The genesis of many of 3M’s most innovative products can be traced back to customers who have challenged 3M to solve problems far outside the company’s normal area of expertise. One such challenge arose during the dark days of World War II – when surgeons in both Army field hospitals and stateside operating rooms found it nearly impossible to create the sterile conditions necessary for performing major surgery.

At the time, the operative site was squared off with sterile towels and secured to the skin with towel clamps. This method afforded little if any protection against infection once the patient was opened.

Several years after the war, a small group of physicians came up with the idea to replace the sterilized towels with a plastic sheet coated with adhesive – rather like an oversize piece of Scotch® Tape – that would adhere to the skin close to the edge of the wound. Because of this association with tape, they thought to approach 3M about the possibility of developing their idea.

A new business is born

At the time, 3M had virtually no experience with medical products; nevertheless, intrigued by the technical challenge, they agreed to collaborate. Two young researchers, Bert Auger (later to become a 3M Staff Vice President) and Lew Lehr (destined to become 3M’s fifth Board Chairman), were assigned to the project. By 1948, their team had succeeded in launching their breakthrough self-adhesive surgical drape – 3M’s first entry into the medical products business.

Even though the new 3M surgical drapes (current versions of which are still being offered as 3M™ Steri-Drape™ Products) were a great improvement over sterilized towels, more protection against infection was needed for more invasive procedures such as cardiothoracic surgery, joint replacements and other procedures involving implants, neurosurgery and trauma events.

The problem is that antiseptic solutions used to prep skin before surgery cannot completely eradicate bacteria – including the naturally-occurring bacteria that continually grow on healthy skin. Any bacteria that migrate into the wound or incision during surgery can result in serious infections.

Stopping germs in their tracks

Based on continuing discussions with surgeons and operating room nurses, the 3M team considered a new approach to the problem. They asked themselves, would it be possible to modify their Steri-Drape design to include an antimicrobial agent built right in to the adhesive? Such a drape could then be affixed directly over the wound or planned incision.

Paul Rosso, Executive VP of 3M Western Europe and former researcher with the 3M Medical Division team, remembers those conversations well.

“In 1977, I was recruited by 3M to work on the incise drape project,” recalls Rosso. “One of the main things that drew me to St. Paul was 3M’s reputation for innovation, so naturally I was intrigued by the prospect of developing this new approach to infection prevention.”

According to Rosso, the main technical challenge was to find the right combination of adhesive and antimicrobial agent that would work together to provide the desired properties.

“We evaluated many kinds of antiseptic materials, but began to settle on iodine, for several reasons; iodine was, and continues to be, the primary type of antiseptic used. It also has the additional advantage of having anti-static properties, making it easier to produce on large rolls.”
Mix and match

One problem with iodine is that when heavily applied, it can burn skin and even corrode metals. If iodine were to be used in the new drape, it would have to be delivered in a controlled manner, so it wouldn’t irritate the patient. Compounding the problem is that iodine is incompatible with many adhesives. Clearly, finding a way to translate this innovative idea into a practical product was going to be a challenge.

The good news was that two of the key components of the proposed product – adhesives and films – were among 3M’s core competencies, allowing the team to dip in to a very deep well of lab expertise, manufacturing resources and scientific knowledge.

Working with a number of groups around 3M, including the former Chemical Resources Lab, the search began for an adhesive that was not only compatible with iodine, but also stuck tightly to the skin.

“It’s important to use a fluid resistant adhesive in this application, in order to maintain a tight seal around the entire edge of the incision,” says Matt Scholz, Corporate Scientist. “If any part of the drape should peel back from that edge, you lose skin contact with the iodine-impregnated adhesive, giving skin bacteria a pathway into the wound.”

With the assistance of Steve Rolfing and other members of the 3M Pharmaceuticals Microbiology Group, an adhesive was found that not only adhered well to skin, but was also compatible with the iodine formulation used as the antimicrobial agent. Prototypes of the drape were made up in the lab, and everything looked like a “go.”

Innovation on a roll

By 1980 the new product, 3M™ Ioban™ Antimicrobial Incise Drapes, was ready for launch. Rosso was drafted to take the product out to the field and demonstrate it to nurses and surgeons. “Hospitals were slower to adopt the product at first than we had hoped,” he recalls. “For one thing, it was a lot different from what they were used to using.”

Still, interest in the new concept was strong. Within a year, Dave Anderson had developed 3M™ Ioban™ 2 Incise Film, which uses the same adhesive as 3M™ Ioban™ Antimicrobial Incise Drapes, but has a more conformable backing. In 1988, Matt Scholz and Patsy Eull co-invented the 3M™ Ioban™ 2 Antimicrobial Incise Drape EZ, a new, easier-to-apply version of the product. The use of Ioban Incise Drapes quickly became the surgeons’ choice of incise drape around the world — and remains so today.

The science of infection prevention — and the recognition of its importance in helping prevent hospital-associated infections — has come a long way from the relatively primitive solutions of the 1940s. By continuing to pursue customer-inspired innovations like Ioban antimicrobial incise drapes, 3M is committed to helping the healthcare industry stay at the cutting edge.