

INITIAL STATEMENT OF BENEFICIAL OWNERSHIP OF SECURITIES

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934 or Section 30(h) of the Investment Company Act of 1940

(Print or Type Responses)

1. Name and Address of Reporting Person* Valacer David (Last) (First) (Middle) C/O MOLECULAR TEMPLATES, INC., 9301 AMBERGLEN BLVD., SUITE 100 (Street) AUSTIN, TX 78729 (City) (State) (Zip)	2. Date of Event Requiring Statement (Month/Day/Year) 08/01/2017	3. Issuer Name and Ticker or Trading Symbol Molecular Templates, Inc. [MTEM]	
		4. Relationship of Reporting Person(s) to Issuer (Check all applicable) <input type="checkbox"/> Director <input type="checkbox"/> 10% Owner <input checked="" type="checkbox"/> Officer (give title below) <input type="checkbox"/> Other (specify below) Chief Medical Officer	5. If Amendment, Date Original Filed(Month/Day/Year)
		6. Individual or Joint/Group Filing(Check Applicable Line) <input checked="" type="checkbox"/> Form filed by One Reporting Person <input type="checkbox"/> Form filed by More than One Reporting Person	

Table I - Non-Derivative Securities Beneficially Owned

1. Title of Security (Instr. 4)	2. Amount of Securities Beneficially Owned (Instr. 4)	3. Ownership Form: Direct (D) or Indirect (I) (Instr. 5)	4. Nature of Indirect Beneficial Ownership (Instr. 5)
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Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

SEC 1473 (7-02)

Persons who respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB control number.

Table II - Derivative Securities Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 4)	2. Date Exercisable and Expiration Date (Month/Day/Year)		3. Title and Amount of Securities Underlying Derivative Security (Instr. 4)		4. Conversion or Exercise Price of Derivative Security	5. Ownership Form of Derivative Security: Direct (D) or Indirect (I) (Instr. 5)	6. Nature of Indirect Beneficial Ownership (Instr. 5)
	Date Exercisable	Expiration Date	Title	Amount or Number of Shares			
Stock Option (right to buy) (1)	(2)	08/06/2024	Common Stock	57,321	\$ 1.27	D	

Reporting Owners

Reporting Owner Name / Address	Relationships			
	Director	10% Owner	Officer	Other
Valacer David C/O MOLECULAR TEMPLATES, INC. 9301 AMBERGLEN BLVD., SUITE 100 AUSTIN, TX 78729			Chief Medical Officer	

Signatures

/s/ Jason S. Kim, attorney-in-fact **Signature of Reporting Person	08/11/2017 Date
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Explanation of Responses:

* If the form is filed by more than one reporting person, see Instruction 5(b)(v).

** Intentional misstatements or omissions of facts constitute Federal Criminal Violations. See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).

Shares of common stock of the corporation then known as Molecular Templates, Inc. ("Old Molecular") were converted into shares of the Issuer pursuant to that certain Agreement and Plan of Merger and Reorganization, dated as of March 16, 2017, by and among the Issuer, Trojan Merger Sub, Inc. and Old Molecular (the "Merger Agreement"). Pursuant to the terms of the Merger Agreement, each share of common stock was exchanged for 7.7844 shares of the Issuer's common stock, which then underwent a reverse split of 11-to-1.

On August 6, 2014, Reporting Person was granted an option to purchase 81,000 shares of common stock of Old Molecular under the 2009 Stock Plan (the "Plan") at an exercise price of \$0.90 per share. Pursuant to the Merger Agreement, this option was converted into an option to purchase 57,321 shares of the Issuer's common stock at a (2) per share exercise price of \$1.27. One fourth of the total number of shares subject to the option vest on the first anniversary of Vesting Commencement Date, which is January 1, 2014 and, thereafter, in forty-eight equal monthly installments, provided that at the relevant vesting dates the Reporting Person continues service to the Issuer and has not been terminated as defined in and as determined under the Plan. The option expires ten years after the date of the grant.

Remarks:

Exhibit 24.1 - Power of Attorney

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, *See* Instruction 6 for procedure.

Potential persons who are to respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB number.

POWER OF ATTORNEY

Know all by these present, that the undersigned hereby constitutes and appoints each of Jason Kim, President, Chief Operating Officer and Principal Financial Officer of Molecular Templates, Inc. (the "Company"), and Matthew Gardella, Matthew Tikonoff, Nishant Dharia, Adam Davey, Jacqueline Cannata, Anne Leland and Brenda Meyette of Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., signing singly, with full power of substitution, the undersigned's true and lawful attorney-in-fact to:

- (1) execute for and on behalf of the undersigned, forms and authentication documents for EDGAR Filing Access;
- (2) execute for and on behalf of the undersigned, in the undersigned's capacity as an officer, director and/or 10% shareholder of Company, forms and authentication documents for EDGAR Filing Access;
- (3) do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to complete and execute any such forms and authentication documents;
- (4) execute for and on behalf of the undersigned, in the undersigned's capacity as an officer, director and/or 10% shareholder of the Company, Forms 3, 4 and 5 (including any amendments thereto) in accordance with Section 16(a) of the Securities Exchange Act of 1934, as amended, and the rules thereunder (collectively, the "Exchange Act");
- (5) do and perform any and all acts for and on behalf of the undersigned which may be necessary or desirable to complete and execute any such Form 3, 4 or 5, prepare, complete and execute any amendment or amendments thereto, and timely file such form with the U.S. Securities and Exchange Commission and any stock exchange or similar authority; and
- (6) take any other action of any type whatsoever in connection with the foregoing which, in the opinion of such attorney-in-fact, may be of benefit to, in the best interest of, or legally required by, the undersigned, it being understood that the documents executed by such attorney-in-fact on behalf of the undersigned pursuant to this Power of Attorney shall be in such form and shall contain such terms and conditions as such attorney-in-fact may approve in such attorney-in-fact's discretion.

The undersigned hereby grants to each such attorney-in-fact full power and authority to do and perform any and every act and thing whatsoever requisite, necessary, or proper to be done in the exercise of any of the rights and powers herein granted, as fully to all intents and purposes as the undersigned might or could do if personally present, with full power of substitution or revocation, hereby ratifying and confirming all that such attorney-in-fact, or such attorney-in-fact's substitute or substitutes, shall lawfully do or cause to be done by virtue of this power of attorney and the rights and powers herein granted. The undersigned acknowledges that the foregoing attorneys-in-fact, in serving in such capacity at the request of the undersigned, are not assuming nor relieving, nor is the Company assuming nor relieving, any of the undersigned's responsibilities to comply with Section 16 of the Exchange Act. The undersigned acknowledges that neither the Company nor the foregoing attorneys-in-fact assume (i) any liability for the undersigned's responsibility to comply with the requirements of the Exchange Act, (ii) any liability of the undersigned for any failure to comply with such requirements or (iii) any obligation or liability of the undersigned for profit disgorgement under Section 16(b) of the Exchange Act.

This Power of Attorney shall remain in full force and effect until the undersigned is no longer required to file forms and execute authentication documents with respect to the undersigned's EDGAR Filing Access or to file Forms 3, 4 and 5 with respect to the undersigned's holdings of and transactions in securities issued by the Company, unless earlier revoked by the undersigned in a signed writing delivered to the foregoing attorneys-in-fact.

[Signature page follows]

IN WITNESS WHEREOF, the undersigned has caused this Power of Attorney to be executed as of the date set forth below.

Signature: /s/ David J. Valacer MD

Name: David J. Valacer MD

Date: 25 July 2017

[Signature page to Power of Attorney]

