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**ARCA BIOPHARMA RECEIVES COMPLETE RESPONSE LETTER FROM FDA ON
THE GENCARO™ NDA**

Broomfield, CO, June 1, 2009 – ARCA biopharma, Inc. (Nasdaq: ABIO) announced today that it received a Complete Response letter from the U.S. Food and Drug Administration (FDA, or the Agency) for its New Drug Application (NDA) seeking approval for Gencaro™ (bucindolol hydrochloride) for the treatment of patients with chronic heart failure.

In its Complete Response letter, the FDA states that it cannot approve the NDA in its current form and specifies additional actions and information required by the Agency for approval of the Gencaro NDA. The Agency acknowledges that several substantial amendments to the NDA submitted by the Company in May 2009 were not reviewed or considered by the FDA in issuing the Complete Response letter, and that these amendments may be referenced in the Company's response to the Complete Response letter. These unreviewed submissions deal with comparative effectiveness, clinical pharmacology, some aspects of pharmacogenetic data, and toxicology/metabolism.

Among other things, the Complete Response letter states that the Company must undertake the following actions to obtain approval:

- Conduct an additional clinical efficacy trial of Gencaro in patients with heart failure;
- Conduct additional clinical pharmacology studies to address drug-drug interaction and pharmacokinetic issues; and,
- Conduct additional non-clinical studies to further characterize Gencaro metabolites.

In its Complete Response letter, FDA asserts that the BEST clinical study, which serves as the pivotal Phase III trial for the application, does not adequately demonstrate efficacy of Gencaro in reducing all-cause mortality in patients with heart failure. The letter raises concerns regarding the integrity of the BEST data based on its audit of certain clinical sites involved in the BEST trial, which may require an independent audit of additional clinical sites and other actions to verify the integrity of the data. In addition, the Complete Response letter raises concerns as to the statistical significance of some of the pharmacogenetic data relied upon by the Company to assert that individual patient response to Gencaro may be predicted by genotype.

The Company believes that data and information submitted to FDA in May 2009, which the Agency acknowledges were not reviewed before sending the Complete Response letter, may

address several of the deficiencies raised by FDA and may limit the need for some of the actions specified in the letter. In particular, ARCA believes a submitted comparative effectiveness analysis demonstrates that Gencaro is as effective in reducing all-cause mortality as other β -blocker therapies, when comparable patient populations are analyzed. In addition, the May 2009 submissions to FDA included two of the requested clinical pharmacology studies, plus non-clinical data and designs of ongoing preclinical studies that were specified by FDA in the Complete Response letter. ARCA also submitted a response to some of the pharmacogenetic issues in the May amendments and plans to conduct additional analyses in response to the Agency's letter.

"The Company is reviewing the Complete Response letter and plans to discuss it with FDA as soon as possible," said Michael R. Bristow, Founder and Chief Science and Medical Officer ARCA. "We appreciate FDA's review of the NDA and will continue to work with FDA to resolve the issues raised in the Complete Response letter."

About ARCA biopharma

ARCA biopharma, Inc. is dedicated to developing and commercializing genetically targeted therapies for heart failure and other cardiovascular disease. The Company's lead product candidate, GencaroTM (bucindolol hydrochloride), is an investigational, pharmacologically unique beta-blocker and mild vasodilator being developed for heart failure and other indications. 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 heart failure treatment. The New Drug Application for approval of Gencaro for the indication of chronic heart failure, including the proposed brand name, was filed in September 2008. On May 29, 2009, ARCA received a Complete Response letter from the FDA. 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 timing and outcome of regulatory review and approval of the Company's New Drug Application for Gencaro; the prospects for ARCA's providing sufficient information in a timely manner as requested in the FDA's Complete Response letter; and, the company's ability to fund future operations. 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 company's ability to complete a strategic transaction to support the potential commercialization of Gencaro, if approved and/or obtain additional financing; the timing and outcome of the FDA's review of the company's New Drug Application for Gencaro, the company's ability to further identify, develop and achieve commercial success for products and technologies; drug discovery and the regulatory approval process; clinical development processes; relationships with strategic partners and dependence upon strategic partners for the performance of critical activities under collaborative agreements;

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, 2008, the company's quarterly report on Form 10-Q for the quarter ended March 31, 2009 and subsequent filings. We disclaim any intent or obligation to update these forward-looking statements.

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