The 35th Annual Meeting of the Japanese Society for Alternatives to Animal Experiments
日本動物実験代替法学会 第35回大会

株式会社新日本科学グループ
Ina Research Inc.

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株式会社イナリサーチ 共催
（株式会社新日本科学グループ）

ランチョンセミナー

２０２２年１１月２０日（日）

13:00～14:00

会場：静岡県立大学 草薙キャンパス
第２会場（13411講義室）
〒422-8526
静岡市駿河区谷田52-1

プログラム

麻布大学

「吸入毒性試験は細胞を用いたin vitro法で代替できるのか？」

福山朋季
麻布大学獣医学部 獣医学科 薬理研究室 准教授

ZeClinics
Powering discovery with Zebrafish

“Zebrafish, a great model for the development of pharmaceutical compounds in ophthalmology.”

Ana G. Duran, Ph.D.
Sales and Account Manager, Commercial Department, **ZeClinics**

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＜略歴・学会活動など＞

2004年3月　東京農工大学 農学部 獣医科卒業（獣医師免許）
2011年3月　岐阜連合獣医大学より獣医学博士号を受理

2004年4月　一般財団法人残留農薬研究所
2014年5月　ノースカロライナ州立大学 獣医部 博士研究員
2018年10月　麻布大学獣医学部 薬理学研究室

・日本免疫毒性学会 理事
・Journal of Immunotoxicology editorial board
・JaCVAM皮膚感作性試験資料編纂委員

＜要旨＞

実験動物を用いた吸入毒性試験は、農薬や一部の化学物質では必須検査項目となっているが、近年の感染症対策として、空中散布消毒薬や気道を標的とした新規医薬品やワクチンの開発が進んでおり、医薬品開発においても吸入毒性試験の需要が増している。現在の吸入毒性試験ガイドラインでは、鼻部や頭部等の曝露が主流となっており、曝露期間中は動物を30分～6時間特殊な固定器に収容する必要がある。最新の吸入曝露装置は動物に最大限配慮した方法が確立されてはいるものの、他の投与経路と比較すると負荷は大きい。また、特殊な機器を必要とすることで、他の投与経路と比較して費用も大きく、動物愛護面でも価格的な面でも、細胞を用いたin vitro吸入毒性代替法の開発は急務である。しかし、被験物質が気体として存在する吸入毒性試験をin vitroで置き換える事は困難で、これまでに確立された吸入毒性試験の代替法は存在しない。

本講演では、吸入毒性試験の簡単な説明と吸入毒性試験に関するin vitro代替法開発の現状、今後の展望について、実際のデータを交えながら紹介する。

-Keywords:**吸入毒性試験、医薬品、農薬、化学物質、細胞**

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Zebrafish, a great model for the development of pharmaceutical compounds in ophthalmology.

Ana G. Duran, PhD
Sales and Account Manager,
Commercial Department, **ZeClinics**

ZeClinics®
Powering discovery with Zebrafish

Biography:

Ana G. Duran is a PhD-level biotechnologist currently developing business relationships between ZeClinics and different types of industries all over the world. Ana passionately uses her scientific knowledge and natural communication skills to understand the needs of the different players and provide customer-focused scientific CRO solutions.

Abstract:

Zebrafish is an instrumental system to model a variety of ocular diseases and to identify therapeutic pathways owing to its highly conserved eye architecture and high degree of genetic homology with humans.

Zebrafish are diurnal and thus have cone-rich eyes, akin to the macula in humans, resulting in color vision with a cone density similar to humans [1]. This feature gives an advantage to Zebrafish for the study of the eye and the development of compounds compared to rodent models. In terms of eye development, Zebrafish display in depth molecular complexity and stringent spatiotemporal regulation similar to that seen in humans. In addition, the adult fish retina possesses a robust capacity to replace lost neurons following injury. All of these factors make the zebrafish an invaluable vertebrate system for studying human ocular development, diseases, and identifying new regenerative therapies [2].

So far, the use of therapeutic compounds administered via intravitreal eye injection has been increasing over the last two decades as medical practice for the treatment of retinopathies [3]. Rabbit and rodents are the most commonly used animals for intravitreal (IV) drug delivery and pharmacokinetics [4,5], while the use of zebrafish to test the administration of therapeutic or neuroprotective compounds is scarce [9]. Therefore, we have validated a protocol for IV injection of compounds of interest in zebrafish adult eyes. This procedure allows screening molecules with potential neuroprotective effect in an AMD model and other ocular diseases.

In our recent study, intravitreal injection of recombinant human nerve growth factor (NGF) in adult zebrafish led to a faster retinal damage recovery in a model of light-induced retinal degeneration [2]. These results demonstrated the highly conserved nature of the NGF canonical pathway in zebrafish and, in addition, support the use of zebrafish models for testing new compounds with potential retinal regenerative properties.

In addition to adult models, the zebrafish larvae models are also relevant to test new drugs and evaluate their effect through behavioral phenotyping, which results in a higher throughput and 3R compliance. By 72 hours post fertilization (hpf), the zebrafish retina is comparable to the retinal morphology of an adult human. ZeClinics is currently expanding its portfolio to provide such models.

References:

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-Keywords: **Retinopathies; Ophthalmological drug development, AMD-dry, Animal Models in ophthalmology, Zebrafish retina; Intravitreal injection**