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Molecular Templates Announces FDA Acceptance of IND Application for MT-6402, a PD-L1-Targeted Engineered Toxin Body Enabled with Proprietary Antigen Seeding Technology

Dosing in Phase 1 Study in Subjects with PD-L1-Positive Cancers Expected to Start in 2Q21

AUSTIN, Texas, Jan. 19, 2021 (GLOBE NEWSWIRE) -- Molecular Templates, Inc. (Nasdaq: MTEM, “Molecular Templates,” “MTEM” or “the Company”), a clinical-stage biopharmaceutical company focused on the discovery and development of proprietary targeted biologic therapeutics, engineered toxin bodies (ETBs), today announced that the U.S. Food and Drug Administration (FDA) has accepted its Investigational New Drug (IND) application for MT-6402, a next-generation ETB targeting PD-L1 that is enabled with MTEM’s antigen seeding technology (AST). ETBs enabled with AST have dual mechanisms of action that include the enzymatic destruction of ribosomes and the delivery of viral class I antigens into the targeted tumor to be processed and presented on its cell surface to induce an antigen specific immune response. MTEM expects to start dosing enrolled subjects in a first-in-human Phase 1 study in relapsed/refractory patients with PD-L1-positive solid tumors in 2Q21.

The Phase 1 study is planned as a multi-center, open-label, dose escalation and dose expansion trial in the United States and outside of the United States. Patients with confirmed PD-L1 expressing tumors or confirmed PD-L1 expression in the tumor microenvironment will be eligible to screen for enrollment in the clinical trial. Following determination of the maximum tolerated dose (MTD) or recommended Phase 2 dose, expansion cohorts are planned to study MT-6402 as a monotherapy in tumor-specific and tumor-agnostic cohorts.

“We are excited to be advancing MT-6402, a third generation ETB, into the clinic for the treatment of patients with PD-L1-positive cancers. MT-6402 utilizes both our proprietary de-immunized toxin scaffold and antigen seeding technology,” said Eric Poma, Ph.D., CEO and CSO of Molecular Templates. “The PD-1/PD-L1 axis is central to many tumors and targeting that axis with a new mechanism of action has an opportunity to provide meaningful benefit to patients. We look forward to providing an update on the Phase 1 study by year-end 2021.”

About MT-6402

MT-6402 is an ETB consisting of a single chain variable fragment (scFv) with affinity for PD-L1, fused to the enzymatically active de-immunized Shiga-like toxin-A subunit (SLTA) and a

class I antigen derived from the human cytomegalovirus (HCMV) pp65 protein. MT-6402 was designed to induce potent anti-tumor effects via PD-L1 targeting through multiple mechanisms that may overcome the limitations of the PD-L1 antibodies. In MTEM's preclinical studies, MT-6402 was found to specifically bind and kill both tumor and immune PD-L1 expressing cells in a manner consistent with SLTA mediated cellular cytotoxicity through ribosomal inactivation, independent of checkpoint inhibition. Additionally, MT-6402 alters the immunophenotype of targeted cells by delivering foreign class I antigen from CMV for presentation in complex with MHC class I, which may provoke a CMV-specific immune response against the targeted cells. Third, MT-6402 may rehabilitate the tumor microenvironment (TME) and allow for immune recognition of tumors by destroying PD-L1-expressing immune cells in the TME through ribosomal inactivation.

About Molecular Templates

Molecular Templates is a clinical-stage company focused on the discovery and development of targeted biologic therapeutics. Our proprietary drug platform technology, known as engineered toxin bodies, or ETBs, leverages the resident biology of a genetically engineered form of Shiga-like Toxin A subunit to create novel therapies with potent and differentiated mechanisms of action for cancer and other serious diseases.

Forward-Looking Statements

This press release contains forward-looking statements for purposes of the Private Securities Litigation Reform Act of 1995 (the "Act"). Molecular Templates disclaims any intent or obligation to update these forward-looking statements, and claims the protection of the Act's Safe Harbor for forward-looking statements. All statements, other than statements of historical facts, included in this press release regarding strategy, future operations, future financial position, future revenue, projected expenses, prospects, plans and objectives of management are forward-looking statements. In addition, when or if used in this press release, the words "may," "could," "should," "anticipate," "believe," "estimate," "expect," "intend," "plan," "predict" and similar expressions and their variants, as they relate to Molecular Templates may identify forward-looking statements. Examples of such statements include, but are not limited to, statements regarding the safety or potential efficacy of the Company's drug or biologic candidates; the prospects of PD-L1 targeting therapies as a potential treatment; statements relating to the development of MT6402; the expected timing of initiating and completing enrollment of cohorts and conducting the planned Phase 1 study of MT-6402; and the Company's belief that its proprietary biologic drug platform technology, or ETBs, provides for a differentiated mechanism of action that may address some of the limitations associated with currently available cancer therapeutics.

Forward-looking statements are not guarantees of future performance and involve risks and uncertainties. Actual events or results may differ materially from those discussed in the forward-looking statements as a result of various factors including, but not limited to the risks associated with the uncertainties inherent in the preclinical and clinical development process; our ability to timely enroll patients in the Phase 1 study; whether the Company's cash resources will be sufficient to fund its continuing operations for the periods and/or trials anticipated; the ability of the Company to protect its intellectual property rights; risks from global pandemics including COVID19; and legislative, regulatory, political and economic developments, as well as those risks identified under the heading "Risk Factors" in the Company's filings with the SEC. Any forward-looking statements contained in this press

release speak only as of the date hereof, and the Company specifically disclaims any obligation to update any forward-looking statement, whether because of new information, future events or otherwise.

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