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ARCA BIOPHARMA SIGNS GLOBAL RIGHTS AGREEMENT WITH LARGE PHARMA COMPANY FOR ONE OF ARCA'S EARLY STAGE ASSETS

Broomfield, CO, May 3, 2011 – ARCA biopharma, Inc. (Nasdaq: ABIO), a biopharmaceutical company developing genetically-targeted therapies for cardiovascular diseases, today announced that it has entered into an agreement with Novartis pursuant to which Novartis is acquiring global patent rights to an undisclosed molecular target. ARCA will receive an upfront payment of \$2.0 million and is eligible to receive clinical, regulatory and commercial milestones totaling \$17.5 million. Additional terms of the transaction were not disclosed.

ARCA is also currently seeking or evaluating business development opportunities for multiple additional compounds in various stages of development which are outside the Company's core focus area of cardiovascular disease. These business development efforts do not include ARCA's lead compound, GencaroTM (bucindolol hydrochloride), which is being developed for cardiovascular disease and for which the Company is seeking strategic partners.

About ARCA biopharma

ARCA biopharma is dedicated to developing genetically-targeted therapies for cardiovascular diseases. The Company's lead product candidate, GencaroTM (bucindolol hydrochloride), is an investigational, pharmacologically unique beta-blocker being developed for atrial fibrillation and heart failure. ARCA has identified common genetic variations that it believes predict individual patient response to Gencaro, giving it the potential to be the first genetically-targeted atrial fibrillation prevention and/or heart failure treatment. ARCA is collaborating with Laboratory Corporation of America to develop the companion genetic test for Gencaro.

For more information please visit www.arcabiopharma.com.

Safe Harbor Statement

This press release contains "forward-looking statements" for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. These statements include, but are not limited to, statements regarding the ability of genetic variations to predict individual patient response to Gencaro and the potential for Gencaro to be the first genetically-targeted atrial fibrillation prevention and/or heart failure treatment. Such statements are based on management's current expectations and involve risks and uncertainties. Actual results and performance could differ materially from those projected in the forward-looking statements as a

result of many factors, including, without limitation, the risks and uncertainties associated with: the Company's financial resources and whether they will be sufficient to meet the Company's business objectives and operational requirements; the protection and market exclusivity provided by the Company's intellectual property; risks related to the drug discovery and the regulatory approval process; and, the impact of competitive products and technological changes. These and other factors are identified and described in more detail in ARCA's filings with the SEC, including without limitation the Company's annual report on Form 10-K for the year ended December 31, 2010 and subsequent filings. The Company disclaims any intent or obligation to update these forward-looking statements.

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