*Chikungunya virus* (CHIKV) is the prototype of the *Alpha virus* genus in the family *Togaviridae*. CHIKV is transmitted by *Aedes spp.*, of mosquitoes and primarily by *Aedes aegypti* (Calisher and Karabatsos 1988). CHIKV was first reported in 1952 in the Southern Province of Tanzania (Lumsden 1955; Robinson 1955). The first ever confirmed outbreak of chikungunya fever in India occurred during 1963-1964 in Kolkata (Shah *et al.*, 1964). Subsequently it was also reported in the erstwhile Madras in 1965. However the last epidemic in India was reported in 1973 from Barsi in the state of Maharashtra (Padbidri and Gnaneswar 1979). After a period of three decades, chikungunya fever (CHIKF) in the recent past has been emerging and re-emerging as an important public health problem world over (Enserink 2007; Ravi 2006).

The magnitude of the outbreak was higher than the chikungunya epidemic last reported (Pavri 1986). The number of suspected cases was estimated to be over one million in the country ([www.nvbdcp.gov.in/chiku-cases.html](http://www.nvbdcp.gov.in/chiku-cases.html) 2007). It has been hypothesized, attributing explosiveness and magnitude of the outbreak to a mutation A226-V in the E1 gene (Santhosh *et al.*, 2009).

Symptoms of CHIKV infection ranges from mild to severe disease characterized by fever, myalgia, arthralgia, rash and headache (Ozden *et al.*, 2007). After the acute phase, polyarthritis may persist for several months to years (Power and Logue 2007). Information on timing of occurrence, evolution and duration of various other symptoms in the acute stage is scanty. Besides, stage specific signs and symptoms in acute stage across age groups have also not been understood. The possible role of CHIKV in destructive arthropathy has been postulated (Brighton and Sinson 1984). However, until recently it has been considered that in chikungunya arthritis, radiological findings are normal (Pialoux *et al.*, 2007).

Atypical presentations such as meningoencephalitis and flaccid limb weakness have been observed in this infection (Patrick and Blaise 2006; Singh *et al.*, 2008). The pathophysiology during CHIKV infection and the basis for disease severity have not been understood (Ozden *et al.*, 2007). Cytokines and chemokines could probably have a role in the immunopathology in chikungunya infection. Only limited studies have been conducted on the cellular damage and the pathway leading to the secretion of these
factors. Currently the immune mechanism in chikungunya infection is poorly understood (Lee et al., 2006).

In 2006 from July through August, medical professionals noticed an increase in the number of cases of febrile illness in Port Blair, the capital city of Andaman and Nicobar Islands. In view of the clinical features suggestive of chikungunya fever and then ongoing epidemic in mainland India, with widespread presence of the vector, *Aedes aegypti*, within the urban agglomeration of Port Blair (Shriram et al., 1999) chikungunya fever was suspected and confirmed. The attack rate during the epidemic was in excess of 60% (Manimunda et al., 2007). During this outbreak there were more than 10 cases with acute flaccid paralysis simulating Guillian Barre Syndrome. Out of these, 4 were confirmed to have CHIKV infection and many subjects were observed with severe chronic arthropathy (Manimunda et al., 2007).

The isolation and characterization of CHIKV were not attempted during the outbreak. Therefore, isolation of CHIKV from the 2006 outbreak in Port Blair assumes significance for understanding the molecular relatedness from other parts of the country. Further this could aid in identifying the CHIKV genotype responsible for explosive outbreak with severe chronicity and atypical manifestations. It is also essential to understand the pathological basis of morbidity in acute and chronic stages of CHIKV infected patients and its immunobiology of CHIKV infection for clinical management of patients.

After a period of two years since the documentation of the chikungunya upsurge in several parts of the country, an outbreak of febrile illness with joint pain was reported to have started from January 2008 in Dakshina Kannada District in the Karnataka State, India (Manimunda et al., 2010). CHIKV infection resulting in rheumatoid arthritis syndrome has been documented (Bouquillard and Combe 2009; Fourie and Morrison 1979). Until recently, it has been considered that in Chikungunya arthritis radiological findings are normal and biological markers of inflammation are normal or moderately elevated (Pialoux et al., 2007). But the acute stage symptomatology across age groups and Magnetic Resonance Image (MRI) findings in chronic arthritis following CHIKV infection has not been documented.
The role of various cytokines and chemokines in patients with varying severity in chronic stage of infection has also not been understood. Therefore, the present study was undertaken to address the following issues viz., Identifying virus responsible for an explosive outbreak in urban Port Blair and to document the evolution of signs and symptoms on time scale, the clinical variation between the CHIKV infected patients (acute and chronic stages), to study the joint pathology through radiology and MRI among the patients. Finally the roles of cytokines and chemokines in acute and chronic patients have also been addressed in the present study. Therefore, against this background the objectives of the present study are as follows:

**Overall Aim:**
To understand the pathological basis of morbidity in acute and chronic patients suffering with *Chikungunya virus* infection.

**Specific Objectives:**
1. Isolation of *Chikungunya virus* from suspected patients with varied clinical manifestations and to further characterize them at the molecular level.

2. To understand the clinical progression of *Chikungunya virus* infection in acute and chronic stages.

3. To understand the pathology of joints in patients with chronic arthropathy through radiology and MRI.

4. Estimate the levels of various cytokines and chemokines in order to understand the immunobiology behind the severity of acute and chronic illness.

5. To study the persistence of anti-chikungunya virus-IgM antibodies on time scale.