

# The evolution of wound dressings: past, present, & future approaches to address local barriers to wound healing

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## Introduction

- Major advancements in wound dressing technologies have historically targeted three key local barriers to wound healing :
  - Exudate management
  - Infection management, and most recently...
  - Biofilm management
- The fluid handling capabilities in dressings have been enhanced from basic cotton gauze through to advanced gelling fiber dressings
- Antimicrobial dressing chemistries have evolved from simple coating to chemical functionalization
- Antibiofilm excipients have been added to antimicrobial dressings to enhance antibiofilm activity

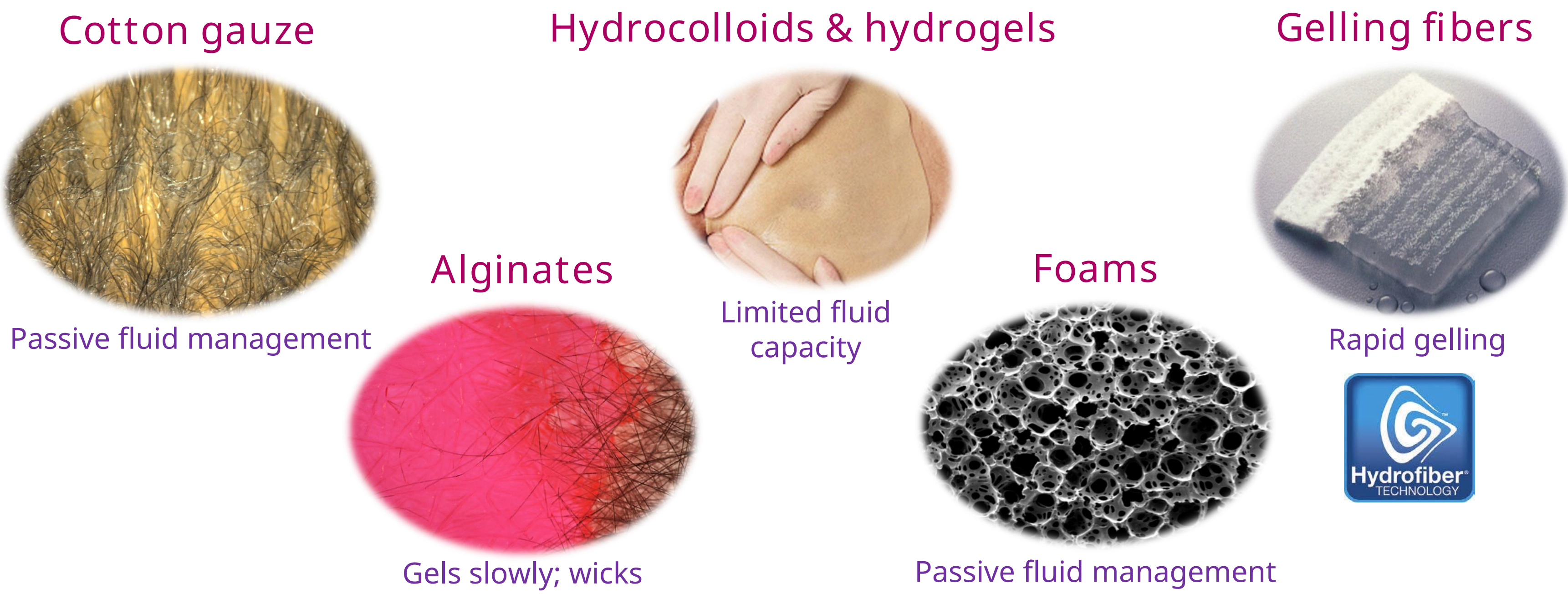
- Dressings continue to evolve to address barriers to, and support healing of, hard-to-heal wounds

Objective

The aim of this narrative review was to highlight key advancements in wound dressing technology during the last three decades. We focus on innovations that target key local barriers to healing (exudate, infection, biofilm), and explore areas that are ripe for innovation in the near future

## Past & Present: Exudate

- Dressing materials have advanced from basic gauzes to alginates, hydrocolloids, and foams, to advanced gelling fibers
- These provide clinically useful material properties for the management of moderately to highly exuding wounds<sup>1</sup>



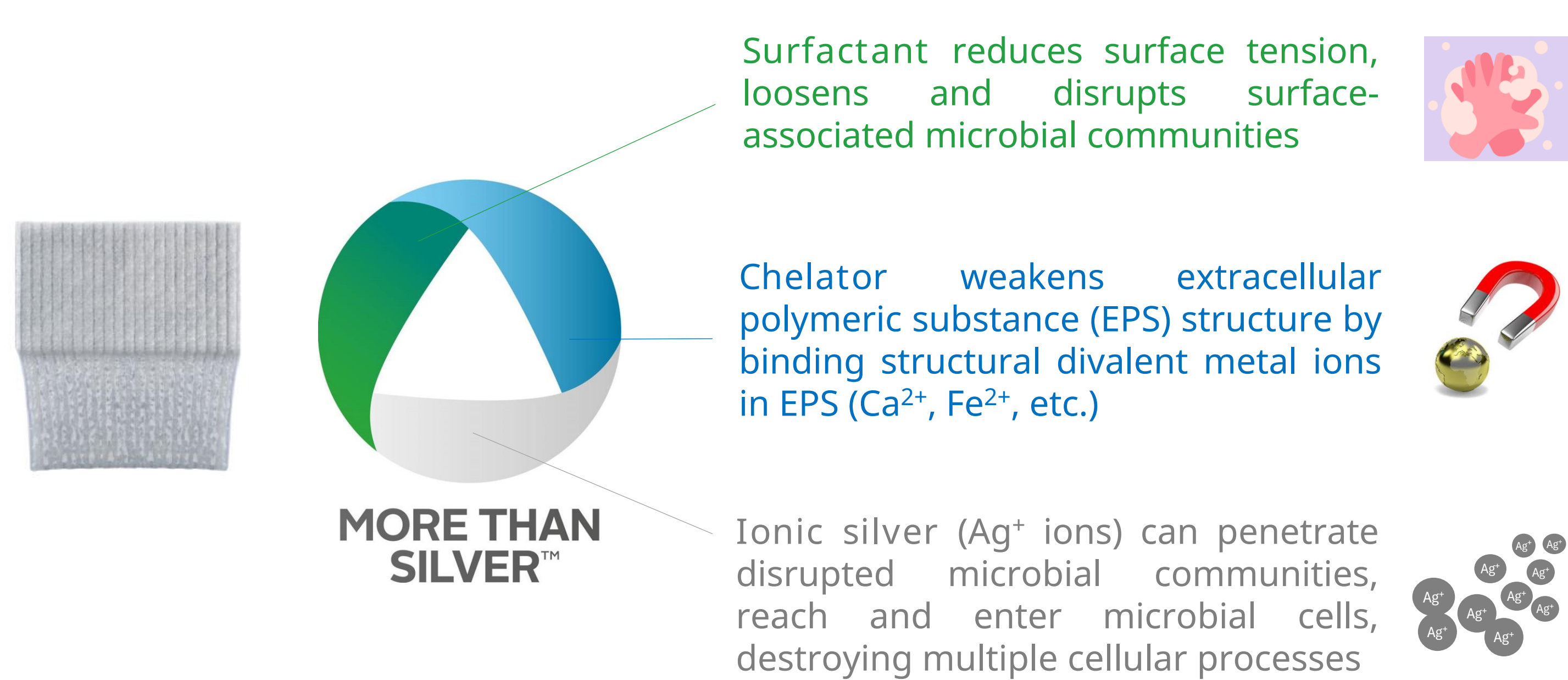
## Past & Present: Infection

- Iodine and honey are not easy to formulate, but gauze dressings are still a front-line antimicrobial option
- The chemical binding of, for example, ionic silver to carboxymethylcellulose gelling fibers provided a safe and effective method for infection prevention and treatment



## Present: Surface-associated microbial communities (biofilm)

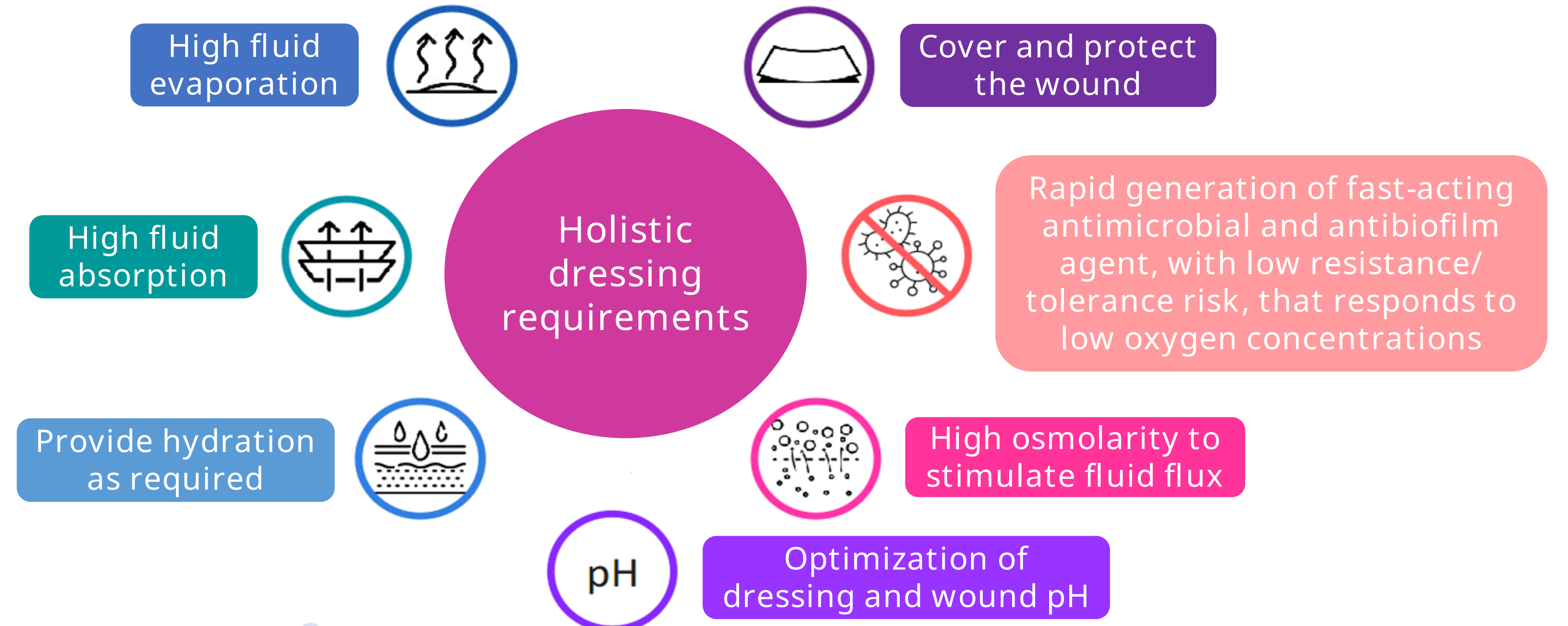
- Biofilm has emerged as a significant contributor to wound chronicity in the past two decades<sup>13-16</sup>
- The first dressings specifically designed to manage these surface-associated microbial communities, Aquacel Ag Advantage, was made available in Europe in 2014 and US in 2018\*:
- Various other approved silver-containing gelling fiber dressings utilize silver salts
- However, these dressings lack ingredients or properties that can disrupt surface-associated microbial communities, and demonstrate limited activity in standard and validated laboratory biofilm tests<sup>17-20</sup>
- Silver gelling fiber dressings with combined surfactant-chelator are in development<sup>21</sup>



\*NOT ALL CLAIMS ARE SUPPORTED IN ALL REGULATORY GEOGRAPHIES

## Future:

- Future dressings will require multifaceted characteristics to reflect the complexity of hard-to-heal wounds, and should ideally be able to simultaneously manage multiple local barriers to healing
- Such dressings may combine physical and chemical properties, to not only manage exudate, infection<sup>22</sup>, and biofilm<sup>23</sup>, but also address healing barriers such as tissue perfusion (e.g., stimulate fluid flux) or hypoxia (e.g., employing antimicrobial systems that respond positively to low oxygen concentrations<sup>24</sup>)



Conclusion

By addressing factors such as perfusion and hypoxia, as well as exudate, infection and biofilm, future dressing technology may facilitate the power of the host immune and wound healing systems

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