



## **Motif BioSciences, Inc.**

*A discovery engine offering best-in-class, novel therapeutic agents and personalized medicine solutions for the pharmaceutical and diagnostics industry*

### ***Background***

Motif BioSciences was founded as a population genetics and personalized medicine company with a mission to discover disease genes and biomarkers for diseases based on carefully planned and conducted studies of specialized populations. Over the past two years, Motif's studies of populations in the MENA region have yielded significant discoveries in the form of novel genomic regions associated with Type 2 diabetes, hypertension, and obesity, validating the Company's scientific approach. The Company is currently in the process of strengthening the intellectual property on these discoveries prior to licensing them out to pharmaceutical and diagnostics companies.

Motif has recently expanded its scientific focus and business model from a population genetics company into a discovery engine offering personalized medicine solutions and novel therapeutic agents and diagnostics for the pharmaceutical industry. The Company plans to take advantage of the radical shift in the pharmaceutical industry's model of drug discovery towards an increasing reliance on in-licensing from small biotech companies to support its pipeline. This shift presents numerous opportunities for smart new players such as Motif in the drug discovery arena:

- firstly, the number and value of licensing-in transactions from small biotech to major pharma companies is growing rapidly;
- secondly, industry consolidation has resulted in our ability to recruit highly experienced senior management talent;
- thirdly, the advent of low cost outsourcing companies in Asia and Eastern Europe with proven expertise in chemistry and other disciplines has made it possible for Motif to enter the field of drug discovery without having substantial internal infrastructure or resources.

### ***A World Class Team***

Motif has assembled the "A" team of drug discovery: senior drug discovery and development executives who have spent decades at the world's leading pharmaceutical companies successfully developing major new drug classes.

They include: Malcolm MacCoss, ex Senior Vice President, Chemistry, Schering Plough and Merck, inventor on 93 patents; James MacDonald, ex Senior Vice President, Toxicology, Schering Plough; John Amatruda, ex Senior Vice President, Clinical Development, Merck;

Nicholas Livingston, ex Vice President, Biology, GSK; Euan MacIntyre, ex Vice President, Pharmacology, Merck; Matthew Wyvratt, ex head of Medicinal Chemistry, Merck; Jerry Skotnicki, ex head of External Chemistry, Wyeth; and P. Kalyanaraman, ex Senior Patent Counsel, Schering Plough.

Blockbuster drugs whose development this team has been closely involved in include: Januvia; Zetia; Vytorin; Zocor; Cozaar; Zestril; Vasotec with combined peak annual revenues of over \$20 billion.

The caliber, track record and vast experience of the Motif team, and their close involvement in guiding every step of the plan, make this a powerful engine for drug discovery. Motif intends to leverage the experience of this team in selecting only projects with a very high probability of success, in managing each project in a highly dynamic and efficient manner to expedite drug discovery and early development.

### ***Priority Projects***

Motif has completed preliminary work on five projects in Migraine; Obesity; Infectious Disease; Over Active Bladder, and Rheumatoid Arthritis, based on the criteria and approach described below. Each project is based on a well established lead compound, with clearly defined and addressable liabilities, and with a well articulated rationale and plan to develop a Best-in-Class New Drug Candidate to Proof of Concept within four years.

### ***Research Approach***

Motif will leverage and replicate the experience of our team over several years in Lead Hopping and the successful development of major drug classes in hypertension and Type 2 diabetes. Essentially, we will build on the work of pharmaceutical companies in the early stages of drug discovery, including target identification and validation, high throughput screening of compound libraries to identify leads, and lead optimization. At this stage, lasting 4-5 years, companies usually file patent applications on their new chemical entities, and proceed to pre-clinical development, validation in man and clinical development.

Typically, early chemical structures and new chemical entities contain flaws in their molecular structure, biological properties, or pharmacokinetic profile, and these are associated with clinical liabilities such as inadequate dosage flexibility, sub-optimum efficacy, molecule based toxicity etc. Experience over several years and across multiple therapeutic classes suggests that the first-in-class drug is rarely the best-in-class drug that enjoys superior performance in the market. Motif's approach will be to screen first-in-class drugs or other early chemical structures that have proof of concept in man but also have clearly defined and addressable liabilities.

Our goal is to develop potential best-in-class new compounds where: a) there is a validated target, b) the chemistry is tractable, c) proof of concept of the mechanism in man has already been established, d) there is the potential for meaningful clinical differentiation versus the first in class drug, and e) there is IP freedom to operate. By rigorously applying these criteria, we believe we can greatly increase the probability of success of each of our projects.

Motif will file patents on new chemical entities, conduct all necessary studies including toxicology and drug metabolism, and conduct first-in-man studies to establish proof of concept with our compounds (Phase IB / IIA). Immediately thereafter, our goal will be to license out our compounds to pharmaceutical companies. It should be noted that the average upfront payment by pharmaceutical companies in 2009 for Phase II compounds was \$70 million, excluding additional revenue from milestone and royalty payments.

### ***Process Overview***

Motif's research is conducted according to a highly dynamic process in which the flow of scientific insights, data, discoveries, and intellectual property will generate a continuous accretion of value in the company from the start of operations.

Our senior team of scientists and consultants is based in the US and will direct a dynamic research process with specialized outsourcing partners in Asia and Eastern Europe. In recent years, several companies in countries such as China and India have established their competence as reliable outsourcing partners in chemistry, biology, and other disciplines and are widely used by mainstream pharmaceutical companies. Motif is in advanced discussions on contractual relationships with selected premium companies in the field.

### ***An Integrated Discovery Continuum***

Motif's expertise in genetics and genomics is focused on several overlapping areas: target and biomarker discovery, pharmacogenomics, and rare diseases. These activities are entirely compatible with Motif's newly acquired expertise in medicinal chemistry and drug discovery, as complementary stages within a single, coherent continuum of discovery from novel genetic associations to validated genetic targets to diagnostic biomarkers to new therapeutics. Our focus on carefully selected studies in specialized populations and rare diseases allows us to generate ground-breaking biological insights at very low cost. Our drug discovery team will have exclusive access to the most promising of these discoveries as novel proprietary targets for drug development. As our population genetics projects continue to generate novel associations and genetic targets, we will have the flexibility, internal capabilities, and external relationships (a) to select genomic discoveries which may have "druggable" potential and to develop them further in house (thereby greatly increasing their potential value), and (b) to license out other discoveries to pharmaceutical or diagnostics companies.

### ***Value Proposition***

**Motif's value proposition builds first and foremost on the credibility and experience of the team.** Our scientists have decades-long first hand experience of successfully discovering and developing major drugs. They have already discovered and developed major new drugs and drug classes via the Lead Hopping approach. At Motif, they will be doing this with even greater focus and intensity. Based on this wealth of experience, we are confident that our research goals are eminently achievable.

**Motif's value proposition builds on proven targets and mechanisms.** Our research focus in drug discovery will be limited to targets, mechanisms, and drugs which have *already* been proven to work. We will explicitly exclude “wildcatting” or speculative projects. Our approach is to take mechanisms and compounds which are well understood and known to work (first-in-class) and to make them much better (best-in-class). Our selection criteria ensure that the probability of scientific and commercial success of each individual project is extremely high, and that the probability of success of the company (based on the three projects which we plan to start) is even higher.

**Motif's value proposition builds on a flexible model of value realization.** Motif will execute a highly dynamic and iterative research process. From the start, there will be a continually increasing body of scientific insights, data, discoveries, trade secrets and patents, resulting in an accumulating balance of company assets. During this process there will be multiple proof points (proprietary insights / data, patent filings, IND approvals, proof of concept data) and ways (licensing-out compounds at the IND or proof of concept stage, co-development arrangements) in which our assets can be monetized. Alternatively, this growing inventory of assets should enable the Company to raise additional investment capital as needed.

**Motif's value proposition is based on a validated and conservative business model.** The market for licensing-in transactions for new compounds by pharmaceutical companies is real and growing, and our model is based on benchmarked metrics reflecting actual, current transactions. We plan to license out compounds as soon as proof of concept in man has been achieved, eliminating the expense and risk of large scale Phase II or III trials. Our model assumes only the upfront payments on these transactions. The downstream milestone payments and royalty streams represent additional upside value creation opportunity beyond the basic assumptions in the business plan.