

UNITED STATES  
SECURITIES AND EXCHANGE COMMISSION  
Washington, D.C. 20549

SCHEDULE 13G  
(Rule 13d-102)

INFORMATION TO BE INCLUDED IN STATEMENTS FILED PURSUANT  
TO RULES 13d-1(b), (c), AND (d) AND AMENDMENTS THERETO FILED  
PURSUANT TO RULE 13d-2(b)

(Amendment No. )<sup>1</sup>

Molecular Templates, Inc.  
(Name of Issuer)

Common stock, par value \$0.001 per share  
(Title of Class of Securities)

608550109  
(CUSIP Number)

September 21, 2018  
(Date of Event Which Requires Filing of this Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

- Rule 13d-1(b)
- Rule 13d-1(c)
- Rule 13d-1(d)

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<sup>1</sup> The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter disclosures provided in a prior cover page.

The information required on the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the *Notes*).

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1	NAME OF REPORTING PERSON  Biotechnology Value Fund, L.P.	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION  Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER  0 shares
	6	SHARED VOTING POWER  1,329,237 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER  0 shares
	8	SHARED DISPOSITIVE POWER  1,329,237 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  1,329,237 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)  3.8% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON  PN	

<sup>(1)</sup> Excludes 168,508 shares of Common Stock underlying the Warrants (defined in Item 4) that are not exercisable due to the Beneficial Ownership Limitation (defined in Item 4), which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.

1	NAME OF REPORTING PERSON  Biotechnology Value Fund II, L.P.	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION  Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER  0 shares
	6	SHARED VOTING POWER  1,005,325 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER  0 shares
	8	SHARED DISPOSITIVE POWER  1,005,325 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  1,005,325 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)  2.9% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON  PN	

<sup>(1)</sup> Excludes 108,536 shares of Common Stock underlying the Warrants that are not exercisable due to the Beneficial Ownership Limitation, which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.

1	NAME OF REPORTING PERSON  Biotechnology Value Trading Fund OS LP	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION  Cayman Islands	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER  0 shares
	6	SHARED VOTING POWER  197,824 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER  0 shares
	8	SHARED DISPOSITIVE POWER  197,824 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  197,824 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)  Less than 1% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON  PN	

<sup>(1)</sup> Excludes 30,190 shares of Common Stock underlying the Warrants that are not exercisable due to the Beneficial Ownership Limitation, which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.

1	NAME OF REPORTING PERSON BVF Partners OS Ltd.	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION Cayman Islands	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER 0 shares
	6	SHARED VOTING POWER 197,824 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER 0 shares
	8	SHARED DISPOSITIVE POWER 197,824 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON 197,824 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9) Less than 1% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON CO	

<sup>(1)</sup> Excludes 30,190 shares of Common Stock underlying the Warrants that are not exercisable due to the Beneficial Ownership Limitation, which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.

1	NAME OF REPORTING PERSON BVF Partners L.P.	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER 0 shares
	6	SHARED VOTING POWER 2,787,629 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER 0 shares
	8	SHARED DISPOSITIVE POWER 2,787,629 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON 2,787,629 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9) 7.9% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON PN, IA	

<sup>(1)</sup> Excludes 362,064 shares of Common Stock underlying the Warrants that are not exercisable due to the Beneficial Ownership Limitation, which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.

1	NAME OF REPORTING PERSON BVF Inc.	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER 0 shares
	6	SHARED VOTING POWER 2,787,629 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER 0 shares
	8	SHARED DISPOSITIVE POWER 2,787,629 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON 2,787,629 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9) 7.9% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON CO	

<sup>(1)</sup> Excludes 362,064 shares of Common Stock underlying the Warrants that are not exercisable due to the Beneficial Ownership Limitation, which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.

1	NAME OF REPORTING PERSON  Mark N. Lampert	
2	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (a) <input checked="" type="checkbox"/> (b) <input type="checkbox"/>	
3	SEC USE ONLY	
4	CITIZENSHIP OR PLACE OF ORGANIZATION  United States	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH	5	SOLE VOTING POWER  0 shares
	6	SHARED VOTING POWER  2,787,629 <sup>(1)</sup>
	7	SOLE DISPOSITIVE POWER  0 shares
	8	SHARED DISPOSITIVE POWER  2,787,629 <sup>(1)</sup>
9	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  2,787,629 <sup>(1)</sup>	
10	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES <input type="checkbox"/>	
11	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW (9)  7.9% <sup>(1)</sup>	
12	TYPE OF REPORTING PERSON  IN	

<sup>(1)</sup> Excludes 362,064 shares of Common Stock underlying the Warrants that are not exercisable due to the Beneficial Ownership Limitation, which provides that the Warrants may not be exercised if, after such exercise, the Reporting Persons would beneficially own more than 4.99% of the shares of Common Stock outstanding.



Item 1(a). Name of Issuer:  
Molecular Templates, Inc., a Delaware corporation (the "Issuer").

Item 1(b). Address of Issuer's Principal Executive Offices:  
9301 Amberglen Blvd, Suite 100  
Austin, TX 78729

Item 2(a). Name of Person Filing  
Item 2(b). Address of Principal Business Office or, if None, Residence  
Item 2(c). Citizenship

Biotechnology Value Fund, L.P. ("BVF")  
44 Montgomery St., 40<sup>th</sup> Floor  
San Francisco, California 94104  
Citizenship: Delaware

Biotechnology Value Fund II, L.P. ("BVF2")  
44 Montgomery St., 40<sup>th</sup> Floor  
San Francisco, California 94104  
Citizenship: Delaware

Biotechnology Value Trading Fund OS LP ("Trading Fund OS")  
PO Box 309 Uglan House  
Grand Cayman, KY1-1104  
Cayman Islands  
Citizenship: Cayman Islands

BVF Partners OS Ltd. ("Partners OS")  
PO Box 309 Uglan House  
Grand Cayman, KY1-1104  
Cayman Islands  
Citizenship: Cayman Islands

BVF Partners L.P. ("Partners")  
44 Montgomery St., 40<sup>th</sup> Floor  
San Francisco, California 94104  
Citizenship: Delaware

BVF Inc.  
44 Montgomery St., 40<sup>th</sup> Floor  
San Francisco, California 94104  
Citizenship: Delaware

Mark N. Lampert ("Mr. Lampert")  
44 Montgomery St., 40<sup>th</sup> Floor  
San Francisco, California 94104  
Citizenship: United States

Each of the foregoing is referred to as a "Reporting Person" and collectively as the "Reporting Persons."

Item 2(d). Title of Class of Securities:  
Common stock, \$0.001 par value per share (the “Common Stock”)

Item 2(e). CUSIP Number:  
608550109

Item 3. If This Statement is Filed Pursuant to Rule 13d-1(b), or 13d-2(b) or (c), Check Whether the Person Filing is a:

- /x/ Not applicable.
- (a)  // Broker or dealer registered under Section 15 of the Exchange Act.
- (b)  // Bank as defined in Section 3(a)(6) of the Exchange Act.
- (c)  // Insurance company as defined in Section 3(a)(19) of the Exchange Act.
- (d)  // Investment company registered under Section 8 of the Investment Company Act.
- (e)  // An investment adviser in accordance with Rule 13d-1(b)(1)(ii)(E).
- (f)  // An employee benefit plan or endowment fund in accordance with Rule 13d-1(b)(1)(ii)(F).
- (g)  // A parent holding company or control person in accordance with Rule 13d-1(b)(1)(ii)(G).
- (h)  // A savings association as defined in Section 3(b) of the Federal Deposit Insurance Act.
- (i)  // A church plan that is excluded from the definition of an investment company under Section 3(c)(14) of the Investment Company Act.
- (j)  // Group, in accordance with Rule 13d-1(b)(1)(ii)(J).
- (k)  // Group, in accordance with Rule 240.13d-1(b)(1)(ii)(K). If filing as a non-U.S. institution in accordance with Rule 240.13d-1(b)(1)(ii)(J), please specify the type of institution: \_\_\_\_\_

Item 4. Ownership

(a) Amount beneficially owned:

As of the close of business on October 1, 2018, the Reporting Persons hold 362,064 warrants, exercisable for an aggregate of 362,064 shares of Common Stock (the “Warrants”). The Warrants have an exercise price of \$6.8423 per share and expire on August 1, 2024. The Warrants are only exercisable to the extent that the holder, together with its affiliates and any other person or entity acting as a group, would not beneficially own more than 4.99% of the outstanding shares of Common Stock after giving effect to such exercise, as such percentage ownership is determined in accordance with the terms of the Warrants (the “Beneficial Ownership Limitation”). As of October 1, 2018, the Beneficial Ownership Limitation limits the aggregate exercise of the Warrants by the Reporting Persons to zero out of the 362,064 shares of Common Stock underlying the Warrants owned by the Reporting Persons in the aggregate. BVF holds Warrants to purchase 168,508 additional shares of Common Stock which are excluded herein as a result of the Beneficial Ownership Limitation. BVF2 holds Warrants to purchase 108,536 additional shares of Common Stock which are excluded herein as a result of the Beneficial Ownership Limitation. Trading Fund OS holds Warrants to purchase 30,190 additional shares of Common Stock which are excluded herein as a result of the Beneficial Ownership Limitation. The Reporting Persons through certain Partners managed accounts (the “Partners Managed Accounts”) hold Warrants to purchase 54,830 additional shares of Common Stock which are excluded herein as a result of the Beneficial Ownership Limitation.

As of the close of business on October 1, 2018 (i) BVF beneficially owned 1,329,237 shares of Common Stock, (ii) BVF2 beneficially owned 1,005,325 shares of Common Stock, and (iii) Trading Fund OS beneficially owned 197,824 shares of Common Stock.

Partners OS, as the general partner of Trading Fund OS, may be deemed to beneficially own the 197,824 shares of Common Stock beneficially owned by Trading Fund OS.

Partners, as the general partner of BVF, BVF2, the investment manager of Trading Fund OS, and the sole member of Partners OS, may be deemed to beneficially own the 2,787,629 shares of Common Stock beneficially owned in the aggregate by BVF, BVF2, Trading Fund OS, and the Partners Managed Accounts, including 255,243 shares of Common Stock held in the Partners Managed Accounts.

BVF Inc., as the general partner of Partners, may be deemed to beneficially own the 2,787,629 shares of Common Stock owned by Partners.

Mr. Lampert, as a director and officer of BVF Inc., may be deemed to beneficially own the 2,787,629 shares of Common Stock beneficially owned by BVF Inc.

The foregoing should not be construed in and of itself as an admission by any Reporting Person as to beneficial ownership of any shares of Common Stock owned by another Reporting Person. Partners OS disclaims beneficial ownership of the shares of Common Stock beneficially owned by Trading Fund OS. Each of Partners, BVF Inc. and Mr. Lampert disclaims beneficial ownership of the shares of Common Stock beneficially owned by BVF, BVF2, Trading Fund OS, and the Partners Managed Accounts, and the filing of this statement shall not be construed as an admission that any such person or entity is the beneficial owner of any such securities.

(b) Percent of class:

The following percentages are based on 35,265,198 shares of Common Stock outstanding, as reported in the Issuer's Prospectus Supplement on Form 424B5 filed with the Securities and Exchange Commission on September 24, 2018.

As of the close of business on October 1, 2018 (i) BVF beneficially owned approximately 3.8% of the outstanding shares of Common Stock, (ii) BVF2 beneficially owned approximately 2.9% of the outstanding shares of Common Stock, (iii) Trading Fund OS beneficially owned less than 1% of the outstanding shares of Common Stock, (iv) Partners OS may be deemed to beneficially own less than 1% of the outstanding Shares, and (v) each of Partners, BVF Inc. and Mr. Lampert may be deemed to beneficially own approximately 7.9% of the outstanding shares of Common Stock (less than 1% of the outstanding shares of Common Stock is held in the Partners Managed Accounts).

- (c) Number of shares as to which such person has:
  - (i) Sole power to vote or to direct the vote  
See Cover Pages Items 5-9.
  - (ii) Shared power to vote or to direct the vote  
See Cover Pages Items 5-9.
  - (iii) Sole power to dispose or to direct the disposition of  
See Cover Pages Items 5-9.
  - (iv) Shared power to dispose or to direct the disposition of  
See Cover Pages Items 5-9.

Item 5. Ownership of Five Percent or Less of a Class.

Not Applicable.

Item 6. Ownership of More than Five Percent on Behalf of Another Person.

Partners, BVF Inc. and Mr. Lampert share voting and dispositive power over the shares of Common Stock beneficially owned by BVF, BVF2, Trading Fund OS, and the Partners Managed Accounts.

Item 7. Identification and Classification of the Subsidiary That Acquired the Security Being Reported on by the Parent Holding Company or Control Person.

Not Applicable.

Item 8. Identification and Classification of Members of the Group.

See Exhibit 99.1.

Item 9. Notice of Dissolution of Group.

Not Applicable.

Item 10. Certifications.

By signing below each of the undersigned certifies that, to the best of its knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect.

SIGNATURE

After reasonable inquiry and to the best of his knowledge and belief, each of the undersigned certifies that the information set forth in this statement is true, complete and correct.

Dated: October 1, 2018

BIOTECHNOLOGY VALUE FUND, L.P.

By: BVF Partners L.P., its general partner  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BVF INC.

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

/s/ Mark N. Lampert  
MARK N. LAMPERT

BIOTECHNOLOGY VALUE FUND II, L.P.

By: BVF Partners L.P., its general partner  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BVF PARTNERS L.P.

By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BVF PARTNERS OS LTD.

By: BVF Partners L.P., its sole member  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BIOTECHNOLOGY VALUE TRADING FUND OS LP

By: BVF Partners L.P., its investment manager  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

**Joint Filing Agreement**

The undersigned hereby agree that the Statement on Schedule 13G dated October 1, 2018 with respect to the common stock, par value \$0.001 per share of Molecular Templates, Inc., and any further amendments thereto executed by each and any of the undersigned shall be filed on behalf of each of the undersigned pursuant to and in accordance with the provisions of Rule 13d-1(k)(1) under the Securities Exchange Act of 1934, as amended.

Dated: October 1, 2018

BIOTECHNOLOGY VALUE FUND, L.P.

By: BVF Partners L.P., its general partner  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BVF INC.

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

/s/ Mark N. Lampert  
MARK N. LAMPERT

BIOTECHNOLOGY VALUE FUND II, L.P.

By: BVF Partners L.P., its general partner  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BVF PARTNERS L.P.

By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BVF PARTNERS OS LTD.

By: BVF Partners L.P., its sole member  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President

BIOTECHNOLOGY VALUE TRADING FUND OS LP

By: BVF Partners L.P., its investment manager  
By: BVF Inc., its general partner

By: /s/ Mark N. Lampert  
Mark N. Lampert  
President