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Preparing Europe for Cell-based Medicine

Implementing LifeTime's research-orientated medical and healthcare plan will require that scientists and clinicians from various fields work in close collaboration and think beyond their current expertise to find the best solutions for their patients. Clinicians will work closely together with biologists, computational scientists, physicists, chemists or mathematicians, and will deal with new types of medical examinations and patient information. Interdisciplinary interactions between scientists will increase, as will their exchange with industry partners, clinicians and the entire hospital workforce. This will lead to a redefinition of professional and organisational arrangements, requiring new training inputs. To respond to these demands, this Strategic Research Agenda (SRA) recommends creating a pan-European and interdisciplinary Education and Training Programme, based on a culture of lifelong learning and high adaptability to the constantly expanding medical challenges and technology development, and citizen literacy and empowerment for an open society trusting science and innovation.

While technological progress has been accompanied by the prompt creation of training modules for early-career scientists, such as PhD students or postdoctoral researchers, these modules still lack interdisciplinarity and its approaches to thinking and operating. Due to various factors such as limited training opportunities, shortage of required local expertise or the current lack of clear career paths, interdisciplinarity has been identified as one of the most vulnerable areas or skills in the European training landscape¹. With most higher-education institutions in Europe not planning or being largely unprepared to include interdisciplinary training in medical² or scientific curricula, these skills should rather be acquired in short- or long-term courses, as well as higher education postgraduate programmes.

With the creation of its Education and Training Programme, LifeTime will sustainably contribute to strengthen its own interdisciplinary workforce, to European scientific and medical excellence, to European innovation with highly-skilled and adaptable professionals, and to increased citizen literacy in LifeTime's core disciplines but also more generally in fields such as epigenetics, genomics, or ethical considerations of science.

¹ [BBSRC and MRC review of vulnerable skills and capabilities](#)
² EIT Health, McKinsey & Company (2020): [Transforming healthcare with AI, the impact on the workforce and organisations](#)

To reach society and the wide professional community concerned by LifeTime, we recommend an inclusive education and training strategy based on three main pillars including postgraduate university education, short-term training to strengthen skills and ensure lifelong learning, and a citizen empowerment programme to increase general scientific literacy. Additionally, LifeTime proposes an appropriate framework to ensure coordination and quality standards of the proposed strategies.

6.1 Promoting Interdisciplinary University Education

As the new skills required by LifeTime are currently not covered by university curricula, and it is challenging to do so in the near future², LifeTime recommends the creation of postgraduate education programmes: Masters and PhDs. Besides the above-mentioned interdisciplinary requirements, students should be exposed to non-academic science sectors, such as industry or healthcare. The University Education will be complemented with short-term learning throughout its term. Students will be highly encouraged to enroll in training in transferable skills, entrepreneurship, bioethics or project management in cross-sectoral settings and in translational collaborative research. The University Education Programme will put in place the necessary instruments ensuring guidance and supervision, as well as mentorship schemes that will provide support and counselling on professional development.

The target audience includes scientists, clinicians and managers of technology platforms. Graduates from LifeTime's education programme will finish their training with a new set of skills that will foster scientific and medical excellence, interdisciplinary and cross-sectoral mindset, creativity and innovative spirit. LifeTime will train new Masters, PhDs and MD-PhDs in fields such as entrepreneurship in biotech, interception clinician-scientists or interceptional medicine technologies.



6.2 Encouraging Lifelong Workforce Training

LifeTime highly encourages every member of its workforce and the wider community to acquire training and strengthen skills that are relevant for the correct functioning of the research and medical programmes. Workforce training sessions will be organised in short- (two to five days) and longer-term courses (up to one month), providing a more flexible framework where lifelong learning can be easily combined with professional activity. This programme will target the widest community, including scientists, clinicians and managers of technology platforms, similarly to the University Education Programme, but also industry partners, medical and scientific technical staff, and administrators that might need training in handling of patients' samples and data. Besides training in various scientific and technological areas, LifeTime recommends training on project management in interdisciplinary or translation research, in technological intersections or even training in entrepreneurship in research and innovation. To raise awareness and train scientists to face the societal implications of research, we recommend training in bioethics as well as Open Science and citizen engagement practices.

Scientists and clinicians will more than ever work together in medical examination, research and therapeutic design, which requires a collaborative mindset³. To face and adapt to the new work culture, they will be encouraged to enroll on specific training sessions on cross-sectoral collaborations. With a big part of the information processing done by machines, clinicians will need to spend more time communicating with the patients, which requires skills such as social and emotional intelligence, compassion, empathy and judgement² that will be valued and covered in LifeTime's Education and Training Programme.

The workforce training programme will contribute to strengthening clinical and scientific skills, keep professionals up to date with new trends and breakthroughs, and highlight the importance of soft skills in medical care.

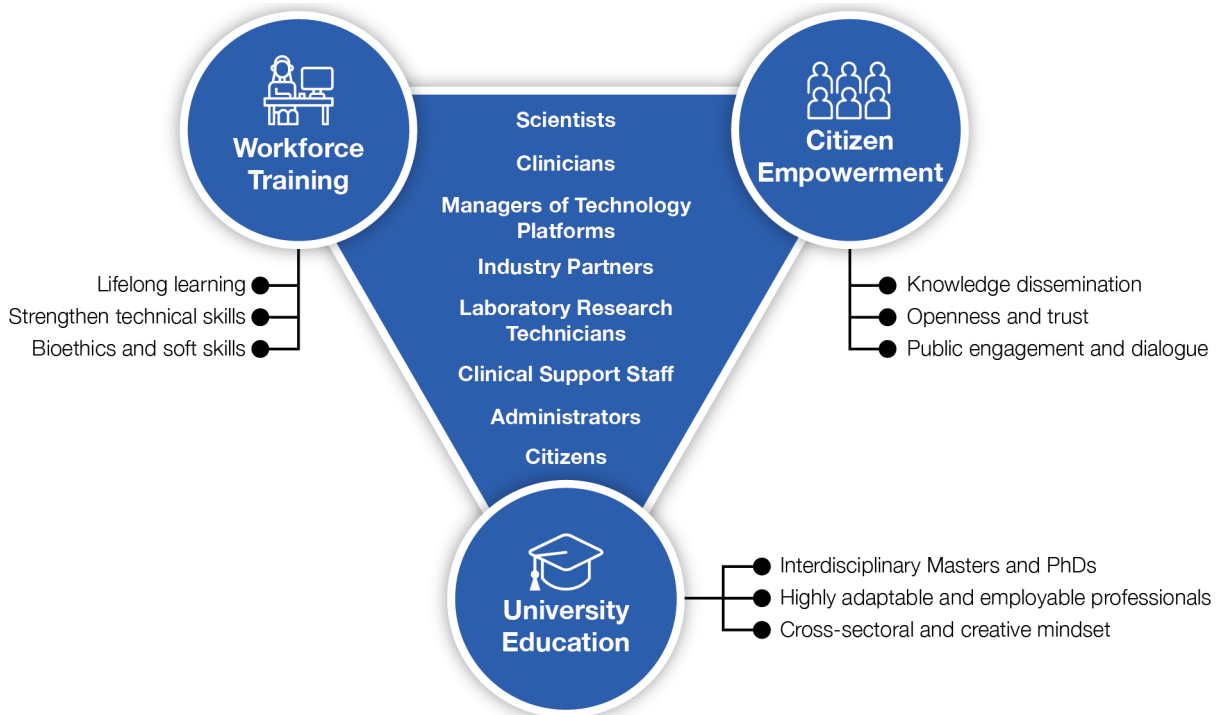
3 The Topol Review [“Preparing the healthcare workforce to deliver the digital future”](#) (2019)

6.3 Empowering Citizens and Disseminating Knowledge

Scientific literacy is still a challenge, and even more so with recent and fast-developing technologies. Since LifeTime aims to apply breakthrough technologies in patient care, it is of utmost importance to overcome this challenge. Teaming up with our Ethics Mechanism ([section 5.3](#)), LifeTime proposes an educational programme to inform and empower citizens, with the organisation of outreach activities such as cycles of colloquia with scientists, as well as exhibitions and dissemination of informative and accessible documentation. This programme will contribute to creating awareness and disseminating knowledge about LifeTime's innovative projects, and will represent an important first step for citizen participation in the decision-making processes.

The recommended public consultations to evaluate public opinion about LifeTime technologies and their implications ([section 5.3](#)), will also help create awareness and disseminate knowledge.

This joint programme of the education and training and Ethics Mechanism teams will contribute to a literate society, more open and empowered to discuss the implementation of new technologies, and encouraging citizens to act proactively together with clinicians and researchers defining the best therapeutic strategies and becoming active members of the research implementation process.



Preparing Europe for cell-based medicine through education and training

6.4 Harmonising the LifeTime Education and Training Programme

LifeTime will create a training framework currently nonexistent in Europe. Not only will we need to train LifeTime's workforce in the various technologies and fields of knowledge, but these will also need to be integrated and applied in combination to the different health challenges. To optimise efforts and ensure synergies between LifeTime's programmes and the available opportunities presently provided by various European institutions, we will collaborate with the training departments of the EMBL, the CRG or the VIB, among many others. To create and support our own solid and coherent Education and Training Programme across Europe, we recommend a framework that will harmonise and coordinate LifeTime's newly proposed activities.

We propose that LifeTime institutions should have their own training departments or conduct some of the training activities. While LifeTime institutions will generally share a common vision, each of them will naturally have its own distinctive strengths. We recommend that the training offered by the individual LifeTime institutions should be based on their local expertise, but highly complementary to other institutes. Complementarity with the global goals of LifeTime education and training should be achieved by a coordination platform connecting all local education and training departments or initiatives. The LifeTime education and training network will be fully based on LifeTime's strong network of university partners, research institutions, research infrastructures, businesses, SMEs, and other socio-economic actors, providing joint research training opportunities. The expansion of the LifeTime network of institutions will be fully accompanied by the expansion of education and training opportunities, contributing to an equitable distribution of excellent education throughout Europe. We recommend that funding of education and training activities should result from a combination of investments in LifeTime, subsidies from the member states and alignment with the currently available European training resources fostering exchange, interdisciplinarity and multi-sectoral research ([section 7.3](#)).

LifeTime trainees will be encouraged to visit other academic and non-academic organisations to get exposed to a variety of environments. In parallel the local training units should provide a learning infrastructure allowing the combination of the training programme with the exercise of the respective professional activities, which can be of particular importance to clinicians.

With networking performing a key role in today's professional interactions, we recommend to organise international networking sessions where students and alumni can connect with professionals from various employment sectors. An alumni network and a career-tracking system should also be put in place to promote exchange of experience and collect information about students' professional developments, helping our teams identify new needs and gaps in European education and training.

To provide correct functioning and conformity with the necessary quality standards, LifeTime recommends significant investments to ensure the space, resources and professionals dedicated to the conception of educational materials and courses, organised in teams composed of training experts with scientific and managerial experience.