

Trace ion flux technology for high-throughput screening of ion transporters

Recent advances in automated patch clamp technology have allowed the pharmaceutical industry to perform ultra high-throughput screens on ion channel targets to assess compound efficacy and safety. Although voltage clamp is the gold standard for recording ion channel activity with high temporal resolution, this method can be expensive and technically challenging. Moreover, electrophysiological techniques are not ideal for screening ion transporters, which are therapeutically important but can have little to no measurable current. Aurora's Ion Channel Reader (ICR) series instruments combine atomic absorption spectroscopy with a patented microsampling process to accurately measure ion flux in cell-based screening assays. ICR technology has been widely used for high throughput screening of both voltage-gated (e.g., hERG, Kv1.1, Nav1.5) and ligand-gated (e.g., KATP, nAChR) channels, and offers high sensitivity, generating accurate drug rank order matching electrophysiology data. More recently, flux-based screening has begun to be applied to the study of ion pumps and transporters (e.g., Na⁺/K⁺-ATPase, Cation Chloride Cotransporter). Using the principles of atomic absorbance spectroscopy to measure the absolute concentrations of cytosolic and extracellular ions, this technique is one of the only methods capable of obtaining high throughput activity measurements for electro-neutral ion transporters. Aurora's ICR instruments provide an alternative approach to ion channel and transporter screening that is independent of methods that rely on voltage manipulation.