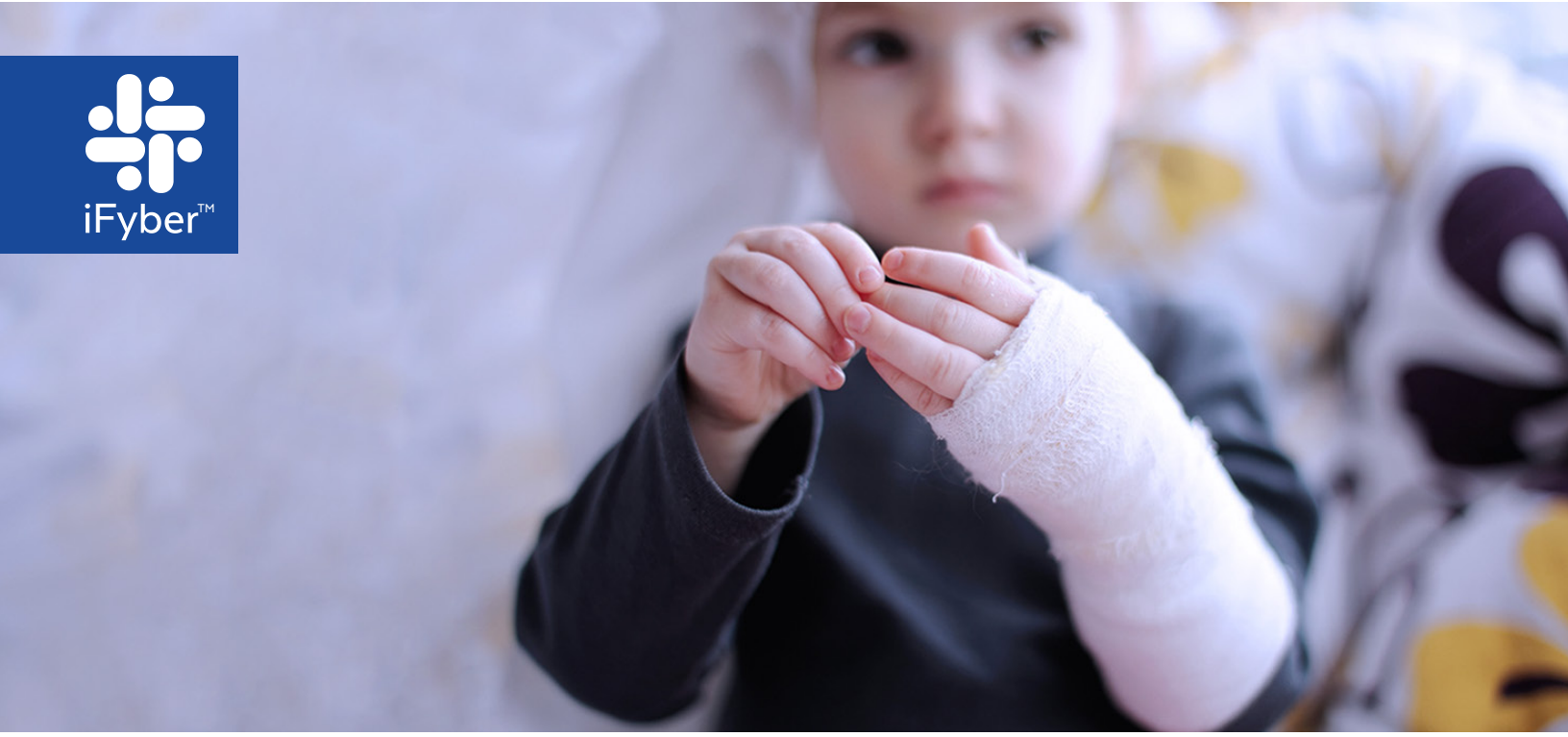

# BIOFILM SUSCEPTIBILITY TESTING

## WHAT IS A BIOFILM?

At a basic level, a biofilm consists of bacterial communities encased within a self-produced protective matrix of sugars and proteins. Compared to free-floating (planktonic) forms of bacteria, biofilm-associated bacteria are much more difficult to kill due in large part to the presence of this protective matrix and a reduction of metabolic activity. Biofilms have been demonstrated to form on a range of surfaces, including medical devices and human tissue systems. iFyber offers a menu of assays that assess biofilm prevention and dispersal efficacy.

## WHY INCLUDE BIOFILM SUSCEPTIBILITY TESTING?

Biofilms pose a major clinical threat. Current estimates from the US National Institutes of Health suggest biofilms account for over 80% of all clinical infections. Given the relatively recent understanding of biofilms, antibiofilm efficacy testing is becoming an increasingly common addition to the screening profile of new antimicrobial technologies.

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iFyber is a preclinical contract research organization offering customized services to companies that operate at the interface of chemistry, microbiology and materials science. iFyber is unique. We pride ourselves on providing access to top scientists and creatively solving problems with quick turnaround times.

## THINK OF iFYBER AS:

- Consultants with a laboratory to back up ideas with data
- An academic lab, solving R&D problems on corporate or start-up timelines
- A testing lab that develops new methods tailored to clients' products and services
- An extension of your R&D lab

## INFECTIONS ASSOCIATED WITH BIOFILMS

- Chronic infected wounds
- Catheter-associated urinary tract infections (CAUTI)
- Central line-associated and catheter-related bloodstream infections (CLABSI and CRBI)
- Acute bacterial skin and skin suture infection (ABSSSI)
- Ventilator-associated pneumonia (VAP)
- Acute otitis media (ear infection)
- Acne vulgaris
- Gingivitis
- Cystic fibrosis lung infection

For more information on iFyber's services: www.ifyber.com | info@ifyber.com | 607.330.2307

## *EX VIVO* PORCINE DERMAL MODEL FOR MATURE BIOFILMS:

### WHAT IS IT?

This custom assay is a robust model of a mature bacterial biofilm, which are a hallmark of many bacterial infections that occur in soft tissues. This model isolates the biofilm component of these infections through the growth of a mature biofilm within a natural porcine dermal matrix. The resulting biofilm (typically grown over 72 hours) exhibits high tolerance to many antibiotics and, importantly, incorporates a relevant substrate when assessing product efficacy in the presence of soft tissue. iFyber has extensive experience adapting this model to our clients needs to test for antimicrobial and anti-biofilm activity against a model for mature biofilm exhibiting tolerance to high doses of antibiotics. In this model, tissue explants are created, wounded, and subsequently infected to enable high throughput screening using a number of assay formats (prevention, eradication, dispersal, synergy).

### WHY USE IT?

The characteristics of biofilms grown on non-biological substrates can differ from what occurs in soft tissue. When looking for antimicrobial solutions to eradicate biofilms from wounds in particular, it can be informative to use an assay that closely approximates the wound environment. Porcine skin is physiologically very similar to that of human skin. Using skin as both the substrate for attachment, and the primary source of nutrition, allows for the development of a biofilm that mimics the characteristics of biofilms found in human wounds. This ex vivo model allows for a high throughput screening of compounds, prototype formulations, solid wound dressings, etc., to complement/augment more costly animal studies.

## MINIMUM BIOFILM ERADICATION (MBEC) ASSAY:

### WHAT IS IT?

This high throughput assay comes in a microwell plate format, enabling growth of 96 bacterial biofilms on polystyrene pegs that protrude down from the lid of the plate into the corresponding well. As the biofilms are attached to the removable peg lid, this assay is set up to allow rapid testing of a range of materials for antibiofilm efficacy. Quantification is achieved by recovering remaining bacteria from the peg lid and enumerating either by standard agar plate counts, or for high throughput purposes, by optical density. iFyber has extensive experience using this assay system to screen antibiofilm technologies against both single-and multi-species biofilms.

### WHY USE IT?

The MBEC assay system (also known as the Calgary Biofilm Device) is accepted as a standard antibiofilm testing approach by the American Society of Textile Manufacturers (ASTM), and is widely used in both industrial and academic settings. As biofilms are cultured on a removable peg lid to provide a high throughput screening tool for assessing biofilm dispersal, eradication or prevention. The system can be used to test both soluble and insoluble materials, unlike other microwell plate-based assay system.

## MICROWELL BIOFILM SUSCEPTIBILITY ASSAYS:

### WHAT IS IT?

This 96-well microtitre plate-based assay involves culturing bacterial biofilms in the wells of the plate, then exposing the formed biofilms to the test agent for a pre-defined time. The total remaining biofilm after exposure to the antimicrobial material is typically quantified by fluorescence methods using the nucleic acid stain, SYTO-9, or colorimetrically using Crystal Violet —a visible Gram stain that labels all components of a biofilm.

### WHY USE IT?

This assay is often used as an initial screen for antibiofilm technologies. It is quick and easy to run, and can help guide further biofilm testing using more complex model systems. The fluorescent dye strategy allows for quantification of biofilm bacteria or total biomass which includes the exopolysaccharide matrix.