

SEEWIESEN

LECTURE SERIES

FALL/WINTER 2018/19

Max Planck Institute
for Ornithology



MAX-PLANCK-GESELLSCHAFT

THURSDAY | November 8th, 2018 | 13 P.M. | HOUSE 4 LECTURE ROOM

MIKE McGREW

University of Edinburgh | Host: Department Gahr

Precision breeding and reproductive technologies for bird conservation and tropical poultry adaptation

Studies using the chicken have made very significant contributions to understanding the development of vertebrates owing to the ease in manipulating the chicken embryo. The chick model system has become even more useful with the sequencing of the chicken genome and development of a robust method for transgenesis in the chicken (McGrew et al., 2004). It was also shown that migratory primordial germ cells from the chicken could be cultured in vitro for extended periods and used to generate transgenic chickens (van de Lavoie et al, 2006).

My laboratory works on a type of stem cell in birds, the primordial germ cell, which is lineage restricted to producing spermatozoa and eggs of birds. These cells can be used to generate gene edited chickens, chicken which contain precise genetic changes in their genome. We have previously demonstrated that chicken primordial germ cells can be efficiently modified in vitro using transposable elements. I will discuss our use of new CRISPR/Cas9 vector to efficient edit single nucleotides in primordial germ cells and the use of sterile surrogate chicken hosts to increase germline transmission rates and decrease the time needed for production of genome edited chicken.

WHO IS MIKE McGREW?

1996	PhD Boston University School of Medicine, USA
1997	EMBO postdoctoral fellowship, IBDM, Marseille, FR
2001	Industry sponsored postdoctoral fellowship, Roslin Institute, UK
2012	Group Leader, Roslin Institute, University of Edinburgh, UK
2018	Senior Lecturer, Roslin Institute, University of Edinburgh, UK

SELECTED PUBLICATIONS

- Idoko-Akoh A, Taylor L, Sang H, McGrew MJ. 2018. High fidelity CRISPR/Cas9 increases precise monoallelic and biallelic editing events in primordial germ cells. *Sci Rep.* 11:15126.
- Woodcock M, Idoko-Akoh A, McGrew MJ. 2017. Gene editing in birds takes flight. *Mammalian Genome*, 28:315–323.
- Taylor L, Carlson DT, Nandi S, Sherman A, Fahrenkrug S, McGrew MJ. 2017. Talen-mediated targeting in chicken Primordial Germ Cells. *Development*, 144: 928-934
- Nandi S, Whyte J, Taylor L, Sherman A, Nair V, Kaiser P, McGrew MJ. 2016. Cryopreservation of specialized chicken lines using cultured primordial germ cells. *Poultry Science*, 95:1905-1911.
- Whyte J, Glover JD, Woodcock M, Taylor L, Brzeczczynska J, Sherman A, Kaiser P, McGrew MJ. 2015. FGF, insulin and SMAD signalling cooperate for avian primordial germ cell self-renewal. *Stem Cell Reports*, 5:1171-82.
- Macdonald J, Taylor L, Kawakami K, Takahashi Y, Sang HM, McGrew MJ. 2012. Efficient modification of primordial germ cells using transposable elements. *PNAS* 109:E1466-1472.
- Zhao D, McBride D, Nandi S, McQueen HA, McGrew MJ, Hocking PM, Lewis PD, Sang HM, Clinton M. 2010. Somatic sex identity is cell-autonomous in the chicken. *Nature* 464:237-42.

CO-ORDINATOR Nicole Fritz | nicole.fritz@orn.mpg.de | 08157 - 932 240