

# Upgrades of Medical Devices



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For those of us in the medical field, from nurses to technologists to doctors, we take it for granted that the newly opened syringe pack or prosthesis is sterile. We know for sure that the transfusion bag contains the right amount of pre-tested anti-coagulant needed.

Although medical knowledge has been evolving for the past 20 or more centuries, it is only recently that the upgrades and significant advancement of medical devices and analyzers occurred. Our knowledge of medicine advanced to include a whole universe under the microscope from infectious agents to pathology of tissues. Knowledge also advanced in the field of chemistry: discovering basic drugs and molding them into newer more effective disease-curers. But let us not forget how much the modern industrial revolution has helped us in our field.

Only 3 centuries ago, medical devices were very bulky, and mostly made of metal. Plastic devices, syringes, tubes, bags, or catheters were unheard of. Sterilization of these bulky metals was basic boiling. It was enough in most cases, but do not fit our current norms. Although germs were thought of, antibiotics were not yet discovered and distributed *en masse* on every street corner on the planet. For whatever device that *was* available, the choices were also limited since globalization didn't exist.

Current industrial technology has given us miniature devices that come in sterilized packages, with guarantee quality certificates. These include from your basic syringe and

needle to the more sophisticated heart implants. Gamma irradiation of devices of closed products and even transfusion units has helped limit many illnesses. In the diagnostic field, testing for 1 cholesterol used up a lot of technician time only 20 years ago. Today, we can test 200 patients in 20 or so minutes using standardized and automated analyzers. Additionally, diagnostic laboratories had a basic number of tests to perform in aiding the physician. Today, and only in the laboratory - excluding radiology - we have more than 800 such tests. The past decade has also seen the commercialization of genetic tests using PCR, from parental testing to genetic typing of the full human genome, to finalizing diagnoses for FMF and thalassemia.

Globalization has also helped provide us with choice. We can now choose between a US-made and Japanese-made device. Cochlear devices which were unavailable few decades ago, now come from various countries, some even with solar-rechargeable batteries made for Africa. Implants have advanced from minor heartbeat-regulating to larger mechanical knee joints to full hip replacement. Bedside devices for blood pressure or glucose measurement have now advanced to ambulatory versions; a diabetic person for example will have his/her glucose checked frequently, and a dose of insulin given automatically when necessary.

Future advances are already becoming reality. One recent inclusion is the internet-linked robotic surgery. This has helped specialist surgeons be available in various places without the need to travel. Micro-implants have been produced to help the blind see, to control seizures (chips implanted on the brain), in small-sized clinical trials. Newer radiologic machines that used to give us 3D images in minutes have now been used to actually "look at your dreams and thoughts". Printers have already been developed to print 3D objects on-site: imagine printing a prosthetic in your clinic for your patient within minutes; it's cheaper and more practical. There are even micro-chips that are rice-sized, that can contain all your health-related information: insurance and NSSF number, blood type, and medical history and drug intake. Such mini-devices are even being made that can take an ECG any time you want, relay it to



your mobile, and send it to your physician via the internet. This can help the doctor decide whether a symptom is non-cardiac or what preparations to make in case it is cardiac-related. Diagnostics have seen the introduction of microarrays, where several tests in a panel are tested together using a drop of blood (Cardiovascular profile, FMF, Cystic Fibrosis and Hemochromatosis- full gene profiling, allergy panels...etc.)

In conclusion, advances in the medical field have helped everyone in the health sector to diagnose, treat and follow patients in a more accurate and efficient way. However, we must all remember that no matter how advanced medicine may be today, a doctors' experienced and logical judgment or a nurses input or a technologists' investigation of an abnormal result far outweighs what any of our current technologies may give us.

## Infos

### Phytothérapie: La Grande Revolution

Certains crieront aux "remèdes de grand-mère", de chamane, d'apothicaire... Comment vaincre la fatigue consécutive à une maladie infectieuse? Par la prêle des champs et l'ortie. Soulager une inflammation et remonter une tension "dans les chaussettes"? Vive la réglisse. Restaurer l'immunité et prévenir les rechutes? Se tourner vers l'échinacée. Récupérer physiquement tout en renforçant la production d'anticorps? Carburer au ginseng. Dans 100 questions sur la phytothérapie, le Dr Éric Lorrain, médecin à Grenoble et président de l'Institut européen des substances végétales, montre combien les plantes sont des alliées de poids de la médecine moderne, pas seulement limitées aux "petites" maladies et à la "bobologie".

Le développement de la pharmacologie de synthèse a permis de copier certains principes actifs particulièrement efficaces contenus dans les plantes et de produire des médicaments (comme l'aspirine, la quinine ou encore la pénicilline) accessibles au plus grand nombre. Leur rôle a été essentiel dans l'amélioration de la santé des populations. Aujourd'hui, "les plantes sont de retour, avec un nouveau visage, dans un nouveau contexte", précise Éric

Lorrain. "Alors que la chimie de synthèse piétine, la chimie extractive avance à pas de géant depuis vingt ans.

Cette révolution est due à la découverte de nouvelles méthodes d'extraction de tous leurs principes actifs. C'est notamment le cas des extraits fluides de plantes fraîches standardisés (EPS), répondant à un cahier des charges extrêmement rigoureux et mis à la disposition des professionnels de la santé. En pratique, la plante est d'abord congelée, puis broyée à des températures négatives.

Suit une multi extraction de toutes les substances, solubles aussi bien dans l'eau que dans l'alcool. Cela donne un produit stable, cinq à quinze fois plus concentré en principes actifs qu'après une extraction traditionnelle.

"Depuis le début des années 2000, trois à quatre références de ces nouveaux extraits enrichissent chaque année la panoplie de ces médicaments naturels capables de restituer au mieux le potentiel thérapeutique de la plante médicinale", note le Dr Lorrain. Les 55 EPS actuellement disponibles peuvent être mélangés sous la forme d'une préparation magistrale "pour confectionner une variété phénoménale de traitements personnalisés". Il est désormais possible d'y recourir pour soigner un nombre croissant de maladies.