



## Technegas™ Is Coming to America

Cyclomedica, is globally known, for its proprietary functional lung ventilation imaging agent Technegas™. Technegas™ is predominantly used for the diagnosis of Pulmonary Embolism (PE). Developed in Australia and first used clinically in 1986, Technegas™ is available in 60 countries where it is referenced in the 2019 European and Canadian Association of Nuclear Medicine guidelines (Bajc 2019, Leblanc 2018) as the preferred ventilation imaging agent for the diagnosis of PE. Although considered consistently and globally as the optimal ventilation agent, Technegas™ is not yet approved in the United States of America (USA).

Compared to available FDA-approved ventilation agents for lung scanning, Technegas™

- is easy to administer to patients as only 3-4 breaths are needed (Roach 2013);
- does not require specific room infrastructure;
- is ideal for single photon emission computed tomography (SPECT) imaging facilitating clinical interpretation (Roach 2013);
- has excellent penetration to peripheral areas reducing the potential for hotspots (Roach 2013);
- has minimal contraindications even in patients with renal impairment or chronic lung obstruction (Miles 2009, Nasr 2017);
- and has a low radiation burden, important for all patients but particularly in young women of child-bearing age and in pregnant women (Isidoro 2017, Bajc 2015).

In the USA, planar ventilation-perfusion (V/Q) is still favored whereas SPECT imaging has already largely replaced planar imaging in most nuclear medicine departments in Europe, Canada and Australia as SPECT offers a holistic interpretation which is associated with very low rates of nondiagnostic reports and allows a diagnostic conclusion that is binary with respect to PE (Le Roux 2015, Le Roux 2017).

### Technegas™ is ideal for V/Q SPECT imaging

V/Q images were traditionally acquired with planar imaging (2D planar). In the recent years, imaging equipment has greatly evolved with the introduction of SPECT which allows for 3-dimensional imaging.

<p><b>2D Planar</b> Lung tissue overlap associated with:</p> <ul style="list-style-type: none"> <li>• <b>decreased sensitivity and specificity</b> for pulmonary embolus;</li> <li>• <b>limited ability</b> to accurately localize segmental lung disease (Elojeimy 2016).</li> </ul>	<p><b>3D SPECT</b> Improved resolution and depth information associated with:</p> <ul style="list-style-type: none"> <li>• <b>increased sensitivity</b> for detection of segmental and subsegmental defects;</li> <li>• <b>improved specificity and accuracy</b> of the scan;</li> <li>• <b>decreased interobserver variation</b> in interpretation (Elojeimy 2016).</li> </ul>
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With the advent of technologies such as SPECT and SPECT fused with low dose computed tomography (SPECT/CT) along with newly developed quantitative software, Technegas™ is more relevant today than ever before. By replacing 2D planar for 3D SPECT imaging and shifting from probabilistic outcomes to binary results, nuclear medicine physicians are enabled to deliver higher levels of sensitivity and accuracy in diagnosis PE with Technegas™ (Hess, 2016) at a fraction of the radiation dose compared to that of Computed Tomography Pulmonary Angiography (CTPA) (Isidoro 2017). The improved diagnostic accuracy of SPECT/CT is also associated with a superior economic value which is attributable to potentially avoidable complications, misdiagnosis and underdiagnosis (Toney 2017).

### Using Technegas™ in 'Beyond PE' applications

Because Technegas™ can show true functional ventilation at alveolar level (Roach 2013), respiratory physicians have shown a strong global interest to use Technegas™ beyond the traditional diagnosis of PE into other applications:

- Diagnosis and follow-up of PE and Chronic Thromboembolic Pulmonary Hypertension (CTEPH) (Roach 2013, Ohira 2015)
- Advanced approach to phenotyping chronic airways diseases such as asthma and Chronic Obstructive Pulmonary Disease (COPD) and identifying patients likely to respond to treatment (Jögi 2014, Bajc 2017, Farrow 2019)
- Preoperative assessment of lung resection candidates with borderline pulmonary reserve (Mortensen 2019, Wechalekar 2019)
- Preoperative assessment of endoscopic lung volume reduction candidates (Hsu 2018)
- Planning radiation therapy to target tumors while preserving functional lung zones (Elojeimy 2016, Eslick 2019)

With the development of SPECT/CT, the integration of anatomic information from the CT scan with the functional information from SPECT imaging, the combined modalities are expanding the potential clinical utility for Technegas™. Mathematical analysis of the V/Q SPECT/CT is believed to provide quantitative functional data that can be analyzed at the lobar and segmental level, that when used in a baseline and follow-up regime, can allow for objective assessment of changes in an individual's lung. In order to further the utility of nuclear respiratory

medicine, Cyclomedica initiated a clinical program utilising Technegas™ in indications ‘Beyond PE’ with some of the most globally respected key opinion leaders in respiratory medicine. These pilot clinical trials are designed to target patients with chronic conditions where Technegas™ can be used for screening, response to therapy and patient management. The current United States Food and Drug Administration (USFDA) trial, CYC-009, underscores the strength of Cyclomedica’s ‘Beyond PE’ strategy as Technegas™ is being used in the trial across several indications such as lung transplants, CTEPH and acute PE.

### What’s in our future

Following completion of some pilot clinical trials, Cyclomedica envisages the growth of Nuclear Pulmonology and Respiriology where V/Q SPECT/CT becomes a pivotal tool in the screening, diagnosis, staging and treatment of patients suffering pulmonary conditions.

### USA, get ready, Technegas™ is coming

Cyclomedica has submitted a 505(b)(2) New Drug Application for Technegas™ to the USFDA and expect approval by early 2021. Cyclomedica is looking forward to bringing Technegas™ to the USA and enabling clinicians with a powerful option for functional lung imaging utilizing V/Q SPECT/CT.



**Sign up early and register your interest for Technegas™ via this QR code.**

### References

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