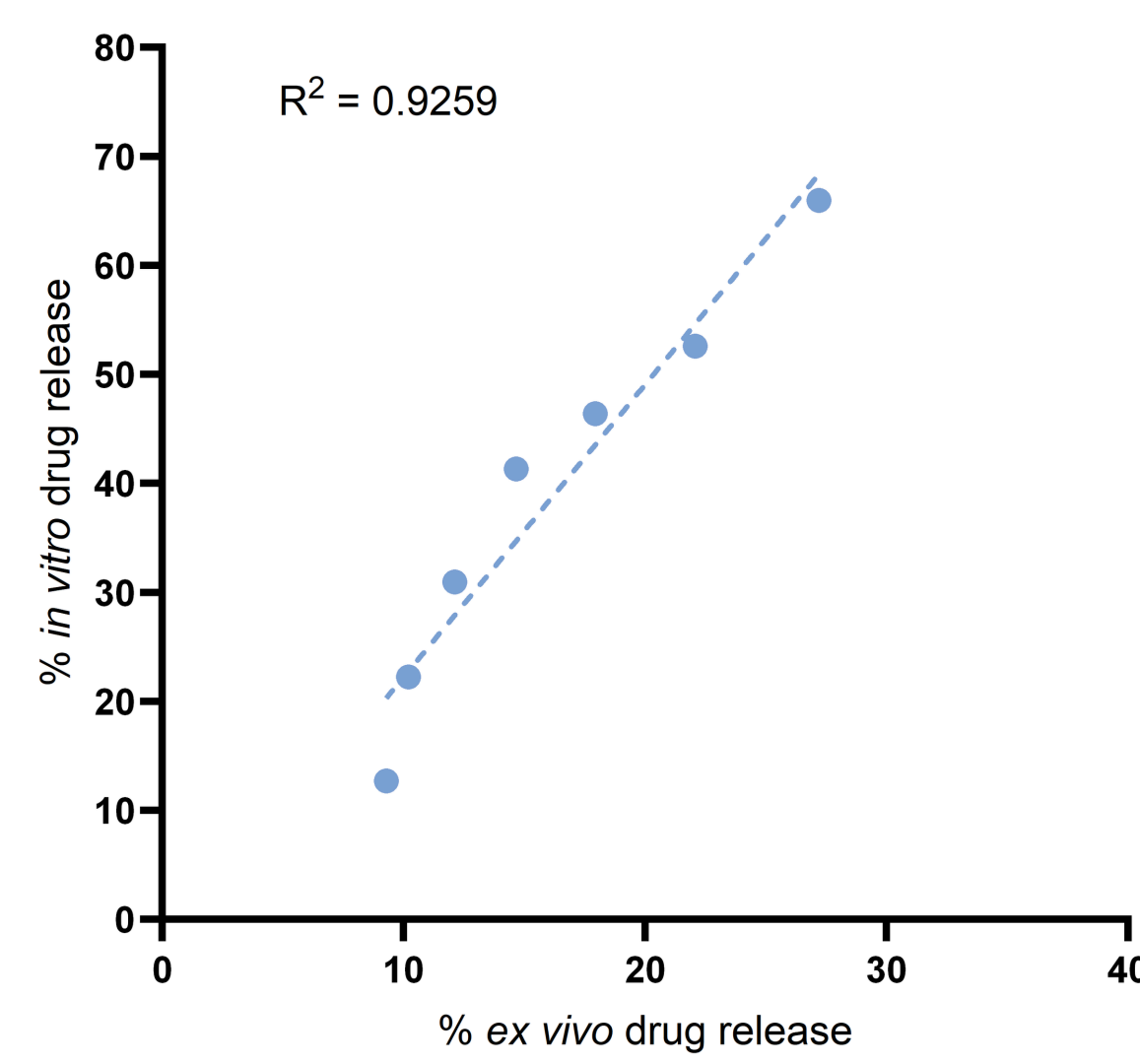
Results



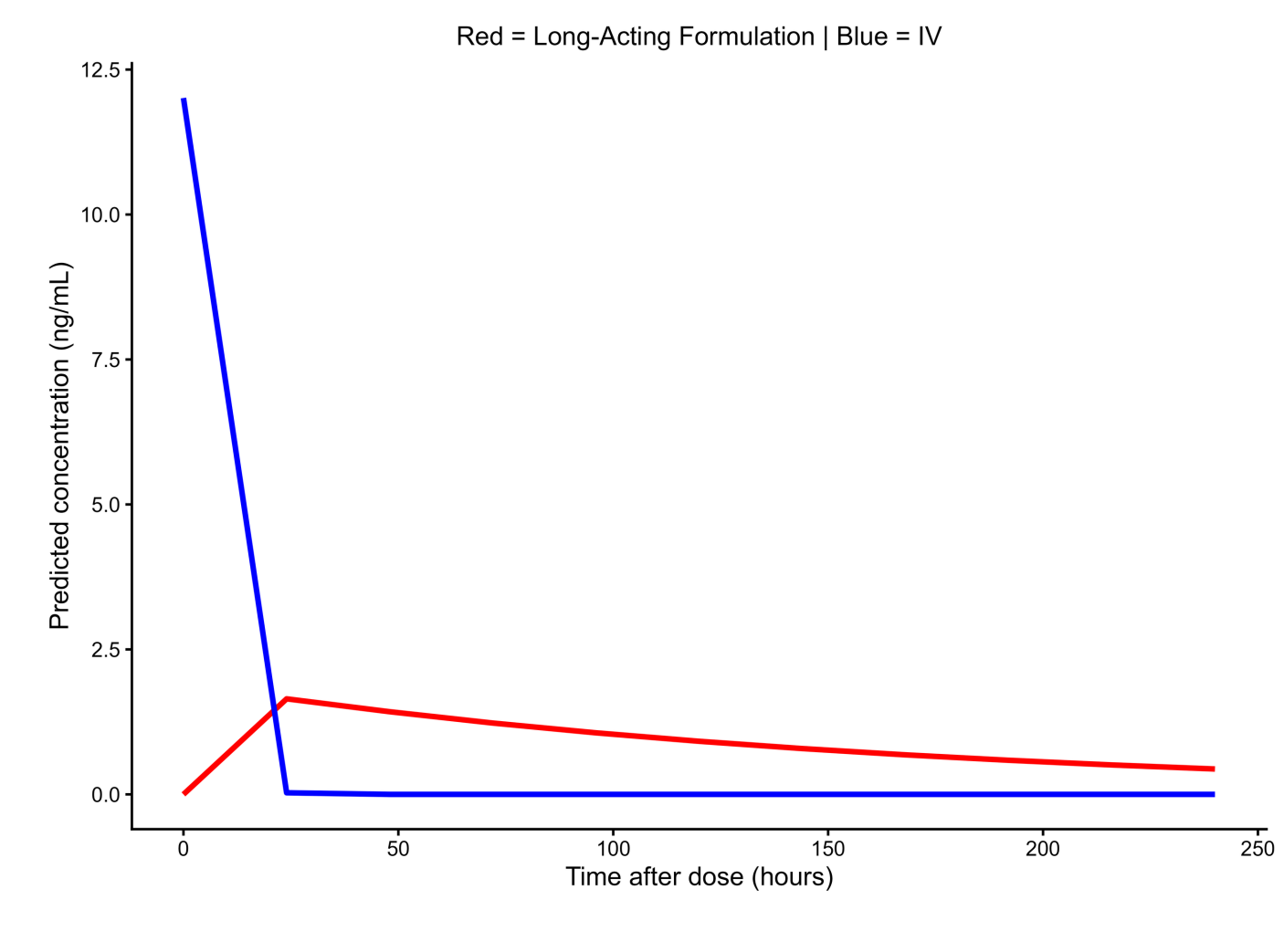
In vitro drug release profile for 10 days in PBS (pH 7.4)



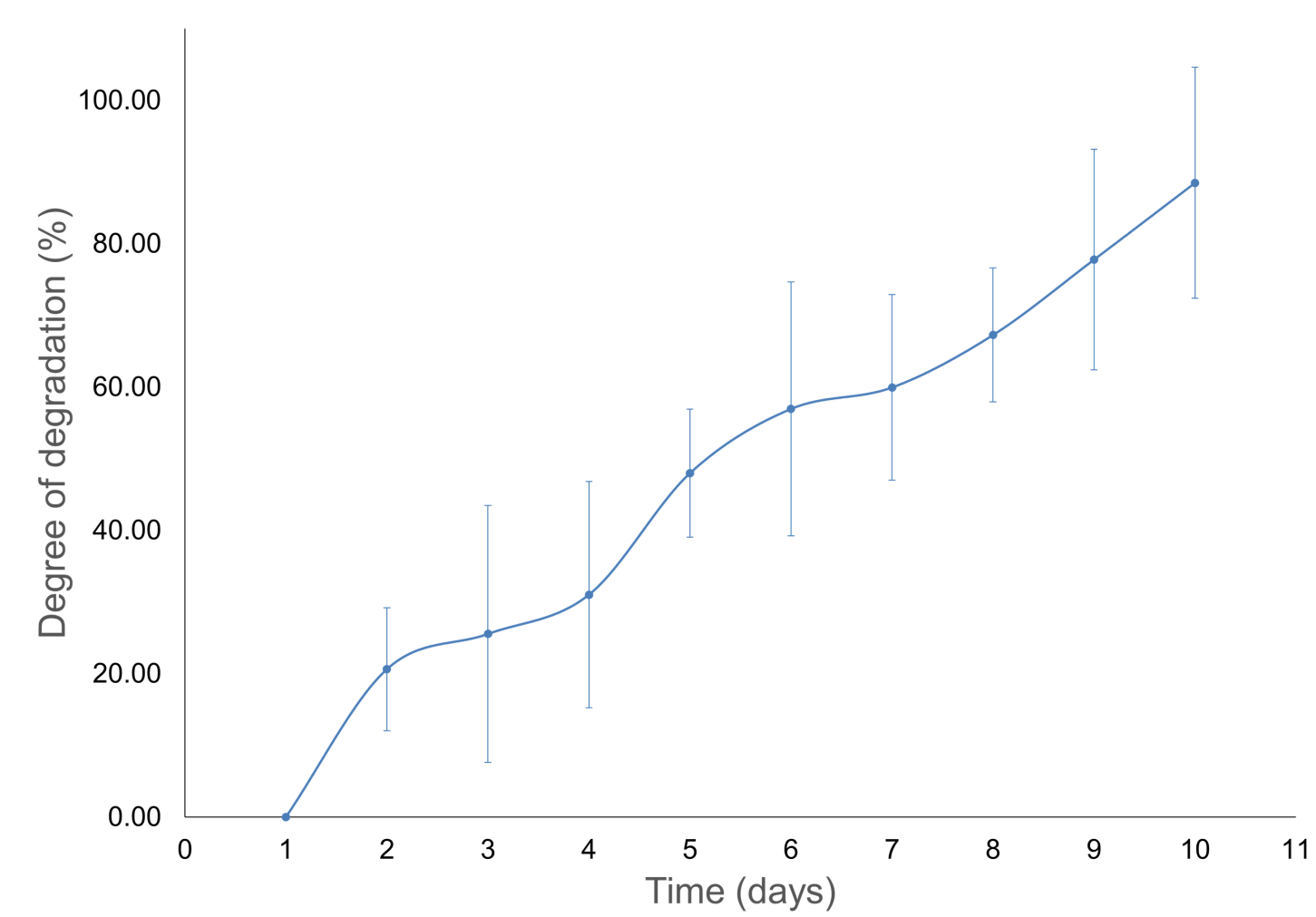
Ex vivo study using pig muscle for 7 days in PBS(pH 7.4)



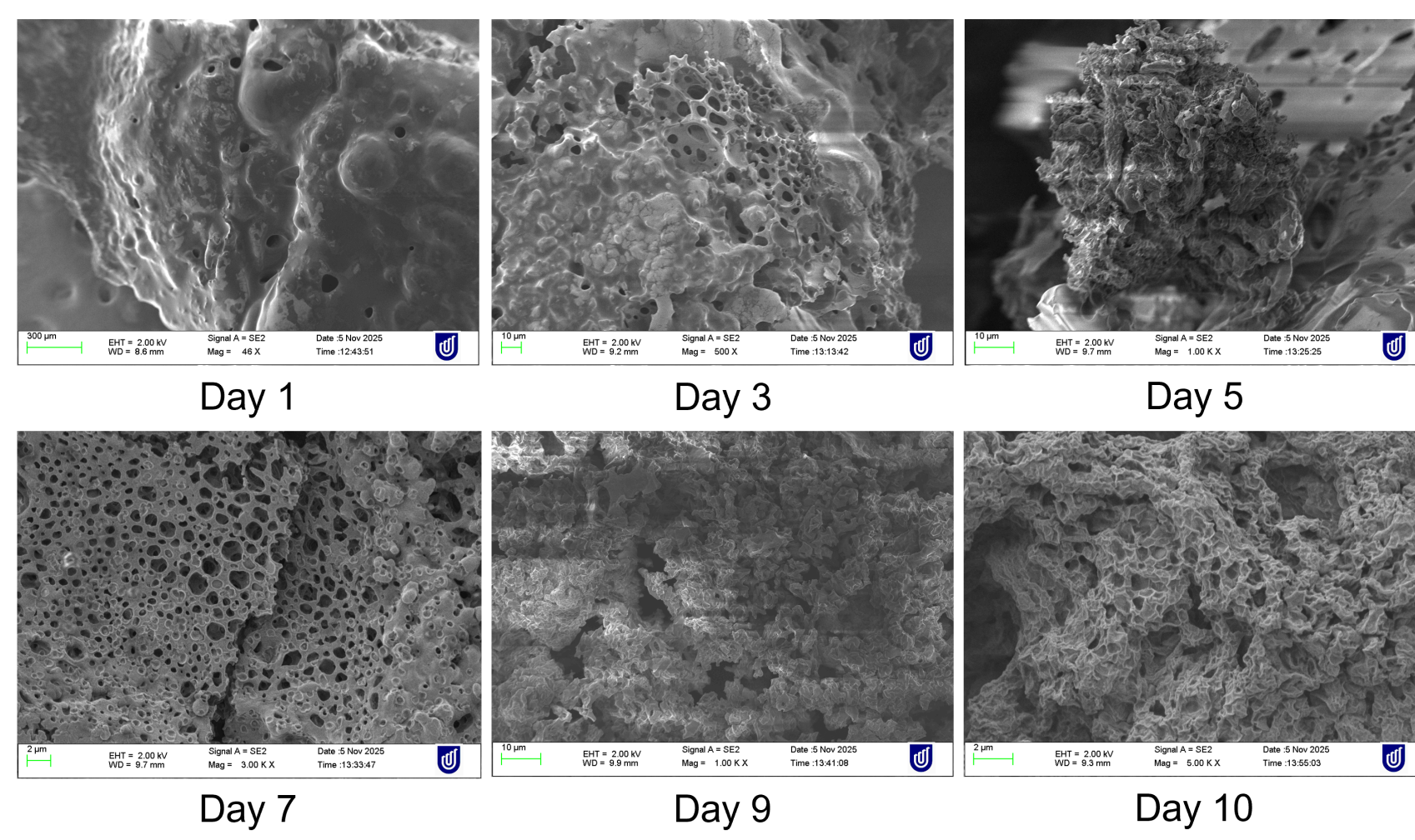
In vitro-ex vivo correlation



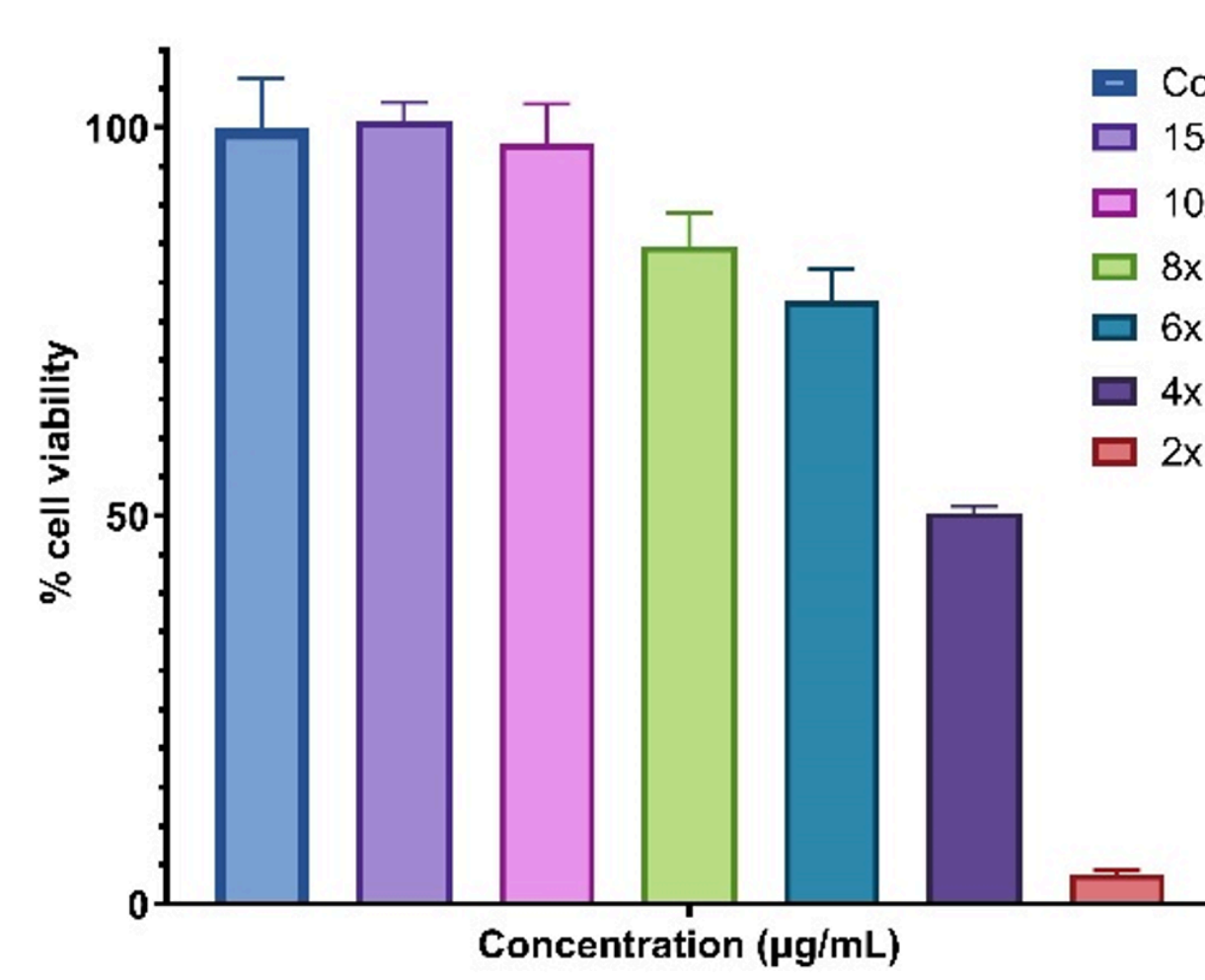
In vivo prediction by convolution method using R studio



In vitro degradation of implant in PBS (pH 7.4)



Surface morphological examination of impant collected over release study



Cell viability by CTG assay in NIH 3T3 fibroblast cells



Viscosity
0.35 Pa.s

Injection force
(22G Needle)
16.49 N

Key Findings



- ➔ Optimised PLGA-based ISFI achieves 10-day controlled release
- ➔ Sol-to-gel transition near physiological conditions with good injectability and confirmed depot formation
- ➔ Non-Fickian release mechanism approaching near zero-order kinetics
- ➔ Confirmed biocompatibility with wide therapeutic safety margin
- ➔ *In vivo* prediction demonstrates superior pharmacokinetic profile over IV administration

Provisional Patent

2026904410 Compositions with lipid component for in situ implant formation	
Bibliographic data	Bibliographic details
Specification / eRegister	Application details
eDossier	Australian application number 2026904410
Lifecycle details	Patent application type Provisional
Fee/publication history	Serial number
Ownership changes	Application status Filed
Licences & mortgages	First IPC mark
Oppositions, disputes & amendments	Currently under opposition No
Filed in May, 2026	

Learning Objective



Design and significance of in situ implant forming systems as a long-acting injectable approach

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