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結核菌を電子顕微鏡による観察で可視化して、想定される現象がどこで起きているのか、どのような分子、構造が関与しているのか、菌体による違いはないかどうかを研究しています。

近年、同一の遺伝子構成を持つクローン抗酸菌細胞でも表現型に差が生じるというデータが報告されています。一卵性双生児でも指紋が異なることから考えると当然のことですが、それを裏付けるには形態学的観察が必須です。光学顕微鏡による単一菌体の連続観察で、1つの菌に由来し同一の遺伝子情報を共有する子孫細胞が異なる形態、異なる薬剤感受性、異なる寿命を持つことが鮮明な画像で示す論文が多数発表されています。

光学顕微鏡観察では菌体の形態学的概要はわかりますが、より詳細な観察をするには電子顕微鏡観察が必要です。できるだけ生きた状態に近い標本を作製するために急速凍結・凍結置換法を用いて試料を作製して、透過型電子顕微鏡で高倍率観察することで、他の手法で想定されていても未だ証明されていない現象を定性的のみならず、定量的にも研究していきたいと考えています。

また、結核菌塗抹検査に携わる技師さんのトレーニング用に、培養細胞、ポリアクリルアミドと液体培養してフォルマリン固定した結核菌を使って人工痰を開発しました。この人工痰を使って陽性度を調節したパネルテストスライドを作製しています。

結核菌の電子顕微鏡写真掲載をご希望のマスコミ、出版関係の方、人工痰、パネルテストスライドを使ってみたい方はご連絡下さい。(E-mail: hyamada@jata.or.jp)

所属学会

- ・ 日本顕微鏡学会
- ・ 日本結核病学会
- ・ 日本細菌学会
- ・ 日本生物物理学会

受賞歴

- ・日本顕微鏡学会 第21回技術功労賞（2016）[生物系応用研究部門]
- ・日本顕微鏡学会 第33回論文賞（第15回和文誌賞）（2018）

著書（共著）

結核改訂版(光山正雄、鈴木克洋編)、II 結核菌の基礎 1. 結核菌の構造、pp31-41, 医薬ジャーナル社、2017.

原著論文等

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