Molecular Epidemiology of HBV in the Torres Strait Islander population.

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The Torres Strait Islands are spread across the waterway between the northernmost tip of Australia and the southern shores of Papua New Guinea.

- The Torres Strait Island population is about 10,000, of which 70% are indigenous.
- The traditional land owners are the Kauraureg people.
- Highly mobile population.
Thursday Island
HBV in Indigenous Australians

- Indigenous Australians represent 2.6% of the Australian population, but are estimated to represent 10% of those living with chronic HBV in Australia.
- HCC incidence is 6 times more common among Indigenous people than non-Indigenous people in this region, with the major aetiological factor being chronic HBV infection.
- The prevalence of chronic HBV infection in the Torres Strait Islander population is unknown.
  - The rate in Torres Strait Islander women was documented in 1986–1987 as 11.5% (66 tested positive of 572).

The aim of this study was to characterize the main HBV genotypes circulating in the Torres Strait Islands.
HBV care in the Torres Strait

- Hepatitis B clinics on Thursday Island are conducted by a Cairns based hepatitis nurse. These clinics provide the primary point for ongoing patient review, education and counselling.

- There is currently no centralised database co-ordinating the follow-up and care of chronic hepatitis B patients.

- Basic pathology investigations for hepatitis B can be undertaken on Thursday Island. However, more complex imaging and liver biopsies must be performed at the Cairns Base Hospital, which is a two hour flight south.

- There is overall low health literacy and understanding of hepatitis
Torres Strait Islands

- Samples from 5 sites
- Saibai Island
- Murray Island
- Thursday Island
- Darnely Island
- Bamaga (on mainland Australia)

Thursday Island is the administrative centre of the Torres Strait Island Region
Methods

• The Thursday Island Health Care Council was approached for permission to undertake this project in their community, and their approval was granted.

• Approval was then granted from the Cairns Base Hospital Ethics Committee.

• A respected health practitioner of Torres Strait Islander heritage was present throughout the consent process and interview process.

• Persons of Torres Strait Islander heritage with serologically proven chronic hepatitis B aged 18 years of age and above were invited to participate in this project.

• Serum samples were sent to VIDRL, sequencing was carried out on the polymerase/envelope region for initial genotyping.

• HBV Full genome sequence was of some samples were carried out to confirm the genotype.

• For phylogenetic analysis, sequences were compared to a set of published reference sequences representing the 9 human HBV genotypes (25 sub-genotypes).
Clinical features (18 samples)

8 male/10 female

66% HBeAg positive (12/18)

Mean serum ALT 27.1±18.9 IU/L

Mutation analysis

- The G145R vaccine escape mutation was detected in one sample.
- BCP/PC mutations were detected in 13 samples (13/18 – 72%)
- From HBV full genome analysis.
  - PreS1/S2 deletions detected in 3 samples (3/10 – 30%)
  - Core gene deletion was detected in 1 sample.
Results
HBV genotype

40 samples were obtained

Genotype was able to be determined for 18 samples

All samples were HBV Genotype C

- 14 samples grouped with HBV subgenotype C14
- 2 samples grouped with HBV subgenotypes C10/C14
- 2 samples grouped with other HBV genotype C subgenotypes
Results
HBV full genome

To confirm the subgenotype, HBV full genome sequence was obtained from 10 samples.

All 10 samples were confirmed HBV Genotype C

- 9 samples grouped with HBV subgenotype C14
- 1 sample grouped with HBV subgenotype C13
Map of Indigenous HBV/C sub-genotypes in Oceania
Future Studies

Further characterise the HBV genotypes found throughout Northern and Central Australia, including the Torres Strait Islands.

A project to determine HBV genotypes present in people from Far North Queensland (FNQ), as well as describe barriers and enablers to HBV management in a correctional centre and pre and post release in FNQ.

A study to assess the association between HBV genotype and clinical outcomes in Indigenous people from urban and regional NSW who have chronic HBV.

A project to examine the consequences of co-infection with HBV and HTLV-1 in Indigenous Australian people from Central Australia.
Conclusion

• The HBV circulating in the Torres Strait Islander population was determined to belong to sub-genotypes HBV/C13 and HBV/C14.

• The sequences were most closely related to HBV sequences isolated from Papua New Guinea and Papua, Indonesia.

• The HBV isolated from the Torres Strait Islanders is notably different to the HBV/C4 strain isolated from Indigenous people of mainland Australia.

• This reflects the differences in culture and origin between the Torres Strait Islanders, and the mainland Indigenous people.
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