Roche pRED Center Basel

The ***2024 SEFA Lab of the Year*** was awarded to the new Roche pRED Center in Basel, Switzerland, that opened in September 2024 as a state-of-the-art research center dedicated to the discovery and development of groundbreaking drugs. The new Roche Pharma Research and Early Development (pRED) Center exemplifies the future of transformative research by fostering innovation and collaboration, and embodying Roche's commitment to advancing global healthcare and delivering life-changing treatments.

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Housing around 1,800 scientists, clinicians, engineers and technicians in advanced laboratories and office spaces, this new 1,056,000 gsf or 634,000 nsf facility consists of two high-rise laboratory buildings with cutting edge lab and digital solutions, alongside an office building and a conference facility. The new center brings together teams of scientists from multiple separate areas into the 4 new buildings with the purpose of accelerating scientific discoveries.

What is pRED?

The Center accommodates the discovery scientists of Basel, conducting research in seven disease areas: cardiovascular and metabolism, immunology, infectious diseases, ophthalmology, neuroscience, rare diseases, and oncology. Its mission is to pursue excellence, push boundaries and make scientific breakthroughs.

Project Goals and Objectives

The primary goal of the project was to create a flexible, modular building concept that could adapt effectively to changes in science and organization. Designed with input from Roche's global pRED researchers, the project team benchmarked over 30 research institutions worldwide with that goal. In particular, the project aims to speed science innovation, create collaborations and scientific connections by housing the right mix of expertise in open, shared, interaction-provoking labs, offices and social spaces.

> *"I have seen many research buildings and institutes in my life but nothing compares to the new pRED Center. I know that this facility will foster innovation and inspire all of the scientists who come to work here".* Hans Clevers, Head of Pharma Research and Early Development

At the onset, the project's objectives were to:

- Transition from aging and substandard facilities not in line with modern science and technology into a site more attractive for both pRED scientists/teams and the global research community.
- Create the necessary changes due to evolving requirements and standards of compliance into a modular plug-and-play environment for fast adaptation to future research needs.
- Evolve from a fragmented workplace scenario not conducive to cooperation (approx. 1,800 researchers distributed across various premises) into a workplace enticement for collaboration and exchange between all fields of science.
- Transition from facilities that lacked no clear separation between lab and office workspace to new spaces with higher productivity and improved efficiency due to a more ergonomic and safer work environment.

The Site and Buildings

In 2014, F. Hoffmann-La Roche AG decided to co-locate its Basel-based discovery research groups, at the time scattered across 17 buildings on campus, into a single location. For over 130 years the site has been an industrial and production setting located on the outskirts of the city of Basel. Now the site has developed into a multifunctional campus that is fully integrated into the fabric of the city. It forms, together with other companies' sites, a life-science cluster unique to Central Europe and establishes the city of Basel as one of Europe's science hubs. By bringing additional research activities to the Basel location the project provides attractive, future-proof jobs for the community.

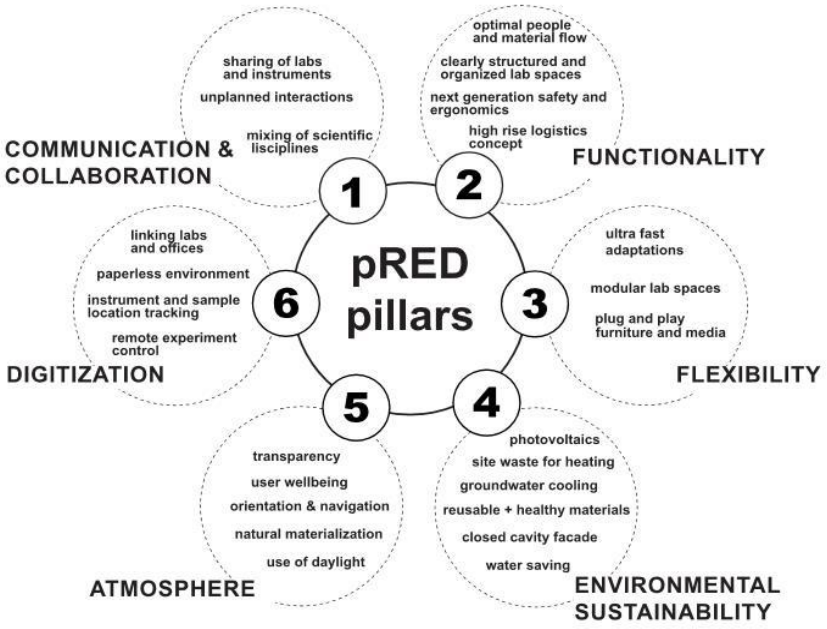
Placing 1,800 scientists on a plot of 136m (447ft) x 88m (289ft), about 12,000 sqm (129,167 sqft), constituted a challenge. Densification was not just mandatory but also regarded as an opportunity to create a vertically stacked research facility, highly efficient in its land use.

Following extensive urbanistic studies, the planning strategy suggested four rectangular buildings of roughly 30m (98ft) x 60m (196ft) in plan, ranging in height from 20m (66ft) to 120m (394ft). Building 04 was designed to accommodate a convention center; building 05 is dedicated to office-based research functions, and the two high rise buildings 06 and 07 house lab facilities

and functions. Built over a six-story underground base, the four lower floors are dedicated to parking while the two upper floors include storage, MEP functions, compound stores and freezer farms.

Pillars of Development

At the heart of the project's programming was the question: "What work environment is anticipated for the future, and what will attract the best scientists from all over the world?" Subsequently, the project team ideas evolved around six main pillars or conceptual areas of development:

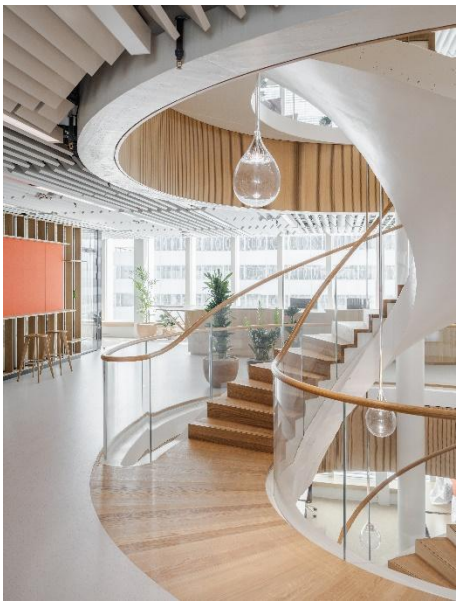


Communication, Collaboration and Connectivity

A key feature of the pRED buildings is the "neighborhoods concept" in the two laboratory buildings: 13 in total neighborhoods consisting of 10 lab and 3 office areas. Typically, each neighborhood, housing between 120 to 150 researchers, spans 3 floors and provides open and transparent work environments. To further promote the collaborative environment, there are no single private offices in the Center, and except for the lab workers desks are unassigned open seating. These offices, lab, communication and collaboration spaces are combined to form a state-of-the-art research environment.

The floors are organized by science and departments, neighborhoods are planned to support the drug discovery process by bringing the right departments together. Combined with the open lab concept, this co-location of several teams and departments in a single neighborhood creates a perfect backdrop for planned and unplanned communication. The spiral communicating staircase at the *Marketplace* in each neighborhood not only provides orientation

but facilitates pedestrian circulation. Additionally, there are open areas between desks that house informal collaboration spaces and are supplemented by small teaming/conference rooms. Kitchenettes are located on the middle floor of every neighborhood; drinks and cold (non-smelling) food is allowed in the office zones, while warm food is only permitted in the kitchenette. Equipment/lab sharing as well as a completely new digital way of working further complements this highly collaborative work environment.



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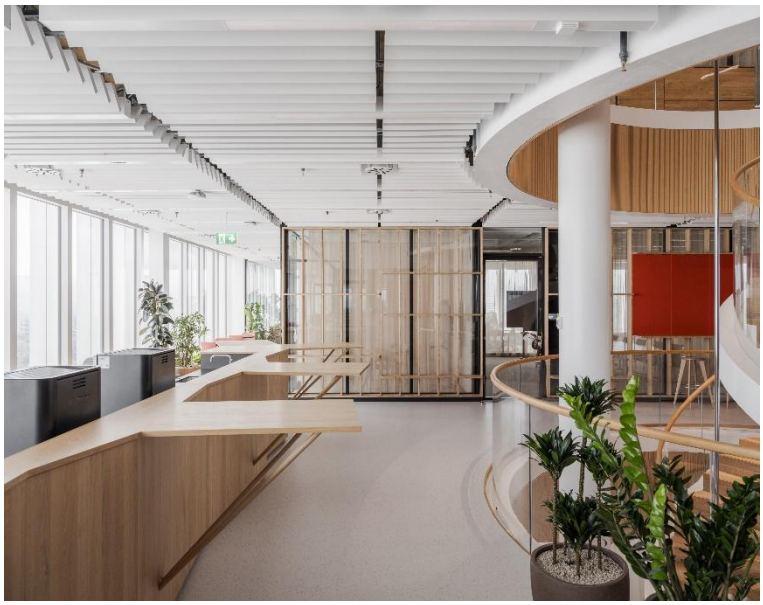

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Connecting all buildings at the ground floor, *the Avenue* is the backbone for collaborations. A cafeteria off *the Avenue* is located at the entrance level on Building 05, facing the Science Square. Another cafeteria is located on the thirteen (top floor) of Building 06. The top level (Floor 23) of Building 07 houses informal, free-to-go-to-collaborative spaces where food and drinks are also permitted. Other spaces like the exterior courtyard or *Science Square*, or the main entrance hall further promote this collaboration concept.

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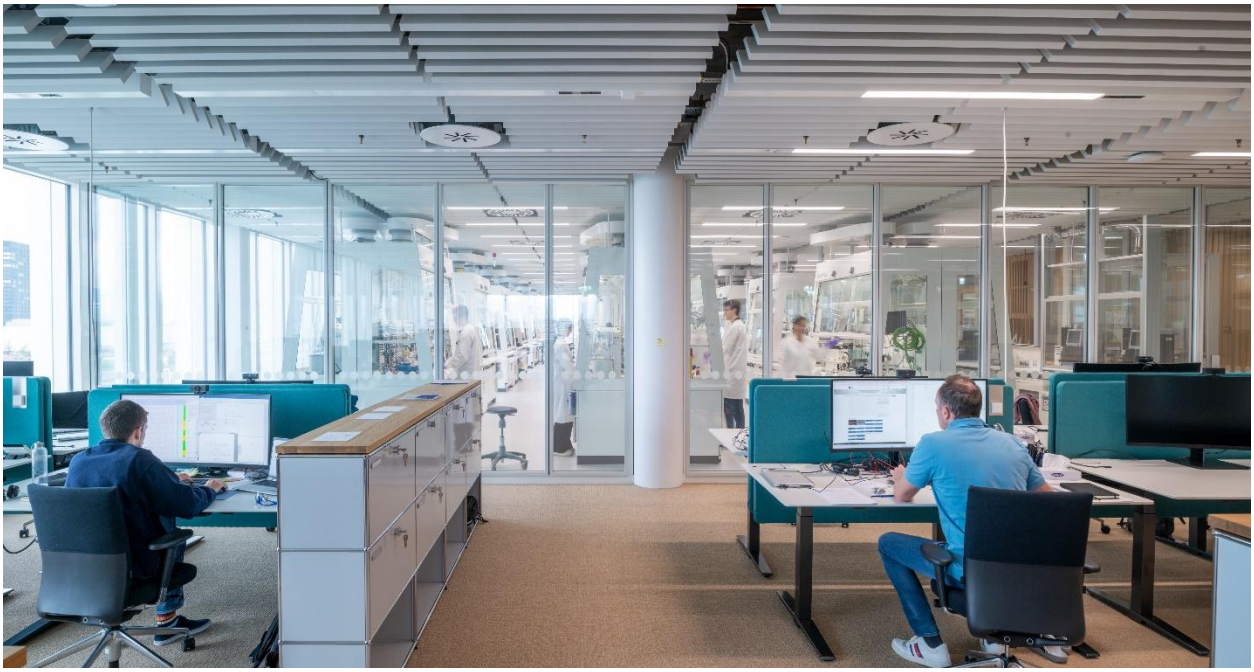
In addition to *the Avenue* on the ground floor, the lab towers are connected via two sky bridges on other floors. On the 6th floor these connect the lab-core functionalities (Centers of Excellence) via the logistic zones. On the 13th floor, the bridge connects the management office floors on Building B07 with the meeting rooms and cafeteria in Building 06.

Workspace

All lab functions are accommodated in the twin towers. In order to maximize collaboration, the workspace was designed so that laboratories sit side-by-side with office spaces.
With asymmetrical core positions, the layouts of the towers have been mirrored to allow large and unobstructed floor plates, providing access to daylight from three sides of each tower.

Flexibility and transparency were key concepts that helped create an open work environment with visual references, maximizing communication among teams and facilitating adjustments to changing requirements.



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Logistics, Hygiene and Material Flow

To ensure operational functionality and avoid cross-contamination, a strict hygiene concept was applied to the project. A clear separation between laboratory zone and non-laboratory zone, as well as clear traffic routes for researchers with or without lab coats ensures compliance with hygiene requirements and proper contamination handling. To ensure safe transition from lab to lab and vice versa, all researchers pass a hygiene station where they must put on, or take off, their personal protective clothing. For the facilitation of interdisciplinary exchange, researchers are given the opportunity to move around within their neighborhood, horizontally as well as vertically, of the same hygiene zone with their lab coats on.

When organizing research facilities in two high rise towers, major emphasis was placed on organizing vertical transportation, storing hazardous goods and separating flows of goods from people.

Serviced by logistics staff, the Laboratory Shop, which is the central hub for the delivery of goods, makes frequently used items quickly available to scientists. Orders are received, processed, commissioned and automatically delivered to individuals by either the conveyor transport system or by freight elevator. Researchers can also collect their orders directly at the Laboratory Shop.

Modularity and Flexibility

The design of the pRED labs does not only provide flexibility and modularity in layout and fit-out, but it also supports adaptations and modifications within a predefined conversion time

and without the need to shut down ongoing research activities in adjacent areas. Developed from a basic planning principle of multiples of 3.4 meters (11ft) square modules, the building's structural systems consist of one-foot thick, poured-in-place, flat slab concrete floor spanning 10.2m (approximately 33ft) between columns, with a 4.3m (14ft) floor-to-floor height and a 3m (9'-10") ceiling height.

To allow for fast adaptability should requirements change in the future, independent of the initial fit-out and usage, all technical installations, lab media, and supplies are preconfigured and available everywhere on each floor. The design consists of a ring distribution for all media and utility systems, with water drain points preinstalled at the grid intersection. As a result, a module can be isolated for adaptation while adjacent research is not hindered.

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The HVAC system is also designed with flexibility in mind, with air supply and extraction located on the north and south side of each floor. Consequently, the air supply in an area of construction can be switched off, while the airflow in the unaffected areas is maintained.

The location of partitions within the lab space was driven by local fire codes, biosafety levels, ergonomics or science. For future modification of the partition walls, the substructure for fireproofing and wall connection in the ceiling were pre-installed at pre-determined locations. Below the level of fixed overhead installations, lab users are free to use any casework components out of the large lab catalog which assures easy and fast hook-ups.

While all laboratories are equipped as BSL2, certain labs may operate at a lower biosafety level. Gravity flow BSL2 disposal stations have been installed in all biological laboratories. Special lab space was defined by the needs of the drug discovery process. The planning concept allows for the implementation of additional special laboratories within the actual layout of lab spaces, offices and write-up areas. Since the special labs could be located anywhere within the laboratory zone, added measures can be taken to support them, including extra cooling, electromagnetic shielding, special media preparation, etc. The animal housing and testing is in a nearby building.

Sustainability

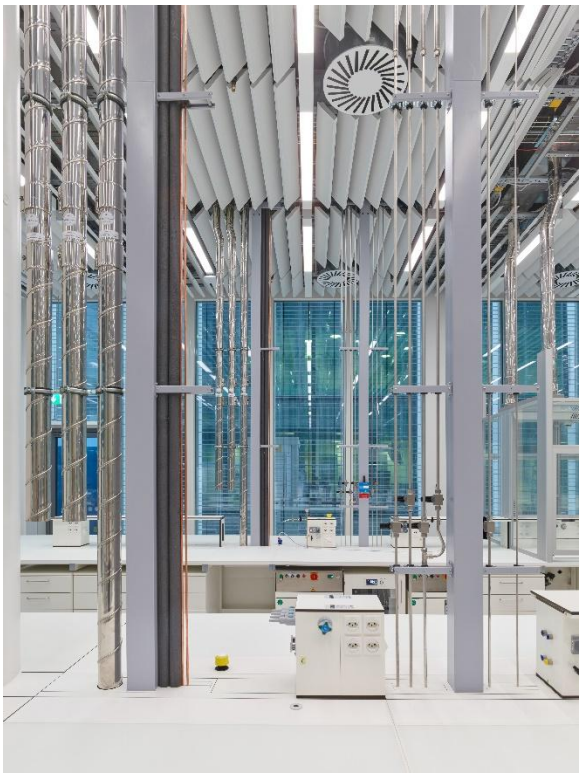
The new pRED Center is a beacon of sustainability and innovation, adhering to Roche's sustainability framework commitment to health, well-being, and environmental leadership. In theory, the buildings meet the highest European and global standards ever reached in lab buildings, but Roche decided not to pursue any official award or recognition.

Well-being – was a top priority for all workspaces. All building and fit-out materials had to fulfill the strict requirements for minimal volatile organic compounds (VOC) emissions. This was rigorously tested throughout construction and resulted in VOC emissions which were 10 times lower than allowed. A cradle-to-cradle system was consequently applied at the design stage and monitored during construction. This approach requires the design and utilization of products that are eco-efficient, to ensure that all materials are used in a continuous cycle of production, use, and regeneration. Nature and biodiversity are supported via green roofs, lush indoor and outdoor greenery and multiple bird nesting possibilities in the facade.

Energy efficiency and thermal comfort – Within the high-performance ceiling there is a unique "heat load compensation system". This heating and cooling concept provides a high level of thermal comfort in the office and lab environments. With this ceiling system, heat loads up to 100 W/sm (9.2 W/sf) from lab equipment rather than through high air exchange rates. Special labs can achieve up to 300W/sqm (27.9 W/sf) within the modular system.

Energy supply to the heating and cooling ceiling is provided via groundwater cooling and the use of waste energy from the Roche site. Photovoltaic panels on larger roofs supply green energy, making the site's power 100% renewable. Energy savings of 50% were achieved compared to current Roche labs.

Building envelope – Transparency, efficient use of daylight and energy efficiency were key objectives when developing the facades for the Center. The laboratory towers use a closed-cavity facade system that optimizes user comfort and reduces maintenance costs. It consists of cavities with a controlled dry air environment and flexible sun shading that is nonsensitive to the wind and weather.



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Digitization

The Center has a digitization system that connects the labs and offices. The system facilitates experiment-related activities by managing shared resources, assisting with lab experiment tasks, and interacting with relevant expert systems. In particular, the system registers and manages sample containers, prints labels, and by scanning containers with mobile devices, it details the appropriate storage location. It helps find sharable materials such as chemical and biochemicals, and facilitates the continuous flow of materials needed, replenishing the specific portfolio of standard lab materials on each floor. Additionally, the digitization system monitors in real-time lab environmental conditions, and tracks equipment status and maintenance/repair schedules.

The system includes an APP based indoor navigation system that not only acts as a building directory and provides room occupancy status but allows occupants to find their colleagues throughout the Center.

Together with Roche’s other global sites, the pRED Center in Basel plays a key role in supporting Roche’s mission to discover and develop novel, breakthrough medicines that make a lasting difference to patient’s lives worldwide.

Project Data

Building Area	1,056,000 gsf (98,100 sm)
Assignable Area	634,000 nsf (58,900 sm)
Lab Area	282,000 nsf (26,200 sm)
Percent of Lab Area	44% of total nsf

Project Team

Client	F. Hoffmann La Roche AG, Basel, CH
Architect of Record	Herzog & De Meuron, Basel, CH
Laboratory Planner	Laborplaner Tonelli AG, Gelterkinden, CH
Construction Manager	ARGE Sulzer Buzzi & Iten Brechbuhl, Basel, CH

About the author

Victor J. Cardona is a retired architect and laboratory designer based in Michigan and Florida. He served as a senior planner, vice-president, and Director of Laboratory Planning Group for SmithGroup. A past member of SEFA's Advisory Board, he has been a past judge in the LOY competition. He has published many laboratory-planning articles and presented them at national and international forums. His projects have been recognized by multiple entities, including four LOY projects. He is the Commodore of his yacht club and spends most of his time sailing Lake Michigan.