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The Auditorium (Level 1)

The role of A-to-I RNA editing by Adar in zebrafish development

Dr Cecilia L. WINATA
International Institute of Molecular and Cell Biology, Poland

Dr Cecilia obtained her PhD in 2009 from NUS (Singapore) under the supervision of Profs Gong Zhiyuan and Vladimir Korzh. She joined the GIS (A*star, Singapore) as a postdoc in the lab of Dr Sinnakaruppan Mathavan, where she studied zebrafish genomics. In 2014, she became a Max Planck/IIMCB group leader at the IIMCB Warsaw (Poland). Her lab studies developmental gene regulation in zebrafish.

Adenosine deaminases (ADARs) catalyse the deamination of adenosine to inosine, also known as A-to-I editing, in RNA. Although RNA editing occurs widely across animals, its biological roles are still elusive. Here, we study the role of A-to-I editing by Adar, the zebrafish orthologue of mammalian ADAR1. We found that RNA editing is pervasive during early embryogenesis, and that it occurs predominantly in the 3'-UTR. Transcripts implicated in gastrulation and embryonic patterning were found to contain multiple editing sites. Functional analysis further revealed that maternal *adar* is essential for anteroposterior and dorsoventral patterning, and that this function is dependent on an intact deaminase domain. On the other hand, zygotic Adar is implicated in the regulation of innate immune response – a function conserved with that of mammalian ADAR. Our study therefore established distinct maternal and zygotic function of RNA editing by Adar in embryonic patterning and regulation of innate immune response, respectively.

Recent Publications:

1. Niescierowicz K., Pryszcz L., Navarette C., Tralle E., Sulej A., Abu Nahia K., Kasprzyk M., Misztal K., Pateria A., Pakula A., Bochtler M., **Winata C**. Adar-mediated A-to-I editing is required for establishment of embryonic body axes in zebrafish. bioRxiv 2021.08.26.457081. *Nature Communications* (accepted).
2. Abu Nahia K,. Migdał M., Quinn T.A., Poon K.L., Łapiński M., Sulej A., Liu J., Mondal S.S., Pawlak M., Bugajski Ł., Piwocka K., Brand T., Kohl P., Korzh V., **Winata C**. (2021) Genomic and physiological analyses of the zebrafish atrioventricular canal reveal molecular building blocks of the secondary pacemaker region. *Cellular and Molecular Life Sciences* 78(19-20):6669-6687.
3. Minhas R., Loeffler-Wirth H., Siddiqui Y.H., Obrębski T., Vashisht S., Abu Nahia K., Paterek A., Brzozowska A., Bugajski L., Piwocka K., Korzh V., Binder H., **Winata C.L.** (2021) Transcriptome profile of the sinoatrial ring reveals conserved and novel genetic programs of the zebrafish pacemaker. *BMC Genomics*. 22(1):715.