Filed pursuant to Rule 433
Free Writing Prospectus dated February 13, 2019
Registration No. 333-229066

TCR² THERAPEUTICS INC.

This free writing prospectus updates the preliminary prospectus dated February 1, 2019 included in Amendment No. 1 to the Registration Statement on Form S-1 (File No. 333-229066) relating to the initial public offering of the common stock of TCR² Therapeutics Inc. On February 13, 2019, the issuer filed Amendment No. 2 to the Registration Statement on Form S-1. This free writing prospectus updates and supplements the preliminary prospectus dated February 1, 2019 with information that is reflected in the preliminary prospectus dated February 13, 2019 included in Amendment No. 2 to the Registration Statement.

- To review the preliminary prospectus included in Amendment No. 2 to the Registration Statement, click the following link on the website of the SEC at www.sec.gov as follows (or if such address has changed, by reviewing the issuer's filings for the relevant date on the SEC web site): https://www.sec.gov/Archives/edgar/data/1750019/000119312519037835/0001193125-19-037835-index.htm . The issuer's Central Index Key, or CIK, on the SEC website is 0001750019.

This free writing prospectus reflects the following supplements and updates that were made in the preliminary prospectus:

Prospectus Summary

The following disclosure was added following the fourth sentence of the second paragraph on page 1 of Amendment No. 2 to the Registration Statement:

However, we recently received a request from the FDA's Center for Devices and Radiological Health (CDRH) for the submission of an investigational device exemptions (IDE) application regarding our use of a commercially available in vitro diagnostic assay for screening mesothelin expression in tumors. Depending on the results of our related ongoing discussions with the FDA, the process for satisfying this request may delay initiation of our planned Phase 1/2 clinical trial for TC-210 in early 2019. Although there can be no assurances, we do not believe this process will delay the generation of our first clinical data for TC-210 expected in the second half of 2019.

Risk Factors

The following language was added to the risk factor entitled "Risks Related to the Development of Our Product Candidates - Clinical development involves a lengthy and expensive process with an uncertain outcome, and results of earlier studies and trials may not be predictive of future clinical trial results. If our preclinical studies and clinical trials are not sufficient to support regulatory approval of any of our product candidates, we may incur additional costs or experience delays in completing, or ultimately be unable to complete, the development of such product candidate" on page 18 of Amendment No. 2 to the Registration Statement:

In particular, we recently received a request from the FDA's Center for Devices and Radiological Health (CDRH) for the submission of an investigational device exemptions (IDE) application regarding our use of a commercially available in vitro diagnostic assay for screening mesothelin expression in tumors. Depending on the results of our related ongoing discussions with the FDA, the process for satisfying this request may delay initiation of our planned Phase 1/2 clinical trial for TC-210 expected in early 2019.

Business Section

The following language was added following the eight sentence of the last paragraph on page 95 of Amendment No. 2 to the Registration Statement:

However, we recently received a request from the FDA's Center for Devices and Radiological Health (CDRH) for the submission of an investigational device exemptions (IDE) application regarding our use of a commercially

available in vitro diagnostic assay for screening mesothelin expression in tumors. Depending on the results of our related ongoing discussions with the FDA, the process for satisfying this request may delay initiation of our planned Phase 1/2 clinical trial for TC-210 in early 2019. Although there can be no assurances, we do not believe this process will delay the generation of our first clinical data for TC-210 expected in the second half of 2019.

The following language was added as a new paragraph on page 129 of Amendment No. 2 to the Registration Statement:

Clinical trials sometimes require submission of an application for an Investigational Device Exemption, or IDE, to the FDA. The IDE application, when requested, must be supported by appropriate data, such as animal and laboratory testing results, showing that it is safe to test the device in humans and that the investigational protocol is scientifically sound. The IDE application must be approved in advance by the FDA, unless the product is deemed a non-significant risk device and eligible for more abbreviated IDE requirements. Clinical trials for a significant risk device may begin once the IDE application is approved by the FDA as well as the appropriate institutional review boards, or IRBs, at the clinical trial sites, and the informed consent of the patients participating in the clinical trial is obtained.

TCR² Therapeutics Inc. has filed a registration statement (including a prospectus, which is preliminary and subject to completion) with the Securities and Exchange Commission (the "SEC") for the offering to which this communication relates. Before you invest, you are encouraged to read the prospectus in that registration statement and other documents the issuer has filed with the SEC for more complete information about the issuer and this offering. You may get these documents for free by visiting EDGAR on the SEC Website at www.sec.gov. Alternatively, copies of the preliminary prospectus related to the offering may be obtained from Jefferies LLC, Attention: Equity Syndicate Prospectus Departments, 520 Madison Avenue, 2nd Floor, New York, NY 10022, by phone at (877) 821-7388, or by email at Prospectus_Department@Jefferies.com; SVB Leerink LLC, Attention: Syndicate Department, One Federal Street, 37th Floor, Boston, MA, 02110, by e-mail at syndicate@leerink.com, or by phone at (800) 808-7525, ext. 6132; or BMO Capital Markets Corp., Attn: Equity Syndicate Department, 3 Times Square, 25th Floor, New York, NY 10036, tel: (800) 414-3627, email: bmoprospectus@bmo.com.

This communication shall not constitute an offer to sell or the solicitation of an offer to buy, nor shall there be any sale of, these securities in any state or other jurisdiction in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of any such state or jurisdiction.