

Research Assessment
Groningen Research Institute of Pharmacy (GRIP)
Faculty of Science and Engineering
University of Groningen
2015-2021

19 April 2022

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Foreword by the committee chair

This assessment evaluates the quality, societal relevance, and viability of the research Institute Groningen Research Institute of Pharmacy (GRIP) of the Faculty of Science and Engineering (FSE) of the University of Groningen from 2015 up to and including 2020. The assessment committee consisted of six scientists from leading universities and research institutes in Europe and the USA. Their expertise spanned the range of research subfields and activities undertaken at GRIP. I am indebted to these committee members for their hard work and cooperative spirit throughout the evaluation process.

The committee's work was greatly aided by the excellent set of materials that were provided to us by the Institute in advance of the review visit. The well-prepared, comprehensive critical reflection of the self-evaluation and the open and constructive nature of the interviews with involved researchers allowed the committee to gain in-depth insight into how the staff viewed the quality of their research, its societal relevance and its viability. We would like to extend a special thanks to the Dean of FSE, prof. dr. Jasper Knoester and the director GRIP, who is also Deputy Director of GUIDE, Prof. Dr. Erik Frijlink.

The online site visit took place on 2 December 2022 and followed directly after the assessment of the research institute of GUIDE of the UMCG (29 November, 30 November and 1 December), in which the research programmes of GRIP are embedded. I would like to extend special thanks to the GRIP/FSE research office, in particular dr. Yvonne Jeuken and dr. Alicia Brandt for their excellent support leading up to and during the course of the review. We would also like to record a special thanks to the secretary of the review, Jesseka Batteau.

The goal of this review was to offer an objective external evaluation of the research, societal relevance, and viability of GRIP as research institute. As will become apparent, our assessment of activities in all of these areas is very positive. Notwithstanding this overall enthusiastic assessment, the assessment committee has taken its role as a panel of 'critical colleagues' very seriously and trusts that its findings and recommendations will prove helpful to the Institute as it develops strategic plans for the coming decade.

Prof. dr. Guy Joos
Chair of the committee

1. The review committee and the procedures

1.1. Scope of the review

The assessment committee was asked to perform a research assessment of research institute GRIP of the FSE, covering the period from 2015 up to and including 2020. The review took place in the context of the evaluation of the research institutes of UMCG, including the Groningen University Institute for Drug Exploration (GUIDE), in which the GRIP research programmes are embedded. The assessment committee consisted of six members. The chair and two members were also involved in evaluation of the research institute GUIDE.

The assessment committee was requested to assess the quality of research conducted by GRIP as well as to offer recommendations in order to improve the quality of research and the strategy, and to answer specific questions posed by the institute. The quality of the research programmes was evaluated during the assessment of GUIDE. These findings formed the basis for the assessment of GRIP as a research institute, whereby the committee focused on four extra aspects and three extra questions described below.

The committee was requested to carry out the assessment according to the guidelines specified in the *Strategy Evaluation Protocol 2021-2027 (SEP 2021-2027)*. The evaluation includes a backward-looking and a forward-looking component. Specifically, the committees were asked to judge the performance of the unit on the main assessment criteria and offer its written conclusions as well as recommendations based on considerations and arguments. The main assessment criteria are:

1. Research Quality
2. Societal Relevance
3. Viability

During the evaluation of these criteria, the committee was asked to incorporate four specific aspects. These aspects are as follows:

1. Open Science: availability of research output, reuse of data, involvement of societal stakeholders;
2. PhD Policy and Training: supervision and instruction of PhD candidates;
3. Academic Culture: openness, (social) safety and inclusivity; and research integrity;
4. Human Resources Policy: diversity and talent management.

The Executive Board of the FSE provided the assessment committee with Terms of Reference concerning the assessment. In this document, the Board asked the committee to pay special attention to and offer recommendations in the assessment regarding the following aspects:

1. Does GRIP's positioning relative to GUIDE and the corresponding organization contribute to the quality, societal relevance, and viability of GRIP as an institute?
2. How could GRIP position itself such that it takes better advantage of funding from independent public granting agencies (indirect funding).
3. On several occasions, recruitment of young talented academic staff has turned out to be difficult for GRIP. What could the institute do to improve this?

1.2. Composition of the committee

The composition of the subcommittee evaluating GRIP was as follows:

Prof. dr. Guy Joos (chair, Ghent University, Belgium)
Prof. dr. Kim Brouwer (University of North Carolina, USA)
Prof. dr. med. Ulrich Förstermann (Johannes Gutenberg University Medical Center, Germany)
Prof dr. Frans Russel (Radboud University, The Netherlands)
Prof dr. Aletta Kraneveld (Utrecht University, The Netherlands)
Ms. Aline Engbers, MSc (University of Leiden, The Netherlands)

The assessment committee was supported by dr. Jesseka Batteau.

Due to pressing duties with regard to Covid-19, prof. dr. Ulrich Förstermann was unable to attend the site visit on 2 December.

1.3. Independence

All members of the assessment committee signed a statement of independence to safeguard that they would assess the research quality of GRIP in an unbiased and independent way. Any existing personal or professional relationships between committee members and the research unit(s) under review were reported and discussed in the first committee meeting. The committee concluded that there were no unacceptable relations or dependencies and that there was no specific risk in terms of bias or undue influence.

1.4. Data provided to the committee

The committee received the self-evaluation report from the unit under review, including all the information required by the SEP. To those committees that requested it, additional information was provided. The Committee also received the SEP 2021-2027 and the Terms of Reference for the assessment.

1.5. Procedures followed by the committee

During an online kickoff meeting on 9 November 2021, the committee members were introduced to GRIP by the Dean of Faculty of Science and Engineering of the University of Groningen. The committee was also briefed on research reviews according to the SEP. Furthermore, committee members were informed of the relation between the evaluation of GUIDE and that of GRIP.

The evaluation of GUIDE took place on 29 November-1 December 2021. This was followed up with an evaluation of GRIP on 2 December 2021.

Due to restrictions as a consequence of Covid-19, all site visits took place via online meetings.

Each of the committee members proceeded according to the SEP. Prior to the first meeting, all committee members independently formulated their preliminary findings of the unit under review, and additional questions for clarification based on the written information that was provided prior to the site visit. During a preparatory meeting, the committee discussed the preliminary findings and questions, decided upon a number of comments and questions, and agreed upon procedural matters and aspects of the review. After the interviews the committee discussed its findings and comments,

allowing the chair to present the preliminary findings and the secretary to draft a first version of the review report.

The draft report was presented to the GRIP/FSE for factual corrections and comments. In close consultation with the chair and other committee members, the comments were reviewed by the secretary and incorporated in the final report. The final report was presented on 19 April 2022 to the Executive Board of University of Groningen.

2. Assessment of Groningen Research Institute of Pharmacy

2.1. Aims and strategy

2.1.1. Introduction to GRIP

The Groningen Research Institute of Pharmacy (GRIP) is one of the ten research institutes of the Faculty of Science and Engineering (FSE) of the University of Groningen, and located adjacent to the Faculty of Medical Sciences. As an institute for pharmaceutical science, GRIP encompasses the scientific disciplines that focus on sustaining health, and treating and curing diseases by use of pharmaceutical interventions, and links fundamental chemistry, biology, physics and mathematics to the medical sciences.

GRIP is part of FSE and participates in the research theme Molecular Life and Health, and also contributes to other FSE-themes such as Advanced Materials, Data Science and Systems Complexity. At the same time, GRIP research programmes participate in the interfaculty research institute GUIDE (Groningen University Institute for Drug Exploration) together with various departments of the University Medical Center Groningen (UMCG).

GRIP consists of eight research units, organized into four research programmes:

- **Medicinal Chemistry and Bioanalysis (MCB)**
Analytical Biochemistry; Drug Design; Pharmaceutical Analysis
- **Biopharmaceuticals: Design, Discovery and Delivery (BDDD)**
Chemical and Pharmaceutical Biology; Pharmaceutical Technology and Biopharmacy;
Nanomedicine and Drug Targeting
- **Groningen Research Institute of Asthma and COPD (GRIAC)**
Molecular Pharmacology
- **PharmacoEpidemiology, -Genetics, -Economics, & -Therapy (PEGET):**
PharmacoTherapy, -Epidemiology, and -Economics

GRIAC and PEGET bring together research groups from both GRIP and GUIDE (UMCG).

GRIP's staff comprises 16 full professors (two of whom have their primary appointment at the UMCG), 7 Tenure Track (TT) associate professors, 4 TT assistant professors, and 5 professors by special appointment. Each research unit is headed by a full professor (chair) and houses one or more additional academic staff members (full, associate and/or tenure-track assistant professors). GRIP is headed by the scientific director, Prof. Frijlink, who is supported by GRIP's Board, consisting of three members, and support staff: a scientific coordinator, a business coordinator and a secretariat. GRIP's scientific director bears final scientific responsibility and is accountable to the Board of the Faculty of Science and Engineering. The education director of Pharmacy, Prof. Hak, bears responsibility for all matters relating to education of the Pharmacy and Medical Pharmaceutical Sciences programmes. The board of GRIP meets once a month with both the scientific and educational directors and the scientific coordinator. To facilitate and safeguard the interfaculty-character and streamline collaboration between GRIP and GUIDE, the scientific director of GRIP is the acting deputy director of GUIDE, while the GRIP scientific coordinator is a member of the GUIDE management team.

2.1.2. Aims and strategy

During the evaluation period, GRIP's mission has been to:

- perform internationally recognized research at the frontiers of knowledge in the pharmaceutical sciences, covering all major aspects of drugs and diagnostics and ranging from discovery, optimization and production to pharmaceutical care and drug use.
- bridge the gap between the fundamental natural and life sciences, and the medical/clinical sciences, in the field of medicinal products.
- contribute to the discovery, development and evaluation of life-saving and quality-of-life-improving therapeutics for patients worldwide both today and tomorrow.
- integrate advanced pharmaceutical research and pharmaceutical education, thus ensuring delivery of qualified pharmacists and pharmaceutical scientists to society and academia.

This overarching mission and vision are supported by five concrete strategic goals informing present and future actions. These focus on 1. stimulating excellent research; 2. enabling inter- and multidisciplinary collaborations; 3. creating societal relevance and contributing to societal wellbeing; 4. offering support for early career researchers; and 5. investing in collaborations with external partners and stakeholders in the field of drug innovation.

In the period under review, GRIP invested in various aspects of the institute to capitalize on its strengths and opportunities. In the first place, several of the research units were reorganized: the research groups Pharmacoepidemiology and Pharmacoconomics, and Pharmacotherapy and Pharmaceutical Care, were merged to form the research group PharmacoTherapy, -Epidemiology, and -Economics (PTEE). This research group has become part of the PEGET programme in GUIDE, which focuses on *real world* assessments and innovative data methodologies to study outcomes of pharmaceutical interventions and their implementation in daily practice. The research groups Pharmaceutical Biology and Therapeutic Gene Modulation, merged to form the new research group Chemical and Pharmaceutical Biology (CPB). The research group Pharmacokinetics, Toxicology and Targeting was reorganized to become the research group Nanomedicine and Drug Targeting, with a stronger research focus on drug delivery and the application of nanotechnology in medicine. The Toxicology- and Pharmacokinetics-related topics were transferred to Pharmaceutical Analysis to complement their organ-on-a-chip profile. Furthermore, the immunological research line was transferred to Molecular Pharmacology.

GRIP has also brought into practice general strategic objectives of FSE and the University of Groningen with regard to Open Science Principles (through the promotion of FAIR data and the accessibility of data sets) and improving gender balance at assistant and associate professor-levels. For the future, GRIP aims to further continue to invest in open science publishing and making data available for the public and the scientific community. It wishes to further develop policies and practices to ensure an open, safe and inclusive research environment which offers ample opportunities to all researchers.

2.2. Qualitative Evaluation

The well-prepared, comprehensive critical reflection and the open nature of the interviews allowed the committee to gain in-depth insight into the quality of research, the societal impact and viability of GRIP. The committee was very much impressed with the constructive, inspiring and insightful conversations it had with all of the representatives of GRIP.

2.2.1 Research Quality

In its evaluation of GRIP, the committee encountered a vibrant, dynamic and stimulating research environment. According to the committee, GRIP's mission is highly relevant and demonstrates the

ambition to truly achieve societal and scientific impact by contributing to multi-disciplinary research in all aspects of drugs, diagnostics and therapeutics, bridging the gap between the fundamental and medical/clinical sciences and ensuring the delivery of new generations of qualified pharmacists and pharmaceutical scientists. GRIP has performed well and stimulated excellent research in the field of pharmaceutical R&D by maintaining high standards in publishing internationally-recognized research, by focusing on platform technologies, and by a strategic organization of the institute. The position of the research programmes of GRIP within GUIDE is enviable, allowing for a productive integration of basic and clinical research as well as innovations in diagnostics and therapies.

Governance

The committee is positive about the governance structure, with a scientific director, who is also deputy director of GUIDE, an educational director and a board of three members. This structure ensures strong leadership as well as a productive connection with GUIDE. The committee is also pleased to note that the restructuring of the research units of GRIP has allowed for a more structured and integrated approach of the research programmes. Following recommendations of the previous PRC, GRIP tightened its connection with GUIDE through the formation of the research programme PEGET, which includes both FSE and UMCG researchers. This intervention enables the integration of all GRIP researchers in GUIDE and ensures that GUIDE now covers the full drug R&D life cycle.

Research environment

The documents and conversations with representatives of the institute testify to strongly developed multidisciplinary and translational research lines, an ongoing investment in collaboration and cross-fertilization between clinical and non-clinical sciences, and productive connections and collaborations with partners and stake-holders within and outside the institute. GRIP is very successful in supporting its research programmes to initiate and participate in internationally competitive networks such as the involvement in prestigious European funding programmes. The committee considers the biobanks and patient data deployed by the Institute as highly valuable assets and observes that GRIP, together with GUIDE, has developed excellent and innovative platform technologies. These strong features confirm that GRIP indeed offers a highly productive, excellent and internationally-recognized research environment enabling its researchers to make major contributions to multi-disciplinary research in all aspects of drugs and diagnostics.

The committee applauds the great commitment of the leadership of GRIP and its talented staff in creating a vibrant multi- and interdisciplinary research and training environment, with a strong focus on teamwork across research groups, institutes, disciplines, and faculties. In speaking to the different representatives of the institute, the committee was impressed by how passionate researchers are about their work and the shared drive to contribute to the improvement of pharmaceutical science. Researchers were very enthusiastic about all aspects of their working environment, indicating that they feel at home in the Institute and value the interactions with their colleagues. GRIP proves itself to be a close-knit and stimulating research community, with PI's of the different programmes supervising PhD-candidates together, monthly meetings with all researchers, structural Pharmacy Integrating Lectures aimed at all members of the institute, and once a year a pharmacy day with all researchers during which, in addition to a plenary lecture by an invited external speaker, a selection of GRIP's PhD candidates are given the opportunity to present their research in various parallel sessions.

Researchers also indicated that they feel supported in their endeavors and have the material and technical facilities they need to execute their research projects. They could give many prominent examples of inter- and multidisciplinary interactions between clinical and non-clinical fundamental

research, and successful collaborations between pharmaceutical, medical and other sciences, within and outside GRIP, including GUIDE, UMCG and FSE, as well as with external, (inter)national partners.

The committee was very pleased to note how inventive researchers are in finding ways to achieve their goals, even when space, facilities and research activities are limited or due to the challenges of the pandemic. Some researchers did note that changes in legislation (privacy requirements and data-management for example) are making grant applications more and more complex and time-consuming. Extra support from GRIP, as well as GUIDE, could perhaps help in navigating these trajectories more smoothly.

In the documentation and conversations with the committee, GRIP indicated that there is still an important knowledge gap in the scope of research with regard to expertise on pharmacokinetic-pharmacodynamic (PK-PD) modelling which they aim to remedy in the coming years. The committee underlines that model-informed drug development is an important emerging field that quantifies preclinical and clinical drug and disease information and is therefore paramount to an effective drug research and development cycle. The committee recommends that the establishment of a dedicated research group in this area within GRIP be reconsidered, headed by a senior staff member at the level of associate or full professor. GRIP has already appointed a Tenure Track staff member to strengthen the education of PK-PD (60% and 30% research).

The committee praises GRIP for its mission to continue to invest in its central position in drug research at the UG and UMCG. The representatives with whom the committee spoke share the ambition to translate the results of fundamental and platform technology-driven research into daily clinical and industrial practice. GRIP researchers indeed collaborate across research programmes and departments within the context of GUIDE, but also with other research institutes. The committee saw exceptional examples of cross-fertilization with clinical research at UMCG that has grown over the years. Both GRIP and GUIDE could play a role in creating opportunities and conditions for joint strategic thinking and working, and further support interdisciplinary and translational research, which is something that needs to be organized at the institute level.

Academic culture

The committee is very positive about the manner in which GRIP invests in good academic culture. First of all, GRIP's policies and scientific practice comply with the Code of Conduct for Scientific Practice of the University of Groningen, which sets the standard for care, reliability, verifiability, and independence in scientific research. The University of Groningen has its own regulations for the protection of academic integrity and provides a confidential advisor for questions pertaining to issues of integrity. Research integrity is also an integral part of the performance evaluation interview for all staff members, as well as an important topic in the training courses for Master students and PhD candidates. A Steering Committee 'Research Integrity' advises the FSE Board, also with regard to issues of data management. The Research and Data Management (RDM) policy of GRIP describes the conditions and processes for storage of research (products). Like each research institute, GRIP researchers set up their own Research and Data Management Plan (RDMP) according to GRIP's RDM policy.

Based on the documentation provided by GRIP and its conversations with representatives of the Institute, the committee was pleased to observe that GRIP truly strives for a culture of engagement, recognition and that it provides a safe and welcoming working environment, involving employees from all parts of the Institute. The training in research integrity for the PhD candidates is effective and leads to awareness of issues that can play a role. PhD candidates were very much aware of Scientific Integrity and how to handle issues related to this. The recently installed committee on engagement and recognition to improve an open and inclusive culture will contribute to the further development of an open academic culture.

GRIP takes research integrity very seriously, the committee however also noted that there is room for improvement. Although no major issues with research integrity have been noted in the past 6 years, the committee does strongly encourage continued attention to the awareness of research integrity issues, particularly among staff members. While the committee values that all PhD candidates have to follow a mandatory scientific integrity course, this is not the case for other academic staff. More effort should be put in prevention and thus integrity training. The committee is convinced that all members of academic community would benefit from formal active training with refresher courses at regular intervals, and dialogue and debate about matters of research integrity as part of their continuous professional development

Output quality

Overall, the research programmes at GRIP are very productive and generate high quality basic and translational research. The committee observes that GRIP has without a doubt strengthened its central position in the pharmaceutical R&D of Groningen, which is evidenced by the fact that GRIP researchers actively participate in multidisciplinary research projects (in UG/UMCG research projects as well as (inter)national research programs), a majority of the publications resulted from various collaborations with UMCG, and more than half of GRIP awarded grants were collaborative grants.

Objective evidence for the outstanding quality of research at GRIP is the increase in output, the number of impactful peer-reviewed publications and the large number of science and scholarship awards, as well as the highly prestigious awards and prizes for individual researchers, such as the Prix Galien and a knighthood for contributions to pharmaceutical science. The Institute's publication profile is characterized by notable papers in the top 10%, and, for a small institute, a high and increasing average in field weighted citations (FWCI). GRIP's standing in the (inter)national field of pharmaceutical sciences is evident from the high percentage of collaborative projects: almost 50% (47) of all projects that were awarded, were collaborative grants with partners from academia, industry or government. Of these, 24 projects (50%) are conducted together with industrial partners. GRIP's strong collaborative potential, particularly with research partners from GUIDE and the UMCG, is also evident in its publication output: 46% of all journal publications have been published together with UMCG researchers.

Open Science

Stakeholder engagement is high on GRIP's strategic agenda, as can be derived from its ambition to play a leading role in its environment by connecting stakeholders and instigating innovation in pharmaceutical and health care. The institute has been successful in promoting open science through open access publishing and establishing FAIR data practices, which further enhances research quality and increases visibility by making research data more accessible to the public and scientific community. The committee was also very positive about the significant increase in the number of open access publications at GRIP; more than 80% of refereed articles were published as open access in 2020, whereas 30% of the papers were open access in 2015. This substantial increase demonstrates that the institute is indeed highly committed to the principles of Open Science. In talking to the GRIP representatives, it became clear that open access is not only high on the strategic agenda, but that the Institute really strives towards living open science. This implies not only open access publishing, but also internal and external availability of data (FAIR principle). The committee noted that there is very good support and extra funding available for open access publications, which ensures that there are no economic hurdles to publishing open access. This is appreciated by the early career researchers (PhD candidates and Tenure Track Staff).

Funding and grants

The committee was very impressed by how successful the institute has been in acquiring external funding in the past six years (in excess of 23 million euros, a total of 99 grants) and its ability to acquire a high number of prestigious prizes and grants, including a VICI grant (1.5 million Euro), an NWO-ECHO and ERC Proof of Concept grant, an ERC starting grant, several ZonMW grants and a FETOpen grant in collaboration with colleagues in the UK and Germany. The central position of GRIP in the faculties of Science and Engineering and Medical Sciences is also underlined by its participation in two larger COFUND initiatives (ALERT and PROMINENT), which are based on extensive collaborative research activities involving both faculties.

Though the amount of funding in past years is impressive, the committee recognized a possible concerning downward trend in industry funding. The committee learned that a potential explanation is the substantial rise in co-funding programmes (e.g. Health Holland, NWO, ZonMW), which often require 10-20% financing from industry, which is drawing away direct industry funding towards programs. Additionally, GRIP has discovered that there is a significant gap in the Dutch funding system. NWO does not fund clinical studies, while ZonMW only funds late phase II studies. This means that there is no regular national public funding for phase I and early phase II clinical studies available. GRIP has started the discussion with governmental funding agencies about this issue.

To address these challenges, the committee recommends that GRIP aligns the research focus according to the research ambitions of GRIP in the national 'Sectorplan' of the Pharmaceutical Sciences sector. The Pharmaceutical Sciences sector plan was launched at the initiative of GRIP, together with the pharmaceutical institutes of the Utrecht University (Utrecht Institute for Pharmaceutical Sciences, UIPS) and Leiden University (Leiden Academic Centre for Drug Research, LACDR) and recently submitted to the ministry of OCW (Education, Culture and Science) of the Dutch government. The committee is very positive about this initiative and encourages the management of GRIP to set up a strategy aligned with the Pharmaceutical Sciences sector plan ambitions to profit better from funding provided by independent public granting agencies.

Position of GRIP within GUIDE

During the site visit, the committee paid careful attention to the integration of GRIP's 8 research groups within GUIDE. The committee observes that the integration of GRIP in GUIDE is without a doubt an enviable asset of the institution, since GRIP is strategically positioned to bridge the gap between bench and bedside. This is formalized by the position of the Scientific Director GRIP as Deputy Director GUIDE. The integration of GRIP within GUIDE is further strengthened by the recently added programme PEGET, which incorporates a wide range of fundamental and clinical research, including methodologies for assessing medication use and outcomes, sex/age differences in drug treatment and outcomes and new interventions to improve medication use. Due to its new positioning, PEGET is able to link better with clinicians who are involved in the use of drugs and to shift towards new topics in drug therapy.

The committee is pleased to note that the support for GRIP investigators is substantial and that their participation in GUIDE allows them to make major contributions. In speaking with the researchers involved, the committee learned that the GRIP programme within GUIDE is considered to be a very strong asset, contributing to the interdisciplinary, multidisciplinary and translational scope and potential of research at GUIDE. The 4 GUIDE programmes in which GRIP research groups are involved are very prominent and take the lead in certain fields. Their link with UMCG and clinical researchers is clearly an added value to them, which allows them to develop research that is not possible in other contexts. Researchers from MCB, for example, indicated that they are very proud of their collaboration with clinicians in the hospital, which enables innovation and allows them to directly improve patient treatment through technology.

Also, GUIDE benefits from GRIP with regard to the technology platforms and expertise that they bring to the institute. Researchers involved in the GRIP programmes, in most cases non-clinicians, work throughout the whole of the hospital and the laboratories at UMCG. GRIP researchers explained how there is ongoing movement and interaction between the UMCG and FSE locations, with a lot of meetings facilitating exchange and sharing of equipment. The previously mentioned PROMINENT programme, initiated by GUIDE, is another example of how FSE and UMCG researchers collaborate. The committee could establish that there is sustained and structural interaction and collaboration between fundamental/basic, non-clinical and clinical sciences, which is made visible by joint papers, grants and participation in programmes by UMCG and GRIP staff. For example, 46% of GRIP's publications (which mostly involve non-clinical researchers) is the result of collaborations with UMCG researchers (who are generally clinical researchers). Furthermore, other programmes in GUIDE are intensifying their collaborations with GRIP as well, something which the committee fully supports.

The committee can only applaud this strong, productive and visible positioning of GRIP within GUIDE, which continues to prove itself as extremely successful, contributing to the research quality, societal relevance and viability of both Institutes. The committee fully encourages ongoing support for this enterprise and facilitation of increased collaborations between clinical research and basic/fundamental sciences, as well as between GRIP and GUIDE.

2.2.2. Societal relevance

GRIP is well positioned to contribute to societal relevance. Creating societal impact is integral to the Institute's mission, vision and strategic goals, with a strong and explicit focus on the discovery, development and evaluation of life-saving and quality-of-life-improving therapeutics for patients worldwide. The scope of GRIP's research portfolio, the interdisciplinary teams, the strong interconnections between basic/fundamental, translational and clinical research, the partnerships with industry and public organizations, the appointment of honorary professors with strong connections to industry or applied research, the productive platform technologies and, in collaboration with GUIDE, valuable assets in the form of biobanks and patient cohorts and data ensure that GRIP has great potential to generate high societal impact. The committee observes that Pharmaceutical R&D is by nature highly societally relevant, and GRIP sustained this through interactions with stakeholders (mainly industry), establishing start-ups, realizing patents and royalty incomes. GRIP researchers are committed to engaging with the public through outreach activities, disseminating their scientific findings and education. In addition, the realization of local start-ups as well as the regional funding shows the importance of GRIP in the northern region of the Netherlands.

In the documentation and during the site visit, the committee was presented with excellent examples and case studies of how GRIP research has impacted and continues to create societal impact in many ways. The realization of PharmLines, a big pharmaceutical data laboratory, as well as other initiatives such as 'Public engagement regarding the use of inhaled medication', and 'Innovation of alternative to animal experiment/human precision-cut tissue slices', are strong examples of GRIP research that have high societal relevance and are very promising for the future. This engagement is also evident in the many productive collaborations with external stakeholders, with industry, and national and regional healthcare organizations, governmental organizations, as well as patient advocacy groups, funders and local, national and international news agencies. Following the advice of the previous PRC, GRIP has worked to increase its interaction with stakeholders. Activities have varied from setting up a patient council to advise on research within GRIAC to teaming up with charities in grant applications. Many researchers collaborate on a regular basis with charity foundations (e.g., Lung Foundation Netherlands, Cancer Fund, Heart Fund, Parkinson Foundation, Alzheimer Foundation) or research aiming to reduce the use of laboratory

animals). Charities provide 12% of grants currently. Importantly, researchers from GRIP collaborate with the “Fair Medicine” foundation to actively combat the abuse of market monopolies and patent positions by pharmaceutical companies.

The committee applauds the entrepreneurial drive within GRIP as well as the support and infrastructure that is offered to all researchers, PhD’s included, for entrepreneurial initiatives. The institute also has a committee that stimulates entrepreneurial activities such as patenting, and that advises on the initiation of start-up companies. The entrepreneurial orientation and support system has resulted in a high number of significant patents and start-ups: over the past period 18 patents were filed by GRIP researchers; 3 of these have formed the basis for new start-up companies. A 6-year total of €21.6 million in royalties were received by the University based on three GRIP patents. Of this amount, €1.2 million was annually re-invested into research for the institute and GUIDE, and over €600.000 was annually re-invested in other FSE research. Several grants were also obtained in collaboration with local companies. Over the review period, six new companies were founded based on scientific results from GRIP researchers, namely Aquilo, SMIO, MiX, PureIMS, Epicyclops, and Papertronics. A seventh company (EV-Biotech) was founded by former PhDs of GRIP, exploiting the knowledge they obtained during the course on entrepreneurship that is offered to PhD candidates. This shows that PhD candidates profit from this supportive environment and also demonstrates that the institute plays an important role in the local community by stimulating economic development through innovation.

To further strengthen the structural and durable societal relevance of its research, the committee advises ensuring a clear vision and shared reflection on social impact, making clear what it aspires to, and setting clear goals and making explicit expectations. At present, the committee found that each programme defines social impact differently, and that even between researchers there are differences of interpretation. A shared vision and reflection on societal impact and how that can be achieved through outreach, activities, and public engagements would be helpful in setting goals for the future. The committee also recommends putting in place pathways and support to nurture and proactively manage the impact pipeline.

2.2.3. Viability

In the period under review, GRIP has shown itself to be forward-looking, agile, self-reflective and proactive in taking measures to ensure that it is able to achieve its mission and goals. The Institute’s mission and vision to contribute to the discovery, development and evaluation of life-saving and quality-of-life-improving pharmaceutical care, drug use and therapeutics are clearly in alignment with the goals of the Faculty of Engineering and Science, as well as GUIDE’s ambition to improve knowledge and practice of personalized medicine.

GRIP has been successful in the review period in its ambition to serve as a facilitator of collaborative opportunities in the broad spectrum of research in drug development and treatment, in close collaboration with GUIDE. Furthermore, innovative research and effective collaborations between preclinical and clinical units, the Institute’s international network, as well as collaborations with various private partners including industry, charities, patient organizations, regional and national healthcare organizations, and other societal stakeholders all contribute to the present and future viability of the institute. Importantly, the positioning of the GRIP within GUIDE allows for unique opportunities for sustained and productive exchange between fundamental/basic, translational and clinical research. The connection between UMCG and FSE is key to both Institute’s profiles and therefore integral to their present and future viability.

Viability also depends on the continued structural and financial support for the research efforts. Based on overall research funding, the viability of GRIP is sound, with acquisition of substantial

funding from a large variety of sources, with significant funding coming from the EU. Being a multidisciplinary institute is in this respect indeed a major advantage, allowing different research groups to tap into funding from different sources.

A point of concern with regard to the financial viability of GRIP, as well as for GUIDE, is a reduction in funding from industry and other external sources over the last two years. The effects of the pandemic on income for charities might be one explanation, but the downward trend may also be attributed to new co-funding programmes in the Netherlands, which draw direct industry funding away from research programmes. According to the committee, this does not pose a threat to the viability of the Institute in the short term. After a downward trend in 2018 and 2019, the Institute was able to counter this by sourcing from a wide spectrum of grant providers. Also, the institute was able to attract increasing numbers of scholarships for PhD candidates, which helped to keep the number of PhD candidates at the same high level as in previous years.

A second challenge to the viability of the Institute is the 'gap' in the Dutch funding system concerning phase I and early phase II clinical studies, also mentioned under 'Research Quality'. There seems to be no funding programmes targeting these specific phases in research. GRIP has started the discussion with governmental funding agencies about this, which the committee encourages, underlining the importance of funding for all phases in pharmaceutical research. Further investment in and alignment with the research ambitions of the national 'Sectorplan' of the Pharmaceutical Sciences sector will help to create more opportunities for funding, according to the committee. A focus on strategic areas will help to create critical mass.

As mentioned under research quality, the strengthening of expertise on pharmacokinetic-pharmacodynamic (PK-PD) modelling is of crucial importance to the viability of the Institute. GRIP has indicated that this is something that it wishes to address in the coming years, among other things, through the establishment of a broad pharmacokinetics platform. Model-informed drug development utilizing preclinical and clinical data is an emerging field that quantifies drug, disease and trial information and is therefore an important bridging discipline between GRIP and GUIDE. The committee noted that more focused efforts and resources, including a dedicated research group and staff members with expertise in this field, are needed to be sufficiently effective in training the next generation of drug development scientists and obtaining competitive external funding.

Human Resources Policy

The institute has demonstrated good viability with adequate staffing of new professorship positions and successful investment in a group of talented young tenure-track researchers. GRIP remained viable and showed flexibility in dealing with challenges (such as Covid-19). The board of GRIP has a steering role in setting the strategic agenda and HRM policy in addition to successful merging of research groups that are strongly embedded in GUIDE. Activities such as allocation of PhD positions, active support in acquiring grants, formal and informal meetings with the scientific director, and a career development day have clearly paid off.

The committee emphasizes the importance of succession planning. Staff composition shows a relatively large fraction of senior researchers and many of these PI's will be retiring in the near future. The Institute is aware of this and is in the process of taking measures to ensure continuity in programme leadership. The committee recognized that critical mass is of great importance, and this is why it is crucial to recruit new talent.

Since GRIP as an institute is relatively small yet very productive, the workload is very high, especially for the younger staff. The committee noted that there appears to be tremendous pressure on younger staff due to extensive teaching responsibilities and expectations to obtain significant research funding, in addition to the time required to properly mentor PhD candidates. This can have

potential negative effects on opportunities for collaborations with GUIDE and other partners. Critical mass is of great importance, and this is why it is crucial to recruit new talent, including staff members with an educational profile to help address the high teaching load.

Diversity

The gender balance at the level of assistant and associate professors is good. The committee highly values that a variety of actions have been taken in the review period to improve diversity and inclusion. GRIP has successfully made use of the University's Rosalind Franklin programme over the past 6 years, filling two new TT positions with talented female researchers. Currently, the internal staff comprises 33% women, which is significantly higher than the Dutch academic mean of 24%, and even better compared to the 17% mean in the Netherlands in Sciences and Engineering. With the retirement of several full professors in the course of 5 years this percentage will increase, given that 75% of GRIP's assistant professors and 57% of the associate professors are women. On the other hand, the Institute is aware that the number of women at senior levels and in leadership positions in the institute still lags behind (only 2 out of 8 research groups are headed by women) and has taken measures to improve these numbers, for example through inclusive vacancy texts and by making sure that at least 2 members of the selection committee are women. Vacancy texts are sent to female researcher networks and suitable female candidates are actively approached and asked to apply. The first "women-only PhD examining committee" at GRIP described in the documentation highlights the growing presence and importance of female researchers in the Institute.

The committee observes that GRIP shows awareness of the need for gender equality and that it takes active measures for a more inclusive HRM policy, although specific performance indicators have not yet been set. Also, it struck the committee that cultural and other aspects of diversity seems to be less on the radar. The documentation reflects on cultural diversity, but this term seems to be narrowed down to the presence of international staff. This may be due to Groningen's remote location, and the fact that its population is not as diverse as elsewhere in The Netherlands. The committee would welcome a broader interpretation of the term diversity, and encourages the development of policies that include other types of, and approaches to, diversity. To conclude, the committee encourages GRIP to set clear targets for future vacant positions to further improve the gender balance at senior levels and at governance levels, and further update and adapt its recruitment strategies to provide an open and inclusive environment.

Talent selection and development

The committee explored how GRIP recruits young talent and manages career tracks of its early career and senior researchers. GRIP aims to increase its academic staff by attracting new talent within the multidisciplinary field of the pharmaceutical sciences, in anticipation of the retirement of several senior staff members. This includes a strategy to maintain the number of PhD candidates at a high level, since their work forms the backbone of research at the institute. Since the University of Groningen can only finance a limited number of PhD positions, the Institute is to a large extent dependent on externally-financed and scholarship PhDs.

The committee learned that talents are actively scouted, through a focus on grant acquisition, active participation of staff members in international PhD recruitment fairs to attract foreign scholarship PhDs, by encouraging the submission of research ideas to FSE-initiatives such as the Molecular Life and Health programme, and the use of institute reserves to fund GRIP PhD positions. In 2018 and 2019, the institute used some of its financial reserves to create 5 GRIP-funded PhD positions, for example. The best master students from the institute were encouraged to apply for these GRIP-funded positions by writing a PhD proposal and finding a matching supervisor. After an internal selection process, 5 students were awarded a bursary PhD position for 4 years.

The committee appreciates that the training and support of early-career scientists (PhD candidates, postdocs, and tenure-track assistant professors) in their academic career development is a key objective of the Institute. The primary responsibility for these activities lies with institutional management and the chairs of the research groups, who are supported by the scientific coordinator. With regard to the PhD candidates, GRIP's support and HRM policies are in line with and supportive of the goals of the Graduate School of Science and Engineering (GSSE). The objective is to educate early-career talented scientists both in the general aspects of science, as well as in the specific aspects of their field of interest. To this end, a wide variety of personal and professional development courses are offered to PhD candidates. (see below 'PhD Policy and Training')

Furthermore, GRIP places great emphasis on supporting its tenure-track professors, since they form the next generation of leaders in science. They receive good support from the management of GRIP as well as from the leaders of their research group, with a focus on the strategic development of their own independent research line and funding strategies. In annual "Result and Development" interviews, the scientific development of the tenure-track assistant professor is reviewed by the research group chair, the Institute's scientific director and director of education. This gives them the opportunity to reflect upon their performance in light of the requirements for promotion following the Faculty's "Career paths in Science" policy. The Young Science and Engineering Network (YSEN) was launched in 2019, a community by and for early-career tenure-track professors within FSE, whose members meet monthly. Internal funding opportunities are preferentially awarded to the early-career tenure-track professors, and they also receive significant support from both the faculty and institute in grant acquisition. Over the assessment period only two candidates left the programme, while eight candidates were promoted achieving tenure and a permanent contract in the process.

The committee highly values GRIP's active policy in recruiting young talent, its strong initiatives for support of its early career researchers and the manner in which it keeps an open attitude towards rapidly emerging fields. It also is very appreciative of the guidance and support of early career tenure-track professors. GRIP is clearly committed to giving its early career researchers the mentoring and funding they need to make the necessary and important steps in their careers. Of those interviewed, the committee was pleased to note that early career and senior researchers at the institute feel supported by their peers and supervisors and that they receive personal mentoring and are stimulated to find their own research path. They feel well-supported in grant applications. Support is offered at Faculty/University level, and there is also good peer-support from colleagues.

The committee appreciates that GRIP actively invests in talent management and encourages the institute to continue to invest in its management of talent and the nurturing of careers of junior researchers, for PhD's as well as postdocs, supporting them in identifying possible career paths that are available, whether this be in academia, industry or other domains in society. For the committee, an important key to success is the embedding of postdoctoral scholars in the research community as highly valued partners who energize programme development. The committee observes that the decreased funding and low number of postdoctoral scholars relative to the high number of PhD candidates could negatively impact the quality of PhD training. The committee noted the long time to degree for some PhD candidates (5-6 years). Based on the available information, the committee concluded that many PhD candidates do additional work after the nominal 4 years of their PhD programme and may be kept 'dependent' for a longer period of time than necessary. The committee recommends assigning more funds and positions to the postdoctoral career phase.

The committee appreciates that FSE has introduced a postdoc platform and appointed two postdoc ambassadors who represent the interests of the postdoctoral community within the faculty are in direct communication with both the platform and the Faculty Board to discuss relevant matters. This will contribute to a stronger position of the postdocs within the Institute.

In answer to the question posed by GRIP on how to further improve recruitment of young talented staff, the committee believes that an increase in the number of postdoctoral researchers with the intent to retain the very best and brightest as future staff could be one approach to address this challenge. Overcoming concerns regarding the high workload and intense pressure on younger staff, which impact quality of life, could help enhance the recruitment of young, talented academic staff.

As observed before, the committee notes that there is a high pressure on younger staff, due to heavy teaching responsibilities, grant expectations, and mentoring a large number of PhD candidates. The committee encourages the hiring of tenure track staff members with an educational profile to help address the high teaching load. The further development of a strong mentoring programme that provides coaching and guidance in career development and grantsmanship would further increase the success of younger staff, and is yet another way to help attract and retain talented academic staff.

PhD Policy and training

GRIP is clearly contributing to talent development through well-established career tracks centered on early career researchers (ECRs). GRIP provides a well-organized, coherent, and stimulating research environment in which PhD candidates are trained to become independent researchers and to develop a wide range of additional, high-level skills relevant for both academia and society. The quality of PhD's is high and the overall support, guidance and training for PhD's, organised by the Graduate School of Science and Engineering (GSSE), is very good.

In collaboration with the supervisor, each PhD candidate enrolling in GSSE must compile a Training and Supervision Plan (TSP) that describes both the research project and the training programme. The training programme is tailor-made and covers 10-15% of the total duration of the PhD programme. Candidates enrolled in a four-year PhD programme are expected to complete a 30-ECTS training programme; for candidates with a shorter PhD programme, the size of the training programme is reduced proportionally. Several courses are mandatory, such as the course on scientific integrity. Six ECTS credits should be spent on courses that concentrate on the acquisition of transferable skills. The remaining credits can be spent on a variety of activities. Credits also can be obtained for the organisation of symposia, workshops, and scientific debates, as well as for representative functions such as membership of the GSSE PhD Council.

PhD candidates meet frequently with their supervisors and colleagues in their research group. In addition, GSSE organizes regular Result and Development interviews. Following university regulations, these meetings are scheduled after 6 and 9 months, and after 2, 3 and 4 years of the project. The interview after 9 months is called the go/no-go interview; at this point in the project, the supervisors need to decide whether or not the PhD candidate has a fair chance of successfully finishing the project within 4 years. If this seems unlikely, the project should be terminated. If a project is expected to take longer than 4 years, the GSSE advises to also schedule an interview addressing this issue after the third year. To support PhD candidates and improve completion times, the GSSE offers the possibility for PhD candidates to receive individual coaching (5-10 one-on-one sessions with an experienced professional with an academic background). Furthermore, to reduce the workload of the PI's, GSSE plays a role in improving the academic skills of the PhD candidates (writing and proficiency in English) as well as training their soft skills.

GRIP stays in close contact with GSSE, through its scientific coordinator, to ensure their PhD candidates are thriving. There is a specially appointed PhD-counsellor, who acts as an ombudsperson and confidential advisor, to whom PhD candidates can turn if they encounter specific problems. The PhD candidates were appreciative of the initiatives that are taken to improve their wellbeing and spoke highly of the many ways in which they are guided, mentored and supervised. PhD candidates

that the committee spoke to are aware of where they can go for support and questions, and they feel heard by their supervisors and mentors. They highly value the courses, workshops and mentoring, which help them develop their academic and transferable skills and support them making the right choices to take the next step in their academic career.

Yet, as stated before, the committee does still have some concern regarding the high numbers of PhD candidates relative to the number of postdocs, the long duration of the PhD trajectory for many candidates, and the potential inequality resulting from differences between employed PhD's and PhD's funded by bursaries. The committee is pleased to note that bursary PhD candidates have found a way to organize themselves and advocate for their rights and that they feel supported by their supervisors. The advantage of bursary PhD candidates is that they have the freedom to make their own choices as they progress through their programme of study and research projects. Nevertheless, the committee was left with the impression that the Institute PhD system, both at the Faculty level and at the Institute level, may require careful consideration and review in order to achieve its optimal balance and full potential within the Institute as a whole.

To conclude, the committee wishes to emphasize that potential points of improvement identified during the site visit are in many cases already under consideration by GRIP and that there are strategies under development to tackle potential challenges and observed threats. This indicates that the Institute is critical, reflective and agile, and willing to confront and embrace those aspects that require more attention and improvement in order to achieve its goals. Therefore, the committee is confident that the following recommendations will be taken into due consideration for future improvements, also with regard to GRIP's self-evaluation and formulated goals and strategy.

2.3. Recommendations

Research Quality

- An important knowledge gap recognized by GRIP is expertise in pharmacokinetic-pharmacodynamic (PK-PD) modelling. Model-informed drug development is an emerging field that quantifies preclinical and clinical drug- and disease information and is therefore paramount to an effective drug research and development cycle. The committee recommends the establishment of a dedicated research group in this area within GRIP.
- The committee recommends that GRIP aligns the research focus according to the research ambitions of 'Sectorplan' for Pharmaceutical Sciences. A focus on strategic areas will help to create critical mass.
- The committee recommends the management of GRIP to set up a strategy aligned with the Pharmaceutical Sciences sector plan ambitions to profit better from funding from independent public granting agencies.

Societal relevance

- To further strengthen the structural and durable societal relevance of its research, the committee advises ensuring a clear vision and shared reflection on societal impact, making clear what the Institute aspires to, and setting clear goals and making explicit expectations.
- The committee recommends focusing on transdisciplinary research beyond industrial partners, including other societal stakeholders such as patient advocacy organizations, prescribers, health insurance companies and policy makers.

Viability

- Although no major issues with research integrity have been noted in the past 6 years, we strongly encourage continued attention to the awareness of research integrity issues, particularly among staff members beyond PhD candidates.

- There is high pressure on younger staff, due to heavy teaching responsibilities, grant expectations, and mentoring PhD candidates. The committee encourages the hiring of tenure track staff members with an educational profile to help address the high teaching load.
- The further development of a strong mentoring programme that provides coaching and guidance in career development and grantsmanship would further increase the success of younger staff, and help attract and retain talented academic staff.

Appendices

1. Programme site visit GRIP on 2 December, 2021

Times: Amsterdam time with **Eastern Standard time (in Bold)** (EST is 6 hours behind after daylight savings time ends).

Time	Topic	People and Affiliation	Google Meet Link
15:00 -16:00 (60 min) (9:00am - 10:00 am EST)	PRC Panel discussion	PRC Panel	meet.google.com/yzd-yfff-she
16:00 -17:00 (60 min) (10:00am – 11:00am EST)	Interviews with Dean FSE and Management GRIP	PRC Panel with <ul style="list-style-type: none"> • Prof. dr. Jasper Knoester, Dean FSE • Prof. Dr. Erik Frijlink, Director GRIP and Deputy Director GUIDE, GRIP: Pharmaceutical Technology and Biopharmacy (PTB), (GUIDE: BDDD). • Prof. dr. Sabeth Verpoorte, GRIP: Pharmaceutical Analysis, (GUIDE: MCB) • Prof. dr. Gerrit Poelarends, GRIP: Chemical and Pharmaceutical Biology, (GUIDE: BDDD) • Prof. dr. Reinoud Gosens, GRIP: Molecular Pharmacology, (GUIDE: GRIAC) • Dr. Ralph van Calck – Scientific Coordinator GRIP 	meet.google.com/zqe-djov-fru
17:00 -17:15 (15 min) (11:00am - 11:15am EST)	BREAK + consultation amongst panel	PRC Panel	meet.google.com/yzd-yfff-she
17:15 -17:45 (30 min) (11:15am - 11:45 am EST)	Interviews with senior researchers (UHD and Prof)	PRC Panel with <ul style="list-style-type: none"> • Prof. dr. Klaas Poelstra, GRIP: Nanomedicine and Drug Targeting, (GUIDE: BDDD) • Prof. dr. Katja Taxis, GRIP: PharmacoTherapy, -Epidemiology & -Economics, (GUIDE: PEGET) • Prof. dr. Amalia Dolga: GRIP: Molecular Pharmacology, (GUIDE: GRIAC) 	meet.google.com/wuy-orwr-qmq
5 min break			

17:50 - 18:20 (30 min) (11:50 – 12:20 EST)	Interviews with Tenure Track UD staff	PRC Panel with <ul style="list-style-type: none"> • Dr. Maarten Bijlsma, GRIP: PharmacoTherapy, -Epidemiology & -Economics, (GUIDE: PEGET) • Dr. Sandy Schmidt, GRIP: Chemical and Pharmaceutical Biology, (GUIDE: BDDD) • Dr. Christoffer Aberg: GRIP: Pharmaceutical Analysis, (GUIDE: MCB) 	meet.google.com/kaz-cbqs-hou
18:20 -19.05 (45 min) (12:20 - 1:05pm EST)	BREAK Lunch/dinner + consultation amongst panel	PRC Panel	meet.google.com/yzd-yfff-she
19:05 – 19:25 (20 min) (1:05 – 1:25 pm EST)	Interview with the Director of the Science and Engineering Graduate School (GSSE)	PRC Panel with <ul style="list-style-type: none"> • Prof. dr. Sabeth Verpoorte, Director GSSE 	meet.google.com/ttp-weum-rkh
5 min break			
19:30 - 20:00 (30 min) (1:30 - 2:00pm EST)	Interviews with PhDs	PRC Panel with <ul style="list-style-type: none"> • Taichi Ochi, GRIP: PharmacoTherapy, -Epidemiology & -Economics, (GUIDE: PEGET), also FSE PhD council member • Luke van der Koog, GRIP: Molecular Pharmacology, (GUIDE: GRIAC) • Ceri Richards, GRIP: Pharmaceutical Analysis, (GUIDE: MCB) • Carin Biel, GRIP: Pharmaceutical Technology and Biopharmacy (PTB), (GUIDE: BDDD) 	meet.google.com/rhx-abbn-djy
20:00 - 21:00 (60 min) (2:00 - 3:00pm EST)	Judgment by panel members	PRC Panel	meet.google.com/yzd-yfff-she
21:00 – 21:20 (20 min) (3:00 - 3:20pm EST)	feedback to FSE/GRIP	PRC Panel with <ul style="list-style-type: none"> • Prof. Jasper Knoester, Dean FSE • Prof. Dr. Erik Frijlink, Director GRIP and Deputy Director GUIDE • Prof. dr. Sabeth Verpoorte, GRIP: Pharmaceutical Analysis, (GUIDE: MCB) 	meet.google.com/dhw-ahqu-ext

		<ul style="list-style-type: none">• Prof. dr. Gerrit Poelarends, GRIP: Chemical and Pharmaceutical Biology, (GUIDE: BDDD)• Prof. dr. Reinoud Gosens, GRIP: Molecular Pharmacology, (GUIDE: GRIAC)• Dr. Ralph van Calck – Scientific Coordinator GRIP• Dr. Alicia Brandt – research policy officer FSE	
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2. Quantitative data

Table 1. GRIP Research staff 2015-2020

1a. Research input at the institute level in full time employment (fte) equivalent and the number of employees

	Academic staff		Post docs & research staff*		PhD candidates
	FTE	No.	FTE	No.	No.
2015	11.80	36	22.27	43	155
2016	11.67	34	20.29	38	154
2017	11.65	36	18.62	34	157
2018	11.34	33	12.23	24	163
2019	11.04	33	10.28	17	164
2020	11.43	33	10.54	15	148

*: Post docs & research staff includes researchers with temporary appointments on specific projects (i.e. post docs) and a few members of the teaching staff that have a minor appointment in research activities. This last group has remained fairly constant and contributes no more than 1 FTE.

1b. PhD candidate numbers and division by funding-type

	Total	Employed		Scholarship ¹		External + self-funded ²	
	No.	No.	%	No.	%	No.	%
2015	155	73	47.1	48	31.0	34	21.9
2016	154	65	42.2	56	36.4	33	21.4
2017	157	66	42.0	61	38.9	30	19.1
2018	163	65	39.9	67	41.1	31	19.0
2019	164	60	36.6	68	41.5	36	21.9
2020	148	51	34.5	61	41.2	36	24.3

1: Includes PhD candidates on UG scholarships under, for instance, the MLH research theme, as well as foreign scholarship programmes such as CSC and LDPD (VSNU types 2a and 2b).

2: PhD candidates that are employed outside the UG (e.g. in a hospital, industry or pharmacy) and external PhD candidate (self-funded; VSNU type 4).

Table 2. GRIP Funding 2015-2020

Table 2a. Total annual expenditure at the institute level

	2015	2016	2017	2018	2019	2020	Total	%
GS1 direct funding	7,510,783	7,758,160	8,706,405	8,317,174	8,786,021	8,446,900	49,525,443	65
GS2 research grants	1,829,866	1,354,264	1,012,169	1,101,094	1,408,315	982,601	7,688,310	10
GS3 contract research	3,380,413	3,050,228	3,657,492	3,101,836	2,826,311	3,558,044	19,574,323	25
Total	12,721,062	12,162,653	13,376,066	12,520,104	13,020,646	12,987,545	76,788,076	100
Personnel costs	8,824,364	8,760,882	9,448,760	9,166,653	9,023,484	10,235,229	55,459,373	
Materials/equipment	3,896,698	3,401,771	3,927,306	3,353,451	3,997,163	2,752,316	21,328,704	

Table 2b. Funding acquired per year at the institute level

	2015	2016	2017	2018	2019	2020	Total	%
GS 1 (projects)	0	100,000	0	0	0	0	100,000	<<1
GS2 (NWO,ZonMw, KNAW)	1,032,277	284,280	2,609,910	1,284,600	150,000	0	5,361,067	23
GS3 (EU)	2,639,287	1,301,128	2,009,219	887,120	85,389	1,905,274	8,827,417	38
GS3 (Industry)	736,310	1,689,489	287,587	0	585,371	572,219	3,870,976	17
GS3 (charities/other)	479,813	971,082	1,477,112	800,247	584,910	907,366	5,220,530	22
GS3 total	3,855,410	3,961,699	3,773,918	1,687,367	1,255,670	3,384,859	17,918,923	77
Total grants	4,887,687	4,345,979	6,383,828	2,971,967	1,405,670	3,384,859	23,379,990	100