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Chikungunya virus infection and cholangiocarcinoma; a common pathway network analysis

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ABSTRACT

Cholangiocarcinoma is an important endemic malignancy in Southeast Asia. This hepatobiliary cancer is related to the chronic opisthorchiasis. In the same area of Indochina, Chikungunya virus (CHIKV) infection, another mosquito borne infection, is also prevalent. An interesting observation is the null prevalence of concurrent CHIKV infection and cholangiocarcinoma. In this study, the authors used bioinformatics pathway analysis for clarification on this interesting phenomenon. From analysis, no co-occurrence of the two diseases is explainable from the pathway network.

Core tip: Chikungunya virus infection and cholangiocarcinoma, are common in Indochina, however, there is no report on co-occurrence of the two diseases.

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Introduction

Cholangiocarcinoma is an important hepatobiliary cancerous disease which is extremely prevalent in Indochina (1). The patients with this cancer usually manifest severe hyperbilirubinemia and hyperalkalinephosphatemia (2). The prognosis of disease in the patient presenting with late stage disease is usually grave (3). A local endemic chronic parasitic infection, opisthorchiasis is known for its etiopathological relationship with this cancer (4).

In the same tropical endemic area, Chikungunya virus (CHIKV) infection, an arbovirus infection, is another important common public health problem (5,6). An interesting epidemiological observation is the null prevalence of concurrent CHIKV infection and cholangiocarcinoma.

Objectives

In this study, the authors used bioinformatics pathway analysis for clarification on this interesting phenomenon. From analysis, no co-occurrence of the two diseases is explainable from the pathway network.

Materials and Methods

Based on bioinformatics technique, the authors used standard pathway expression analysis, as used in referenced publication (7), for network appraisal. Starting from database literature searching for the reports on the pathway described in cholangiocarcinoma and CHIKV virus infection, the identified collected pathways from all reports were assessed to determine the common pathway between the two disorders (CHIKV infection and cholangiocarcinoma). The network mapping of the identified common pathway was further performed to represent the possible same pathomechanism.

Results

There are detected common pathways between CHIKV infection and cholangiocarcinoma (8, 9). The identified common node from network analysis is the vimentin expression. The competitive mechanism in case with concurrent CHIKV infection and cholangiocarcinoma is observed and hereby presented in Figure 1.

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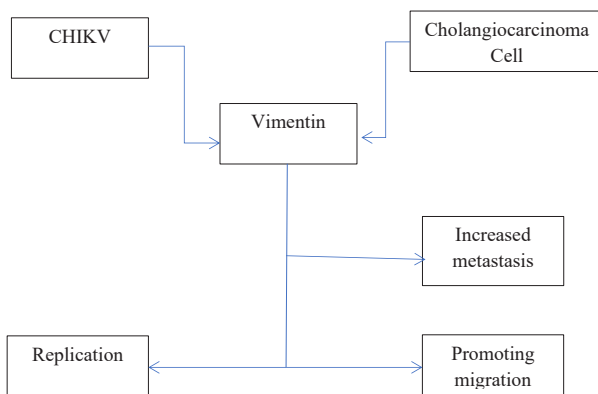


Figure 1. Competitive mechanism between CHIKV infection and cholangiocarcinoma via vimentin.

Discussion

The pathway mapping with expression analysis is an important standard informatics tool for clarification on the pathogenesis of medical disorders. In oncology, this bioinformatics technique can be applied for appraisal of the complex pathological network in malignancy. Also, the situation of co-pathology between cancer and non-cancer diseases can be analyzed by this approach. The good example is the previous publication using network analysis for clarifying the pathophysiological process in co-occurrence of hepatitis C infection and renal cell carcinoma (7).

In this report, the authors successfully identified the common pathways via vimentin between CHIKV infection and cholangiocarcinoma. While CHIKV uses vimentin for replication process, the carcinoma cholangiocarcinoma cell uses vimentin in metastasis and cellular migration. It is no doubt that this is a competitive process between the two medical problems. In fact, both disorders, CHIKV infection and cholangiocarcinoma, are common in Indochina, however, there is no report on co-occurrence of the two diseases. Of interest, the concurrence between dengue and other less common malignancy such as osteosarcoma is published in the literature (10).

Conclusion

The identified competitive mechanism via vimentin is a possible explanation for the observation of non-concurrence in the tropical endemic Indochina setting of both public health problems.

Authors' contribution

Both authors wrote the manuscript equally.

Conflict of interests

The authors declared no competing interests.

Ethical considerations

Ethical issues (including plagiarism, misconduct, data fabrication, falsification, double publication or submission, redundancy) have been completely observed by the authors.

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References

1. Khuntikeo N, Titapun A, Loilome W, Yongvanit P, Thinkhamrop B, Chamadol N, et al. Current Perspectives on Opisthorchiasis Control and Cholangiocarcinoma Detection in Southeast Asia. *Front Med (Lausanne)*. 2018; 5:117. doi: 10.3389/fmed.2018.00117.
2. Wiwanitkit V. Clinical findings among 62 Thais with cholangiocarcinoma. *Trop Med Int Health*. 2003; 8:228-30.
3. Buisson Y. Control of *Opisthorchis viverrini* infection for cholangiocarcinoma prevention. *Bull Soc Pathol Exot*. 2017; 110:61-67. doi: 10.1007/s13149-017-0544-8.
4. Wiwanitkit V. Dengue fever: diagnosis and treatment. *Expert Rev Anti Infect Ther*. 2010; 8:841-5. doi: 10.1586/eri.10.53.
5. González-Sánchez JA, Ramírez-Arroyo GF. Chikungunya Virus: History, Geographic Distribution, Clinical Picture, and Treatment. *P R Health Sci J*. 2018; 37:187-194.
6. Pulmanusahakul R, Roytrakul S, Auewarakul P, Smith DR. Chikungunya in Southeast Asia: understanding the emergence and finding solutions. *Int J Infect Dis*. 2011; 15:e671-6.
7. Wiwanitkit V. Renal cell carcinoma and hepatitis C virus infection: is there any cause-outcome relationship? *J Cancer Res Ther*. 2011; 7:226-7. doi: 10.4103/0973-1482.82931.
8. Saentaweek W, Araki N, Vaeteewoottacharn K, Silsirivanit A, Seubwai W, Talabnin C, et al. Activation of Vimentin is Critical to Promote a Metastatic Potential of Cholangiocarcinoma Cells. *Oncol Res*. 2018; 26:605-616. doi: 10.3727/096504017X15009778205068.
9. Issac TH, Tan EL, Chu JJ. Proteomic profiling of chikungunya virus-infected human muscle cells: reveal the role of cytoskeleton network in CHIKV replication. *J Proteomics*. 2014;108:445-64.
10. Totadri S, Radhakrishnan V, Raja A, Sagar TG. Chikungunya Fever with Seizures, Myocarditis, and Severe Thrombocytopenia in a Child With Osteosarcoma. *Pediatr Blood Cancer*. 2016; 63:1687. doi: 10.1002/pbc.26040.