AVEO PHARMACEUTICALS INC
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AVEO Pharmaceuticals, Inc.

Prospectus Supplement No. 1 Dated December 1, 2010

To the Prospectus Dated November 10, 2010

4,500,000 shares

Common Stock

We are supplementing the prospectus included in the Registration Statement on Form S-1 dated November 10, 2010, which was declared effective by the Commission on November 23, 2010. The information contained herein supplements information set forth in the prospectus, including without limitation under the captions Management s Discussion and Analysis of Financial Condition and Results of Operations Strategic Partnerships and Business Strategic Partnerships . This prospectus supplement is not complete without, and may not be delivered or utilized except in connection with, the prospectus, including any amendments and supplements thereto.

Investing in our common stock involves risks. See Risk Factors beginning on page 7 of the prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus supplement is truthful or complete. Any representation to the contrary is a criminal offense.

The prospectus, including without limitation the information concerning our license agreement with OSI Pharmaceuticals, Inc. (OSI) set forth under the captions Management s Discussion and Analysis of Financial Condition and Results of Operations Strategic Partnerships and Business Strategic Partnerships is supplemented as follows:

On December 1, 2010, the Company issued the following press release announcing that OSI had exercised its option under the parties July 2009 agreement to obtain a non-exclusive, perpetual license to certain elements of the Company s propriety technology platform and that OSI will pay the Company $25 million in license expansion fees:

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OSI Pharmaceuticals, Inc. Exercises Option under Discovery and Translational

Research Collaboration with AVEO

Option Triggers $25 Million in Milestone Payments to AVEO

MELVILLE, NY/TOKYO, JAPAN and CAMBRIDGE, MASS., December 1, 2010 OSI Pharmaceuticals, Inc., (OSI), which is a wholly owned subsidiary of Astellas U.S. Holding Inc., a holding company owned by Astellas Pharma Inc., and AVEO Pharmaceuticals, Inc. (NASDAQ: AVEO) today announced that OSI has exercised its option under the parties July 2009 agreement providing the right for OSI to internalize certain elements of AVEO s proprietary technology platform, including components of the Human Response Platform (HRP) for the identification/characterization of novel epithelial-mesenchymal transition (EMT) agents and proprietary patient selection biomarkers, in support of OSI s clinical development programs. Under the terms of the agreement, OSI will pay AVEO $25 million in license expansion fees; $12.5 million was paid upon delivery of the notice of option exercise and $12.5 million will be paid following the successful transfer of the applicable technology from AVEO to OSI. The transfer is expected to be completed in July 2011.

OSI s collaboration with AVEO has demonstrated the significant value the company s Human Response Platform and related insights provide to us for exploiting the biology of epithelial-to-mesenchymal transition, or EMT, stated Naoki Okamura, chief executive officer of OSI Pharmaceuticals. Incorporating certain elements of the AVEO platform and bioinformatics capabilities in-house will enable us to further differentiate our approach to the discovery, development and commercialization of novel new medicines for the treatment of cancer.

We are delighted to be a collaborator with OSI, and this milestone further demonstrates the unique insights and value AVEO s novel cancer biology platform brings to cancer drug development, stated Tuan Ha-Ngoc, president and chief executive officer of AVEO Pharmaceuticals. We believe our proprietary platform has enabled AVEO to build a unique profile in the biotech sector, and we will

continue to leverage our platform both in support of select strategic partnerships and to further develop our internal pipeline. With our two lead product candidates advancing in clinical development and a strong vision for the future, we are well positioned to execute on our strategy of becoming a fully integrated cancer therapeutics company.

Background on the OSI/AVEO Alliance

The July 2009 agreement was an expansion of the drug discovery and translational research collaboration announced in October of 2007. The alliance between AVEO and OSI has been anchored around developing molecularly targeted therapies to target the underlying mechanisms of EMT in cancer and to develop patient selection biomarkers to support OSI s targeted medicine pipeline. EMT is a process of emerging significance in tumor growth and disease progression and a focal point of discovery and translational research in oncology drug development. The companies expanded their efforts in 2009 to validate cancer targets and to deploy key elements of AVEO s proprietary HRP translational research platform in support of OSI s ongoing clinical development programs.

About EMT Research at OSI

EMT and its reverse, Mesenchymal-to-Epithelial transition (MET), are important phenomena in developmental biology that are increasingly associated with tumor biology. EMT is thought to be a marker of tumor progression, with tumors that express mesenchymal markers having a greater tendency to be invasive and metastasize than those tumors only expressing epithelial markers. OSI s interest in EMT derived from its translational research efforts into better understanding which patients optimally benefit from therapy with the company s flagship product, Tarceva® (erlotinib). Because mesenchymal tumor cells co-opt different sets of oncogenic signaling pathways, EMT targets represent a novel therapeutic opportunity in an area of significant unmet medical need. OSI has surmised that understanding and targeting the dynamic biological processes of EMT has offered it the opportunity to establish a highly differentiated, industry leading position as the organization best able to capitalize on this emerging field of oncology research. The company has focused its oncology research on discovering and validating EMT related targets; developing novel therapies and combinations of therapies against these EMT targets; developing specialized models that recapitulate EMT processes; and identifying and validating biomarkers to support these programs. The company believes that developing a differentiated and industry leading technology platform for its oncology research efforts is an essential component in establishing the strategic value of OSI s oncology franchise.

About AVEO s Human Response Platform (HRP)

For decades, the standard preclinical model for testing the efficacy of novel oncology drug candidates has been the human tumor xenograft model. However, well-known challenges with these models include the artificial nature of the implanted tumor cells, which have adapted for growth in culture as opposed to an *in vivo* environment that would most closely mimic tumor activity in humans. Despite the low success rate of oncology products in clinical development in part due to the high rate of false positives associated with this method of testing xenografts are used broadly throughout the industry because no better model system has been available to more accurately predict success in the clinic.

AVEO s HRP is designed to meet and overcome these challenges. HRP is based on the company s proprietary, genetically-defined *in vivo* models of human cancer, in which each model is engineered to contain signature genetic mutations that are present in human disease. Beyond these cancer-initiating engineered mutations, the resultant tumors acquire common and distinct spontaneous mutations during tumor progression. These mutations provide additional natural genetic variation more akin to the range of genetic heterogeneity encountered across different primary human tumors. The tumor-to-tumor

genetic variation in the system provides the opportunity to identify genetic correlations between responding and non-responding tumor populations, and to apply such genetic profiles in clinical development.

About OSI Pharmaceuticals, Inc.

OSI Pharmaceuticals is committed to shaping medicine and changing live by discovering, developing and commercializing high-quality, novel and differentiated targeted medicines designed to extend life and improve the quality of life for patients with cancer and diabetes/obesity.

In June, 2010, OSI Pharmaceuticals, Inc. became a wholly owned subsidiary of Astellas US Holding, Inc. which is part of the Astellas US group of companies (Astellas). For additional information about OSI, please visit http://www.osip.com.

About AVEO

AVEO Pharmaceuticals (NASDAQ: AVEO) integrates a proprietary cancer biology platform with drug development and commercial expertise in its efforts to discover and develop targeted cancer therapeutics. The company s lead product candidate, tivozanib, is an oral, triple VEGF receptor inhibitor with a highly differentiated profile. Tivozanib is currently being investigated in a global, randomized Phase 3 clinical trial called TIVO-1 comparing tivozanib to sorafenib in advanced kidney cancer, as well as additional clinical studies in other solid tumor types. AVEO s second most advanced product candidate, AV-299, is a potent, functional anti-HGF antibody that is currently in Phase 2 development. AVEO s proprietary, integrated cancer biology platform offers the company a unique advantage in oncology drug development and has provided a discovery engine for high-value targets. This approach has resulted in a promising pipeline of monoclonal antibodies against novel targets including HGF, ErbB3, RON, Notch and FGFR. For more information, please visit the company s website at www.aveopharma.com.

Forward-Looking Statements

Any statements in this press release about AVEO s future expectations, plans and prospects, including the expected timing of transfer of technology from AVEO to OSI and the associated receipt of the payment from OSI, the potential for AVEO s cancer biology platform to offer benefits in oncology drug development, including exploiting the biology of EMT; AVEO s potential ability to leverage its cancer biology platform to consummate strategic partnerships and further develop its pipeline AVEO s belief that it is well positioned to execute on its strategy of becoming a fully integrated cancer therapeutics company, and other statements containing the words believes, anticipates, plans, expects, will and similar expressions, constitute forward-looking statements within the meaning of The Private Securities Litigation Reform Act of 1995. Actual results may differ materially from those indicated by such forward-looking statements as a result of various important factors, including risks relating to: AVEO s ability to successfully transfer the requisite technology to OSI under its collaboration with OSI; AVEO s ability to successfully research, develop and obtain and maintain regulatory approvals for its product candidates; negative results from its preclinical and clinical trials; AVEO s inability to obtain and maintain adequate protection for intellectual property rights relating to its product candidates and technologies; unplanned operating expenses; AVEO s inability to raise substantial additional funds to achieve its goals; competition; general economic and industry conditions; and other factors discussed in the Risk Factors section of AVEO s most recent Form 10-Q filed with the Securities and Exchange Commission, and in other filings that AVEO periodically makes with the SEC. In addition, the forward-looking statements included in this press release

represent AVEO s views as of the date of this press release. AVEO anticipates that subsequent events and developments will cause its views to change. However, while AVEO may elect to update these forward-looking statements at some point in the future, AVEO specifically disclaims any obligation to do so. These forward-looking statements should not be relied upon as representing AVEO s views as of any date subsequent to the date of this press release.

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