# Press Release

## Theralase Provides Interim Data Analysis on Anti-Cancer Treatment for First Four Patients Treated

### First Four Patients Treated with Company's Anti-Cancer Treatment Achieve Pre-Defined Primary, Secondary and Exploratory Outcome Measures

*Toronto, Ontario – November 8, 2017*, Theralase Technologies Inc. ("**Theralase®**" or the "**Company**") (**TSXV: TLT**) (**OTCQX: TLTFF**), a leading biotech company focused on the commercialization of medical lasers to eliminate pain and the development of Photo Dynamic Compounds ("**PDCs**") to destroy cancer provides an interim data analysis on the first four patients treated, with the Company's patented, light-activated PDC, TLD-1433, in a Phase Ib Non-Muscle Invasive Bladder Cancer ("**NMIBC**") clinical study ("**Study**"), demonstrating successful achievement of the pre-defined primary, secondary and exploratory outcome measures.

The Study entitled, "*A Phase Ib Trial of Intravesical Photo Dynamic Therapy ("**PDT**") in Patients with NMIBC at High Risk of Progression, Who are Refractory to Therapy with Bacillus Calmette-Guerin ("**BCG**") and Who are Medically Unfit for or Refuse a Cystectomy*" commenced treating patients in March 2017 and to date has treated three patients at the Maximum Recommended Starting Dose ("**MRSD**") (0.35 $mg/cm^2$) and one patient at the Therapeutic Dose (0.70 $mg/cm^2$) of TLD-1433 PDC, activated by laser light (525 nm, 90 $J/cm^2$) delivered through a combination of the TLC-3200 PDT Medical Laser and TLC-3400 Laser Probe Dosimetry Fibre Optic Cage ("**DFOC**") technology.

Enrollment for the remaining five patients to be treated at the Therapeutic Dose is currently ongoing with Theralase's clinical partner.

Pre-defined Study objectives for patients with high risk, Ta, T1 or Carcinoma In-Situ ("**CIS**") NMIBC are:

1) **Primary:** Evaluate safety and tolerability. (Measured by patients who experience Adverse Events ("**AEs**") Grade 4 or greater that do not resolve within thirty (30) days; whereby: Grade 1 = Mild AE, Grade 2 = Moderate AE, Grade 3 = Severe AE, Grade 4 = Life-threatening or disabling AE, Grade 5 = Death)

2) **Secondary:** Evaluate the PharmacoKinetics ("**PK**"). (movement and exit of drug within tissue) of TLD-1433 (Measured by TLD-1433 concentration levels in plasma and urine over 72 hours)

3) **Exploratory:** Evaluate efficacy. (Measured by Recurrence Free Survival ("**RFS**"), defined as the interval from Day 0 (Day of PDT treatment) to documented recurrence or death from any cause, whichever occurs first. Recurrence is defined as any new tumour growth (i.e.: any biopsy-confirmed new or recurrent tumour), evaluated at 90 days for the first three patients treated at the MRSD and primarily at 90 days for the last six patients treated at the Therapeutic Dose and secondarily at 180 days post treatment)

The Study data results will be evaluated by the Data Safety Monitoring Board ("**DSMB**") and Health Canada, upon completion, based upon achievement of the primary and secondary objectives.

**Interim Data Results:**

1) As previously reported, the first three patients treated at the MRSD successfully achieved the primary, secondary and exploratory outcome measures at 90 days post treatment.

2) Patient four treated at the Therapeutic Dose successfully achieved the primary, secondary and exploratory outcome measures at 90 days post treatment. During the 90 day cystoscopy analysis, patient number four's bladder surface wall was observed to be red and inflamed. The patient will continue to be monitored to see if this condition resolves.

3) Although not a pre-defined outcome measure of the Study, patient one, two and three have successfully achieved the primary and secondary outcome measures at 180 days post treatment.

4) Although not a pre-defined outcome measure of the Study, patient one, two and three have not achieved the exploratory outcome measure at 180 days post treatment.

**Conclusions:**

Light activated TLD-1433 PDC, based on initial data, has demonstrated:

1) A high level of safety, tolerability and PK, in patients with high risk, Ta, T1 or CIS NMIBC, for 180 days post PDT treatment, when treated at the MRSD;

2) A high level of safety, tolerability and PK, in patients with high risk, Ta, T1 or CIS NMIBC, for 90 days post PDT treatment, when treated at the Therapeutic Dose;

3) An ability to delay recurrence and progression of NMIBC at the MRSD for between 90 to 180 days post treatment for patients, who have a clinical history or are at high risk of UUTUC and potentially longer for those that do not;

4) An ability to delay recurrence and progression of NMIBC at the Therapeutic Dose for 90 days post treatment.

**Discussion:**

Patients one and two have a previous history of Upper Urinary Tract Urothelial Carcinoma ("**UUTUC**") diagnosed prior to their PDT treatment, while patients 3 and 4 are at high risk of UUTUC. This clinical observation, along with peer-reviewed clinical research[1,2] raises the possibility that the source of patient one, two and three's recurrent NMIBC may have originated by seeding in the bladder from these extravesical sites, potentially confounding the exploratory outcomes for these patients (In this NMIBC patient population, 80% of patients recur, while 50% of patients progress). The extravesical upper tract locations of all treated patients were not exposed to the PDT treatment in the Study.

Although patient one, two and three, treated at the MRSD (1/2 of Therapeutic Dose), recurred at 180 days post treatment; there was no sign of progression of the disease; indicating, that they may benefit from multiple PDT treatments, delivered between 90 to 180 days post treatment.

The interim data obtained to date suggests that the Theralase PDT treatment was able to achieve the primary, secondary and exploratory objectives of the Study at both the MRSD and Therapeutic Dose, delaying recurrence and more importantly delaying progression of NMIBC, for more than 90 days post PDT treatment, which would be of particular benefit for NMIBC patients; especially, patients who do not have a previous history of UUTUC.

Enrollment and treatment of the remaining five patients to be treated at the Therapeutic Dose will provide additional data on the ability to achieve the primary, secondary and exploratory outcome measures at this dose and if so, up to which timepoint.

According to the literature, previous intravesical chemotherapeutic agents have been shown to reduce tumour recurrences; however, none of these agents has proven to be of benefit in preventing disease progression.[3, 4, 5, 6]

BCG, an attenuated strain of Mycobacterium bovis, which is used as a vaccine against tuberculosis, has been shown to prolong the time to development of muscle invasion[7, 8]; however, despite a high initial complete response rate with BCG, a significant number of participants will eventually fail BCG therapy with notable local and systemic toxicities being observed with continued, prolonged use of BCG.[9]

Patients with BCG-refractory NMIBC have a 50% chance of disease progression and radical cystectomy should be recommended[10]; however, for patients who refuse cystectomy or who are too ill for major surgery, alternative methods may be considered, but at the risk for interval disease progression.[11]

For such high-risk patients, failing treatment with intravesical BCG, for whom cystectomy is not an option, further BCG therapy or other intravesical therapies; including: immunotherapy, chemotherapy, device-assisted therapy or sequential combination therapy is recommended.[12, 13, 14, 15]

Intravesical therapy for patients with NMIBC, who are not candidates for or who refuse cystectomy, presents an opportunity for a new therapy, such at Theralase's PDT technology, provided that the therapy:

1) Requires a limited number of treatments to be delivered

2) Provides high safety and minimal toxicity to the patient

3) Can delay recurrence and/or disease progression for a reasonable length of time

The initial data obtained to date by Theralase suggests that the Company's PDT technology is able to achieve these objectives.

Arkady Mandel, MD, PhD, DSc, Chief Scientific Officer of Theralase stated: "The interim data analysis for the Phase Ib NMIBC clinical study indicates that although patient one, two and three have recurred with NMIBC at 180 days post treatment, their disease has not progressed. No reliable risk factors have yet been identified for bladder recurrence in recent literature; however, the general understanding in the field is that a previous history of bladder cancer and a multifocal primary tumor (presenting in the bladder and UUTUC) are two main factors, most often associated with bladder recurrence. The interim data; therefore, raises the possibility that NMIBC was re-introduced into the respective patient's bladder

from the UUTUC. If patients five through nine achieve the primary, secondary and exploratory efficacy outcome measures at 90 days post treatment, even if they recur at 180 days post treatment, but do not progress, then a strong argument can be made to schedule them for repeat PDT treatment procedures. The initial data obtained to date supports that PDT treatment at the MRSD is very safe and tolerable for NMIBC patients and prevented recurrence of NMIBC for between 90 to 180 days, post treatment, for patients presenting with both NMIBC and UUTUC."

Dr. Mandel went on to say, "Using this initial data, in combination with the data to be obtained on the next five patients, the design of a Phase 2 clinical study, currently under review by the Company, would involve treating patients at either the MRSD, Therapeutic Dose or another dose, dependent upon: a review of the complete set of data achieved for all nine patients evaluated for the primary, secondary and exploratory outcome measures, the patient's quarterly cystoscopy analysis and the detection or absence of recurrence, during this evaluation. Review of this dataset should allow for determination of the optimal dose for initial or additional PDT treatments, as required. Upon completion of the Study, Theralase will discuss the complete dataset with it's Medical and Scientific Advisory Board ("**MSAB**") to determine which dose of TLD-1433 would be most appropriate to use in a Phase 2 NMIBC multicenter clinical study."

Roger Dumoulin-White, President and CEO of Theralase stated that, "I am pleased in the performance of both the TLD-1433 PDC and the laser light system used to activate it, in the first four patients treated clinically. TLD-1433 demonstrated an ability to localize specifically to the bladder cancer lesions preferentially over healthy urothelium. The volume of the patient's bladders and hence their surface areas, treated to date has varied significantly; however, the DFOC adequately compensated for these variations and was able to deliver a fairly uniform distribution of laser light across the bladder wall surface area and hence a fairly uniform activation of the absorbed TLD-1433. Optimization of the dose of TLD-1433 to use in a Phase II clinical study, coupled with optimization of both the TLC-3200 and TLC-3400 DFOC technology, currently underway by the Company, to increase ease of manufacture and optimize uniformity of light distribution, will be important to successfully achieve a primary efficacy outcome measure."

Mr. Dumoulin-White continued, "The initial clinical data obtained to date supports the hypothesis that light activated TLD-1433 is able to achieve the primary, secondary and exploratory Study objectives, and coupled with data on the remaining five patients to be treated, will be used by the Company to design a multicenter, multiple PDT treatment, Phase 2 NMIBC clinical study, with a primary objective of efficacy in a larger patient population."

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**About Theralase Technologies Inc.**

Theralase Technologies Inc. ("**Theralase®**" or the "**Company**") (**TSXV: TLT**) (**OTCQX: TLTFF**) in its Therapeutic Laser Technology ("**TLT**") Division designs, manufactures, markets and distributes patented super-pulsed laser technology indicated for the treatment of chronic knee pain, and in off-label use, the elimination of pain, reduction of inflammation and dramatic acceleration of tissue healing for numerous nerve, muscle and joint conditions. Theralase's Photo Dynamic Therapy ("**PDT**") Division researches and develops specially designed molecules called Photo Dynamic Compounds ("**PDCs**"), which have demonstrated an ability to localize to cancer cells and then when laser light activated, effectively destroy them.

Additional information is available at www.theralase.com and www.sedar.com .

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