3D Cell Culture Trends 2011

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Conditions Under Which This Market Report Is Sold

Executive Summary

- This market report summarizes the results of HTStec's second industry-wide global web-based benchmarking survey on three dimensional (3D) cell culture carried out in October 2011.
- The study was initiated by HTStec as part of its ongoing tracking of fast moving life science technologies and marketplaces and to update its previous report (published February 2010).
- The main objectives of this study were to comprehensively document current interest in, experience of and progress made in applying 3D cell culture techniques in academic research, drug discovery and tissue engineering/regenerative medicine settings, and to understand their future requirements.
- The survey looked at the following aspects of 3D cell culture as practiced to date (2011) and in a few cases as predicted for the future (2014): current level of awareness with 3D cell culture; current level of adoption (% use) of 3D cell culture methods; areas where interest in 3D cell culture is primarily focused; main applications of 3D cell culture; opinion on statements about 3D cell culture; most important advantages of 3D cell culture; approaches that have demonstrated most promise to date in facilitating 3D cell culture; coverglass or microplate format compatibility requirements; interest in different 3D scaffold properties; different cell types used for 3D cell culture work; typical size of an assay or project planned with a 3D matrix or scaffold; number of different 3D assay wells expected to be setup or processed in 2012; where 3D cell culture will make the biggest impact over the coming years; assay types successfully demonstrated using cells within a 3D matrix; the most important tasks to automate in 3D cell culture; opinion on statements related to automating 3D cell culture; awareness of approaches/platforms used for the automation of 3D cell culture and tissue production/fabrication; interest in outsourcing 3D cell culture; interest in purchasing some 3D derived products or services; interest in 3D organotypic microtissue models; level of success achieved with 3D cell culture; realistic adoption period for a new 3D scaffold; main barriers to the adoption of a new 3D matrix; % of cell culture scientists likely to have switched from 2D to 3D cell culture by 2015; budget for 3D cell culture consumables and its breakdown into components; factors most influencing future purchasing of 3D cell culture-related products; 3D scaffolds or formats most likely to be purchased; suppliers of consumables and/or instruments that first come to mind and those most purchased from; budget allocation to purchase new equipment to enable 3D culture; and unmet needs in 3D cell culture or microtissues today.
- The main questionnaire consisted of 29 multi-choice questions and 2 open-ended questions. In addition, there were 4 questions related solely to the administration of survey.
- The survey collected 146 validated responses, of these 60% provided comprehensive input.
- Survey responses were geographically split: 42% Europe; 40% North America; 8% Rest of World; 6% Asia (Excluding Japan); and 4% Japan.
- Respondents came from 85 University/Research Institute/Not-for-Profit Facilities; 24 Pharmaceutical Companies; 19 Biotechs: 6 Hospitals/Clinics/Medical Schools; 4 Government/Military/Defense Facilities; 3 Fee-For-Service Providers/CROs; 2 Other Organizations; 2 Diagnostics Companies; and 1 Cosmetics Company.
- Most survey respondents had a senior job role or position which was in descending order: 30 research scientists; 24 senior scientists/researchers; 20 professors/assistant professors; 12 post docs; 11 section /group leaders; 9 directors; 8 others; 6 department heads; 5 lab managers; and 1 vice president.
- Respondents represented labs with the following main activities: 44 cancer research; 22 basic research; 20 drug discovery; 15 regenerative medicine; 13 tissue/organ engineering; 11 stem cell biology; 9 preclinical research/ADMET; 6 cell therapy; 4 other; 1 developmental biology; and 1 clinical research.
- Survey results were expressed as an average of all survey respondents. In addition, were appropriate the data was reanalyzed after sub-division into the following 5 survey groups: 1) Academic Research; 2) Pharma & Biotech; 3) Tissue Engineering & Regenerative Medicine; 4) Europe; and 5) North America.
- Only 45% of respondents were fully aware of 3D cell culture and all its benefits.
- The median level of adoption of 3D cell culture was to a limited extent (i.e. <25% of all cell culture work).
- The main application investigated using 3D cell culture was cell-to-cell or cell-to-matrix interactions.
- The level of agreement with some statements about 3D cell culture and 3D automation was recorded.
- More realistic cell biology and function was rated the most important advantage of 3D cell culture.
- Biomimetic scaffolds were ranked as the approach that had demonstrated most promise to date in facilitating 3D cell culture.
- The 3D scaffold format most wanted was compatibility with the 96-well microplate.

- The requirements for 3D scaffolds with different types of properties were recorded.
- Greatest use was made of primary cells and transformed or recombinant cell lines in 3D cell culture work today (2011).
- The median typical size of an assay or project in 3D cell culture was 50 assay wells.
- The median expected volume of 3D cell culture work in 2012 was 200 assay wells.
- Model development/tissue modeling was rated the application area where 3D cell culture is expected to make the biggest impact.
- The assay type most used/investigated in a 3D cell culture matrix today (2011) was cell proliferation.
- Respondent feedback on the most important tasks to automate with 3D cell culture and the challenges they pose for automation were documented.
- The approaches to the automation of 3D cell culture respondents had greatest awareness of were: 3D Biomatrix's Perfecta3D™ hanging drop 384-well plates; 3D Biotek's 3D Insert™-PCL 96-well plate compatible scaffolds; and Hamilton BioLeviator™ & Global Cell Solutions magnetic microcarrier-based GEM™ system.
- Only a minority of respondents have outsourced 3D cell culture or related activity to date (2011).
- Ready-made kits for specific cell-based assays developed within a 3D matrix were the 3D derived product or service respondents were most interested in accessing.
- A list of 3D organotypic microtissue models respondents would like to see offered for sale was recorded. Primary and secondary interest in specific microtissues was gauged with respect to organ or tissue type, species source, disease status required, and a reasonable price for 96 microtissues.
- Most respondents rated their success achieved with 3D cell culture as moderate (i.e. some improvement over 2D).
- The median realistic adoption period for a new 3D scaffold was 9-12months.
- Limited ability to image or assay or process cells was rated as the main barrier to the adoption of a new 3D matrix.
- A median of 30% of cell culture scientists are predicted to have switched from 2D to 3D cell culture by 2015.
- The median budget allocated for spending on 3D cell culture consumables today (2011) was $10K-$25K. The biggest proportion of this budget was allocated to microplates.
- A bottom-up model was developed around the respondent's spending on 3D cell culture consumables to estimate the global market. In 2011 this market was estimated to be around $34M. Segmentation and CAGR estimates are given in the full report.
- Internal data proving added value of 3D versus 2D cells was rated as the factor that will most influence the purchasing of 3D cell culture related products.
- The commercial 3D scaffold or format offering respondents were most interest purchasing was a 3D scaffold supplied separately, ready to be added to the culture vessel of choice.
- The supplier of consumables and/or instruments that first comes to the mind of respondents when they think of 3D cell culture was BD Biosciences.
- The commercial suppliers that respondents have most purchased 3D cell culture consumables and/or related instruments from were BD Biosciences, Life Technologies and Corning, together these 3 suppliers had more than 50% market share.
- The maximum likely median budget allocation to buy new equipment to perform 3D cultures, microtissue production or fabrication would be $25K-$50K/lab.
- Feedback on some unmet needs in 3D cell culture or microtissues were documented.
- The full report provides the data, details of the breakdown of the responses for each question, its segmentation and the estimates for the future (2014). It also highlights some interesting differences in the survey groups, particularly between Tissue Engineering & Regenerative Medicine versus Academic Research or Pharma & Biotech groupings.

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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. HTStec's initial focus was on assisting clients delivering novel enabling platform technologies (liquid handling, laboratory automation, detection instrumentation, assay reagent technologies etc.) to drug discovery. This is now been extended to include broader coverage of new bioassay technologies across the life sciences.
- Over the past 9 years HTStec has published more than 75 market reports on drug discovery technologies and authored over 40 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 initiated both in response to a sponsor's specific requests or speculatively as part of HTStec's tracking of fast-moving or emerging marketplaces.
- 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 drawn mainly from Pharma and Biotechs, although increasingly University, Academic and Research Institute labs are participants.
- Produced extremely rapidly and typically published within 3 weeks of starting the collection phase.
- Reports are short (around 50 pages), 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 any market estimates are given so readers can apply their own factors and easily make alternative estimates if they prefer.
- 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.
- Critically HTStec's Trends reports have generated much interest and acclaim amongst survey respondents, to whom they are made available free of charge (subject to acceptance of HTStec's copyright terms) so they can benchmark their internal processes.
- 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 niche market research on enabling technologies in drug discovery and the life sciences.

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