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MYTHS AND REALITIES OF LABORATORY GLOVES

Virtually every task in the laboratory entails the use of gloves and it is fair to say that they are our constant companion for the most of the working day. Not surprisingly for something which shares such as an intimate relationship with our lives, gloves may be a frequent topic of discussion. With this in mind and taking into account the huge diversity of gloves used in the laboratory, is it any surprise that stories relating to gloves have reached mythical proportions.
We will now consider some of the most commonly encountered myths and provide a reality check.

Myth 1: Only natural latex gloves can give me an allergy

As we wear gloves more frequently and for longer periods, the issue of glove-associated allergy is becoming an increasing concern. Whilst natural latex gloves are often associated with some of the most serious symptoms (latter may be systemic and can even lead to anaphylaxis), all glove materials have the potential for causing allergies. *1*2Chemical allergy is more commonly encountered than natural latex allergy, but is often confused with the latter. With natural latex and nitrile gloves, chemical allergy is frequently derived from the accelerators (e.g. thiazoles dithiocarbamates, thiurams etc) that are used in the vulcanisation process. Plasticizers such as phthalates are often found in vinyl gloves and can also trigger a chemical allergy.

Reality: all glove materials have the potential for causing an allergy

Myth 2: All nitrile gloves offer the same chemical resistance

With nitrile offering a broad range of chemical protection, this glove material is often selected where chemical exposure is a concern. In the face of increasing price pressure and perhaps also to give users latex-like comfort, manufacturers have been steadily reducing the thickness of their gloves. If we look at the palm thickness (the part of the glove that is most likely to be in contact with chemical exposure), then the thickness of nitrile gloves may vary from 0.07mm to 0.14mm. With such a wide variation in palm thickness, comes varying levels of chemical protection.

Reality: Not all nitrile gloves offer the same level of protection. Seek out data on palm thickness and even better ask glove manufacturer to provide glove-specific chemical data.

Myth 3: Gloves of the same material and thickness offer a similar level of chemical resistance

Whilst there may be a correlation between glove material, thickness and chemical resistance properties, other factors may need to be borne in mind. Chlorination of gloves can give them a polished surface, which can enhance their chemical resistance. Likewise the waxy or polymer coating that is applied to gloves as an alternative to powder can act as an additional barrier to chemical exposure. Such variations reinforce the need to seek out product-specific chemical permeation data, which is available on most manufacturers' websites.

Reality: gloves of the same material and thickness may vary in their chemical resistance

Myth 4: All gloves have the same barrier properties

Gloves are often worn as a barrier for personal protection or for process protection and often for both. Prior to use, gloves may exhibit equivalent barrier properties as defined by AQL. The latter refers to the statistical probability of holes in the gloves. In-use, glove material, thickness, degradation etc will influence the potential to develop holes. A simulated use study by Kerr*[3] revealed failure rates of respectively 35% and 9% in vinyl and latex. To assess the barrier performance of your gloves, you can perform your own test by wearing a pair for a defined time then filling them up with water to see whether they leak.

Reality: different glove materials offer different levels of barrier resistance

Myth 5: Gloves that are textured offer better grip

Glove wearers in the laboratory often favour gloves that have textured surfaces and particularly those with textured fingertips believing that this will give them better grip. Whilst this may be the case, a textured glove does not always equate with good grip. In fact it is possible to manufacture textured gloves with low grip and smooth gloves with high grip. Glove manufacturers often refer to "tack" (i.e. level of grip) and this is particularly relevant to natural latex gloves which are naturally "tacky". Through the surface treatment (typically based on chlorination), manufacturers can alter the tack level. The question of tack is a constant dilemma for manufacturers. Too much tack leads to the gloves sticking together and having unacceptably high levels of residual chemicals (latter may be skin irritants) and too little, the gloves may be clean but provide not enough grip.

Reality: Grip on gloves is determined by surface tack, which is controlled by the level of chlorination and/or the coatings used by the manufacturer

Myth 6: Powder-free gloves are always "clean"

In the days when powdered gloves were regularly used in the laboratory, these were generally understood to be "dirty" having undergone minimal processing whilst the powder represented a significant contaminant. Powder-free gloves traditionally underwent washing and particularly chlorination to remove powder used as a release agent in the manufacturing process. However manufacturers are increasingly opting for powder-free gloves that are not washed and chlorinated. Instead of powder, a polymer coating or wax is used as the release agent. Whilst these gloves may qualify as powder-free, it should be noted that the coating can cause skin sensitivities and contribute to process contamination. To see whether your gloves have this coating, just spray the gloved hands with alcohol then rub your hands together. If it's present you'll notice very quickly how slippery your hand become, but even better if you touch a glass window you'll see the coating rapidly crystallise.

Reality: Powder-free gloves may have high levels of residual chemicals on them

Myth 7: One disposable glove can meet all my needs in the laboratory

Having one disposable glove to meet all needs is understandably an attractive proposition. However looking at the different hazards in the laboratory, a differentiated approach to selection of disposable glove may be more appropriate. We already know that gauge thickness, glove materials etc can provide varying levels of personal protection to chemical exposure. Likewise longer length gloves may be preferred for extra process or personal protection. Finally users with sensitive skin may seek out gloves with low dermatitis potential. These gloves may be identified as accelerator-free and/or well washed gloves.

Reality: Multiple factors in the laboratory support a differentiated approach to glove selection and therefore the likelihood of one glove meeting all needs is unlikely to be achievable

Conclusion

Selecting gloves is a complex business and the huge diversity in glove choices does not make it easy. We have discussed a range of topical subjects which may cloud judgement. Hopefully a better understanding of the realities surrounding glove myths will contribute to selecting the correct glove for particular applications.

References

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*2 Gibbon K.L., McFadden J.P., Rycroft R.J., Ross J.S., Chinn S & White I.R. (2001) "Changing frequency of thiuram allergy in healthcare workers with hand dermatitis", *British Journal of Dermatology* 144(2): 347-350

*3 Kerr LN, Boivin W.S., Chaput M.P. et al. (2002) "The effect of simulated clinical use on vinyl and latex exam glove durability" *Journal of Testing and Evaluation* 30(5): 415-420

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