Pion

SCISSOR N3

In Vitro
Subcutaneous
Injection Site
Simulator

POWERING DISCOVERIES.

Pion

SCISSOR N3

In vitro measurements for *in vivo* insights

SCISSOR N3™ is an advanced *in vitro* subcutaneous injection site simulator designed to accelerate formulation screening and rank-ordering for injectable drug development. It enables scientists to compare candidate formulations early in development using bio-relevant data, helping identify the most promising candidates with confidence.

SCISSOR N3 provides critical insight into how a drug behaves after subcutaneous injection, including its release profile and the impact of excipients. By generating predictive *in vitro* data,[1,2] the platform reduces reliance on less-predictive animal studies - saving both time and development costs.

Injection Types (Formulations)

- Solutions
- Suspensions
- *In situ* forming gels

Modalities (Drug Types)

- Antibodies
- Peptides
- Proteins
- Oligonucleotides
- Small molecules
- Pro-drugs

The Pion Advantage

Biorelevant Solution

Bridge the gap in predicting and comparing how subcutaneous drugs will behave *in vivo*. No animals. No cells. Just an artificial matrix designed specifically to represent human-relevant stresses, *in vitro*.

Accelerate Insights

Animal studies can take 3 months or even up to 9 months for NHPs. SCISSOR provides data in days, accelerating decision making, catching risks early.

Alternative to Animal Testing

Supporting the FDA's strategic plans to reduce animal testing, SCISSOR delivers human-relevant, correlative data validated with monoclonal antibodies.[1,2]

Speed Up. Spend Less

SCISSOR provides human-relevant data, so you can make confident decisions earlier, select the right candidates faster, and avoid costly late-stage failures.

How it Works

SCISSOR is a biorelevant system designed to simulate subcutaneous injection.

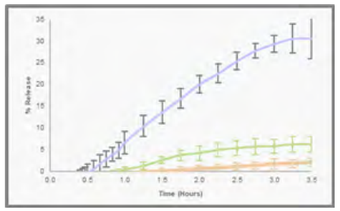
It consists of a cartridge filled with an artificial extracellular matrix that mimics the subcutaneous space, suspended within an outer chamber containing bicarbonate buffer that represents release into the systemic circulation. Injection into the cartridge recreates key *in vivo* stresses, exposing the drug to a simulated subcutaneous environment where potential matrix interactions can occur prior to release into the outer chamber over time. *In vitro* release and injection behavior are monitored using integrated turbidity measurements, imaging, and UV fiber optics, enabling comparison between formulations or drug candidates.

Rainbow R6 and SCISSOR N3

Coupled with the Rainbow R6™ *in-situ* fiber optic UV-vis spectrometer, the platform enables true, real-time, post-injection release data while avoiding the lag and degradation risks of offline analysis. In addition, simulated lymphatic and systemic release data can be measured *in-situ* giving real-time results and enriching the data collection process. Sample aliquots can also be collected with an additional external fraction collector to allow for offline analysis with any preferred analytical method facilitating more in-depth research.

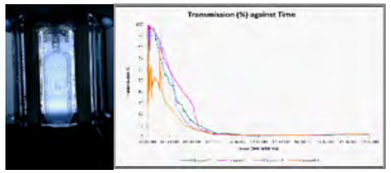
What Data Can the SCISSOR Produce and How Can You Use it?

%Release



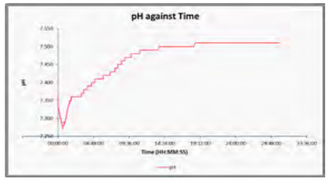
Rank order to understand and compare performance

Images and Turbidity/ Transmission



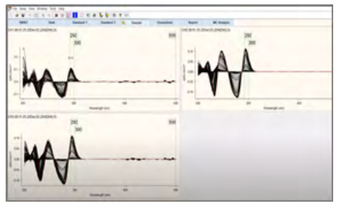
Understand behavior, possible mechanism of release, possible aggregation risk

pH at Injection Site



Understand impact of formulation pH at injection site, possible impact on aggregation risk

Spectral Shift in Rainbow



Can provide additional information of general API stability

Why is this Data Useful?

SCISSOR provides data to predict and understand drug performance, flag failure risks early, and select candidates with greater confidence. The result:

- Less time spent on reformulation
- Faster progression to a final candidate
- Reduced risk of late-stage failure

%Release data alone can't tell the full story; understanding the drivers behind performance enables more confident drug candidate selection.

Technical Specifications

pH range:	4 – 10, +/- 0.05 pH over range
Chamber temperature:	34°C (typical); adjustable over 30 – 40°C
Chamber sizes:	300 mL and 60 mL vessels available
Cartridge size:	5 mL
Temperature stability:	+/- 1.0°C degrees over 24 hours
Temperature equilibration time:	< 1 hour
Camera image capture:	2 images/minute
Pump flow rate:	>25 mL/minute
Fluid transit time:	<30 seconds (chamber to sampling port)
Selectable stirring speeds:	4
LED wavelength:	504nm

Consumables

- SCISSOR Cartridge Packs with ECM (Standard ECM and ECM-XR available)
- SCISSOR Electrode Storage and pH buffer solutions
- Pipette tips for Autoinjector

Option Accessories (to be ordered separately)

- Pion Rainbow R6 UV-Vis Spectrophotometer for real-time %Release quantification
  - Including a UV dip probe for each SCISSOR chamber
  - AuPRO analysis software which can auto-refine and measure multiple APIs in one solution.
- SCISSOR Autoinjector for reproducible injections
- Fraction Collector for taking sample aliquots from the chamber buffer overtime for offline quantification

References

1. Hanafy, B.I., Trayton, I., Sundqvist, M., Caldwell, J., Mody, N., Day, K. and Mazza, M. (2025) 'Predicting human subcutaneous bioavailability of monoclonal antibodies using an integrated *in-vitro/in-silico* approach', *Journal of Controlled Release*, 380, pp. 715–724.
2. Bown, H.K., Bonn, C., Yohe, S., Bumbaca Yadav, D., Patapoff, T.W., Daugherty, A. and Mrsny, R.J. (2018) '*In vitro* model for predicting bioavailability of subcutaneously injected monoclonal antibodies', *Journal of Controlled Release*, 273, pp. 13–20.

Bridging *In Vitro* and *In Vivo*

Predict clinical performance before clinical studies begin. By combining SCISSOR technology with 10+ years of expertise and advanced *in silico* modeling techniques, Pion translates *in vitro* measurements into actionable predictions of *in vivo* outcomes. Delivering **foresight**, not hindsight, so development decisions can be made earlier, faster, and with greater confidence.

PION ANALYTICAL SERVICES

Don't have the time or equipment to do your own assays? Send them to us!

Pion Analytical Services offers the ability to compare, de-risk, and predict your subcutaneous drug performance *in vitro* using the SCISSOR technique.