

Ion Channel Trends 2009



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Executive Summary

- This market report summarizes the results of HTStec's sixth annual global Pharma, Biotech and Academic Research web-based benchmarking survey on ion channels carried out in June 2009.
- The study was initiated by HTStec to meet the specific needs, interests and focus of the survey sponsors. The objectives of this year's study were to better understand respondent's interest and experience of: 1) ion channels investigated, assay technologies and screening metrics; 2) automated patch clamping (APC) systems and in evaluating the new APC systems coming to the market; 3) future requirements for ion channel screening using human embryonic stem cells (HESC); and 4) outsourced ion channel testing services. Equal emphasis was given to soliciting opinion from Pharma, Biotech and Academic Research segments, in both North America and Europe.
- The survey looked at the following aspects of ion channel testing, as practiced today (2009) and in some cases as predicted for the future (2011): interest in different classes of ion channels; ion channel activities undertaken; technologies used to study ion channels in different areas of drug discovery; number of ion channel targets or programs under investigation; areas where ion channels assays are increasing; number of ion channel primary screens and data points per screen; typical hit rates for primary screening; use of pools of compounds; impressions gained using different APC systems for a list of variables; importance users attach to these variables when working with APC systems; future plans to purchase new APC systems; interest in using emerging microfluidic approaches; plans to investigate new APC systems coming to the market; importance given to APC software capabilities; opinion on population patch recordings; interest in using HESC; thoughts on accessing HESC; ion channel measurements using HESC and cell type of greatest interest; opinion on HESC assays and applications; interest in accessing some new ion channel products and services; interest in electrical recordings of field potentials in brain slices; most trusted and most used fee-for-service providers; and annual ion channel testing budgets for in house consumables; CAPEX purchases (instruments); and outsourced testing at fee-for-service providers.
- The survey questionnaire consisted of 28 multi-choice questions and 3 open-ended questions. In addition, there were 7 questions related solely to survey demographics. The survey collected 119 responses (83 complete and 36 partially filled out) from 83 different organisations.
- Survey responses were geographically split: 49% Europe; 31% North America, 8% Japan; 7% Rest of World; and 6% Asia (Excluding Japan).
- Survey respondents were drawn from persons or groups actively involved in ion channel screening, selectivity profiling and safety assessment against ion channel liabilities in house, as well as persons involved in outsourcing these activities to fee-for-service providers. Most respondents were also highly experienced users of APC systems.
- Respondents came from 32 different University/Research Institute/Government Labs; 32 Medium-Small Pharma & All Biotech; 11 Large Pharma; 5 CRO; 3 Other; and 1 Agrochemical Company.
- Survey respondents represented: 31 Labs with Multiple Drug Discovery Roles; 16 Assay Development Labs; 16 Life Science Research Labs; 13 Basic Research Labs; 10 Secondary Screening Labs; 7 Therapeutic Area (Target Identification/Validation) Labs; 7 Safety Assessment (e.g. hERG Compliant Assays etc.) Labs; 6 Hits-To-Leads (Lead Optimization) Labs; 5 Compound Profiling Labs; 4 Primary Screening (HTS) Labs; 3 Other Labs; and 1 Early Non-Compliant hERG Liability Testing Lab.
- Most survey respondents had a senior job role or position which was in descending order: 25 Research Scientist; 19 Senior Scientist/Researcher; 18 Section/Group Leader; 12 Director; 11 Principal Investigator; 10 Other Roles; 7 Professor; 6 Post-doc; 6 Lab Manager; 4 Department Head; and 1 VP.
- Survey results were expressed as an average of all survey respondents. In addition, where appropriate the data was reanalyzed after sub-division into the following 5 survey groups: 1) Large Pharma; 2) Medium/Small Pharma & All Biotech; 3) Univ. Res. Inst. & Gov't Lab; 4) Europe; and 5) North America.
- The class of ion channels of most interest to respondents was voltage-gated sodium channels.
- Of the ion channel activities undertaken in house most respondents were carrying out screening of lead compounds against specific ion channel targets.
- The main assay technologies used in house to study ion channel targets in drug discovery were: manual patch clamping in target identification/validation; APC systems in primary screening of focused/targeted libraries, secondary screening, hits-to-leads, compound profiling, early non-compliant hERG liability testing, and safety assessment (e.g. hERG compliant assays); and fluorescent-based ion flux assays in assay development and primary screening of full diversity libraries.

- 3 ion channel programs was the median number under investigation in respondent's organisations. Increases in the number of ion channels assayed are predicted for primary and secondary screening.
- The median number of ion channel primary screens undertaken in 2009 was 2. The median number of data points per primary screen was 50K to 100K.
- The median recorded hit rate for focused and full diversity libraries was 1%–5% and 0.1%–1% respectively. Around 1 in 10 of screens used compound pools.
- With respect to respondents current experience of APC systems the following received the highest ratings: Cellectricon Dynaflo Pro II for: patch success rates; longevity of the recording; suitability for kinetics; reproducibility; seal resistance; and system maintenance; Nanion NPC–1 Port–A–Patch for: ease of assay optimization; amplifier capability & performance; instrument cost; and cost per data point; Nanion NPC–16 Patchliner for: suitability for any cell type; MDS Ionworks Quattro: for throughput; Sophion QPatch16 for: software ease of use; and included analysis software; Sophion QPatch HT; for system reliability.
- Patch success rates were ranked the most important system variable when using APC systems.
- The APC systems respondents expressed greatest interest in purchasing over the next few years were Nanion NPC–16 Patchliner, Nanion NPC–1 Port–A–Patch, and Sophion QPatch HTX.
- The majority viewpoint on using emerging microfluidic APC approaches (i.e. Fluxion and Cellectricon) was low, i.e. considering pilot studies with a view to adoption.
- A significant proportion of respondents have an active in-house technology evaluation program to investigate the new APC systems coming to the market, with greatest interest shown for evaluating the Fluxion IonFlux HT and Nanion SyncroPatch 96.
- Simple set-up of routine screens was rated as the APC software capability of greatest importance.
- With respect to population patch recordings most respondents expressed a willingness to accept lower seal resistance for the improved consistency and success rates of population recordings.
- The majority viewpoint on using HESC in ion channel services and research was low, i.e. considering pilot studies with a view to adoption. Most respondents want to measure currents in HESC and plan to access this capability primarily by in house purchase. Neurons were the HESC cell type respondents had greatest interest in using/accessing.
- Respondents see HESC assays and applications principally focused around disease models, with the largest impact expected here, and they are not sure if genetic variation is an issue or desirable.
- Respondents feedback on: 1) novel ion channel applications or assays that will be enabled using HESC; 2) specific applications or assays that improved cell model technologies (e.g. using HESC) would replace or augment; and 3) the assay validation required when using HESC; are documented.
- From a list of potential new ion channel products respondents showed most interest in accessing large scale quantities of cryopreserved cells expressing an ion channel of interest.
- Little interest was shown in sending out large screening decks for outsourced Flipr ion channel assays, irrespective of CRO location.
- Most respondents were not likely to adopt electrical recordings of field potentials from brain slices.
- The most trusted and most used fee-for-service provider of ion channel testing was ChanTest.
- The median 2009 annual budgets for ion channel testing were: \$50K–\$100K for in house consumables; \$50K–\$100K for CAPEX purchases (instruments); and none for outsourced testing at fee-for-service providers.
- A bottom-up model was developed around the respondent's budgets to estimate the global Pharma & Biotech market for ion channel testing. The total market in 2009 was estimated to \$106M for in house consumables, the majority of which was APC patch plates; \$76M for CAPEX purchases (instruments); and \$45M for outsourced testing at fee-for-service providers, with greatest expenditure on profiling of lead compounds against a panel of ion channel targets. Where appropriate these markets were broken down, segmented and CAGR estimates for 2011 made.
- The full report provides the data, details of the breakdown of the responses for each question and the estimates for the future (2011). It also highlights several interesting differences between the survey groups.

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General Information on HTStec and HTStec's Trends Market Reports

- HTStec Limited an independent market research consultancy founded in September 2003 whose focus is on assisting clients delivering novel enabling platform technologies (liquid handling, laboratory automation, detection instrumentation and assay reagent technologies) to drug discovery and the life sciences. Over the past 6 years HTStec has published nearly 50 market reports mainly on drug discovery technologies and authored 28 review articles in Drug Discovery World.
- HTStec's Trends reports owe their origins to the need by developers and vendors of new enabling technologies in drug discovery to get up-to-date relevant market metrics on which to base informed business decisions.
- Typically focused on a specific market niche or segment, in many cases overlooked or frequently misunderstood by broader market studies.
- Investigations are mainly initiated in response to a sponsor's specific requests.
- HTStec's extensive experience of the market, both as a Pharma End-User and working for a major Life Science Tool Provider ensures the industry relevance of the market research collected.
- Based entirely on web-based feedback from potential customers typically drawn mainly from Pharma and Biotechs, although increasingly University and Research Institute labs are also being researched.
- Produced extremely rapidly and typically published within 3 weeks of starting the collection phase.
- Reports are short, concise and focused on giving readers the basic data, analyzed in several different ways.
- Limited to reporting the main findings alone, without exhaustive discussion on the relevance of the results.
- Market estimates are mainly based on bottom-up calculations and usually avoid attempts to forecast widely beyond the next 2-3 years. Full details on the derivation of market estimates are given so readers can apply their own factors and easily make alternative estimates if they prefer or know better.
- Owing to the sensitivity of some of the data collected, all reference to the origin of participating companies is removed, data is pooled to get an industry average and the anonymity of all respondents fully preserved and guaranteed.
- Unlike alternatives HTStec's Market Surveys and Report are aimed at giving readers, information they want and can rely on, not information they don't need, cannot easily discern or is of dubious authenticity.
- HTStec aims to be the premier global provider of highly focused market research on enabling technologies in drug discovery.
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