



## ***Pneumocystis jiroveci***

### **Background**

*Pneumocystis jiroveci* (formerly known as *P. carinii*) is an opportunistic atypical fungus that causes a severe and often fatal pneumonia (pneumocystis pneumonia/PCP) in immunocompromised patients<sup>1</sup>. Infection with this fungus is an AIDS-defining illness. Occasionally infection is also seen in malignancy patients.

Asymptomatic colonisation of *P. jiroveci* has been described in immunocompromised patients with primary acute and chronic respiratory disorders including bacterial pneumonia, lung fibrosis, transplant patients and lung edema<sup>2,3,4</sup>. The detection of *P. jiroveci* in these groups of patients suggests that lung tissue damage may favour colonisation of this organism<sup>2</sup>. Consequently, colonisation may represent a reservoir for person-to-person transmission in these patients<sup>2,4</sup>.

*Pneumocystis jiroveci* does not respond to conventional anti-fungal agents and so identification is key to successful treatment.

### **Diagnosis**

*P. jiroveci* cannot be cultured *in vitro* and therefore laboratory diagnosis for many years relied upon cytological staining or immunofluorescent assay. Generally, very few organisms are present within the upper respiratory tract and thus lower respiratory tract specimens such as BAL and induced sputa (in conjunction with other clinical indicators) are usually required for the definitive diagnosis of pneumocystis pneumonia.

PCR detection offered at Micropathology Ltd. allows for the detection of *P. jiroveci* DNA in a range of clinical samples.

#### **1. Blood**

Several studies have demonstrated that *P. jiroveci* can be detected in serum and blood product derivatives<sup>5,6,7,8</sup> however, due to the conflicting results obtained, the

usefulness of such samples in detecting the presence of *P. jiroveci* remains to be established.

Detection in peripheral blood may represent transient dissemination of *P. jiroveci* due to an alteration of the endothelial architecture of the lung, possibly due to prolonged treatment. Alternatively, it may represent the presence of damaged organisms / DNA complexes released from phagocytic cells transiently passing through the bloodstream<sup>5,8</sup>.

Extrapulmonary pneumocystosis, affecting organs such as the spleen, kidney and also the foetus, is a rare condition but demonstrates that the organism can be spread systemically via the bloodstream<sup>9,10</sup>.

## 2. Oral wash

Oral washes may be useful when invasive sampling procedures are not feasible<sup>1,11,12</sup>. Several studies have compared paired oral washes and BAL samples for the detection of *P. jiroveci* and although the results are mixed<sup>13</sup>, most have demonstrated similar specificity and sensitivity between the two sample types<sup>11,12,14</sup>. Antibiotic treatment prior to oral wash sampling negatively affects the detection of *P. jiroveci* DNA<sup>14</sup>. Systematically collected oral wash samples may be useful in monitoring the effectiveness of treatment<sup>11</sup>.

## 3. Respiratory samples

*P. jiroveci* has been detected using molecular methods in respiratory samples including BAL, induced sputum and tracheal aspirates<sup>15</sup>. A study by Gupta *et al.*,<sup>15</sup> investigated the detection of *P. jiroveci* in respiratory samples by PCR when compared to standard microscopy techniques. BAL and sputum were demonstrated to be the most useful clinical samples. None of the nasopharyngeal aspirates tested were positive for the presence of *P. jiroveci* DNA<sup>15</sup>.

Micropathology Ltd. recommend BAL and sputum samples for the detection of *P. jiroveci* DNA (in addition, we accept Naso-pharyngeal aspirates). These sample types have been validated for *Pneumocystis jiroveci* detection using our in-house assay. Where these samples cannot be obtained, there may be some value in testing oral washes, as long as PCP treatment has not already been started.

We would always advise that a diagnosis of PCP is made only after consideration of the full clinical picture.

## References

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