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Supplementary Table 1. Conversation with ChatGPT about its ability to assist with cancer biology and tissue repair research

The Question	ChatGPT's Answer
Will ChatGPT be a practical and essential assistant in cancer research and the laboratory?	While ChatGPT and similar AI models can provide valuable assistance in a cancer laboratory, their role may be more limited compared to other domains. Here are a few considerations regarding the practicality and potential usefulness of ChatGPT in a cancer laboratory setting: 1. Data analysis: ChatGPT can assist with data analysis tasks in a cancer laboratory. It can help process and analyze large datasets, identify patterns or trends, and aid in interpreting research findings. However, it's important to note that AI models like ChatGPT are primarily language models and may not have the specialized knowledge or expertise in specific laboratory techniques or assays. 2. Literature review and research assistance: ChatGPT can be useful for literature reviews and generating hypotheses in the laboratory setting. It can help researchers access relevant scientific literature, summarize key findings, and provide insights into existing research. However, it's essential to evaluate the information provided by AI models critically and corroborate it with additional sources. 3. Experimental design and planning: While ChatGPT can provide general information and suggestions, it may not replace the expertise of laboratory scientists and researchers in designing and planning experiments. The complexity of experimental design, laboratory protocols, and technical considerations may require human knowledge and hands-on experience. 4. Decision Support: ChatGPT can provide general guidance and decision support based on existing scientific knowledge. It can help researchers and laboratory personnel consider different options or factors when making decisions. However, it's important to note that final decisions should involve domain experts who can consider all relevant factors and nuances specific to the laboratory's context. 5. Training and education: ChatGPT can serve as an educational tool in a cancer laboratory setting, providing explanations and answering questions related to cancer biology, laboratory techniques, or research methods. It can help researchers and trainees expand their knowledge base and foster learning. In summary, while ChatGPT can be a practical and useful assistant in a cancer laboratory for specific tasks such as data analysis, literature review, and general guidance, it should not replace the expertise, critical thinking, and hands-on experience of laboratory scientists. It is best utilized as a complementary tool to support and enhance their work, rather than a substitute for human expertise and judgment.
How can ChatGPT assist in tissue repair and wound healing research?	1. Literature synthesis: Rapidly summarize current evidence on tissue repair, biomaterials, growth factors, stem cells, and molecular pathways in wound healing. 2. Hypothesis generation: Suggest novel research directions or combinations of therapies for accelerating wound repair. 3. Experimental design support: Compare existing laboratory methodologies, recommend model systems, and help draft or refine protocols. 4. Troubleshooting: Provide possible explanations for unexpected lab outcomes and propose adjustments to experimental setups. 5. Data interpretation: Contextualize findings within existing research, highlight biological mechanisms, and suggest statistical approaches. 6. Writing and communication: Assist with grant proposals, manuscripts, and precise documentation of research methods and results. 7. Collaboration facilitation: Streamline knowledge sharing across multidisciplinary teams by generating concise summaries and explanations.
How can ChatGPT assist in cancer biology research?	As an AI language model, I can assist in cancer biology by providing information, explanations, and answering questions related to various aspects of the field. Here are some specific ways I can help: 1. Explaining cancer biology: I can provide an overview of the basic concepts and processes involved in cancer development, including cell growth, mutation, tumor formation, metastasis, and the role of genetic and environmental factors. 2. Describing different types of cancer: I can provide information on specific types of cancer, including their characteristics, risk factors, common symptoms, diagnostic approaches, treatment options, and ongoing research in the field. 3. Discussing cancer treatment modalities: I can explain different treatment options available for cancer, such as surgery, chemotherapy, radiation therapy, targeted therapies, immunotherapy, and hormone therapy. I can also provide insights into emerging treatments and clinical trials. 4. Addressing specific questions: If you have specific questions related to cancer biology, its molecular mechanisms, genetic factors, or any other related topic, I can provide detailed explanations and information based on the available knowledge in the field. 5. Exploring research and advancements: I can provide updates on the latest research findings, breakthroughs, and advancements in cancer biology, including novel treatment approaches, diagnostic methods, and potential therapeutic targets. Please note that while I can provide general information and insights, I am not a substitute for professional medical advice or a healthcare provider. For personalized information and guidance regarding cancer diagnosis, treatment options, or any specific medical concerns, it is always recommended to consult with qualified healthcare professionals who can evaluate your individual case.
How can ChatGPT assist in regenerative medicine and stem cell research?	1. Explaining core concepts: Provide accessible explanations of stem cell biology, differentiation pathways, organoid models, and principles of regenerative medicine. 2. Highlighting therapeutic approaches: Summarize emerging strategies such as induced pluripotent stem cells (iPSCs), mesenchymal stem cell therapies, scaffold-based tissue engineering, and gene-editing applications (e.g., CRISPR). 3. Comparative analysis: Contrast preclinical versus clinical evidence, highlight safety challenges (e.g., tumorigenicity, immune rejection), and contextualize within regulatory frameworks. 4. Protocol refinement: Suggest best practices based on reported studies, model systems, and biomaterial applications for regenerative purposes. 5. Translation insights: Explore challenges in moving from laboratory research to bedside application, including ethical, safety, and manufacturing considerations.
How can ChatGPT assist in wound healing and burn care research?	ChatGPT can rapidly summarize evidence on wound repair, biomaterials, and regenerative therapies; propose hypotheses for novel interventions (e.g., stem cell or scaffold-based therapies); support burn injury research by identifying pathways common to cancer and wound healing; aid in wound assessment by synthesizing clinical scoring systems and imaging data; and assist in designing protocols for infection monitoring, scar prediction, and rehabilitation strategies.

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How can ChatGPT support research in cell and tissue biology?	1. Educational support: Clarify fundamental biological processes such as cell signaling, extracellular matrix remodeling, apoptosis, autophagy, and cell–cell communication. 2. Methodological assistance: Guide microscopy techniques, flow cytometry, cell culture, 3D bioprinting, and organ-on-chip models. 3. Data contextualization: Help interpret findings from imaging, transcriptomic, and proteomic analyses in the context of cellular function. 4. Research synthesis: Summarize recent literature on cell differentiation, morphogenesis, and tissue-level coordination of cellular functions. 5. Interdisciplinary bridge: Facilitate connections between cell/tissue biology and applied domains such as biomaterials science, bioengineering, and regenerative medicine.
How can ChatGPT assist in cancer Immunogenetics?	In the field of cancer immunogenetics, ChatGPT can assist by offering information, explanations, and answering questions related to the intersection of cancer, the immune system, and genetics. Here are some specific ways in which I can help: 1. Explaining cancer immunogenetics: I can provide an overview of the role of genetics in cancer development, progression, and response to immunotherapy. This includes discussions on tumor antigens, major histocompatibility complex (MHC) molecules, immune checkpoint proteins, and the genetic factors that influence the tumor-immune interaction. 2. Discussing tumor immunology: I can provide insights into the mechanisms by which the immune system recognizes and targets cancer cells. This includes examining the concept of immune surveillance, immune evasion strategies employed by tumors, and the interplay between the tumor microenvironment and immune cells. 3. Describing immunogenetic markers and signatures: I can provide information on specific genetic markers or signatures that are associated with cancer immunotherapy response or prognosis. This may include genetic alterations, such as tumor mutational burden (TMB), microsatellite instability (MSI), or specific gene mutations that impact immunotherapy efficacy. 4. Exploring immune-based cancer therapies: I can explain various immunotherapy approaches used in cancer treatment, including immune checkpoint inhibitors, CAR-T cell therapy, cancer vaccines, and adoptive cell therapy. I can discuss the underlying genetic considerations and mechanisms of action for these therapies. 5. Addressing specific questions: If you have questions related to cancer immunogenetics, such as the influence of particular genes on the immune response or the genetic basis of immune-related adverse events, I can provide information and insights based on current knowledge in the field. It's essential to note that, while I strive to provide accurate and up-to-date information, the field of cancer immunogenetics is continually evolving. Therefore, it's always recommended to consult scientific literature, research papers, and domain experts for the most recent and specialized information.
As you said, you can "Exploring immune-based cancer therapies: I can explain different immunotherapy approaches used in cancer treatment, such as immune checkpoint inhibitors, CAR-T cell therapy, cancer vaccines, and adoptive cell therapy. I can discuss the underlying genetic considerations and mechanisms of action for these therapies."How would it be? And in what depth can you be specified?	I can provide an overview and explain the general principles and mechanisms behind immune-based cancer therapies, including immune immune checkpoint inhibitors, CAR-T cell therapy, cancer vaccines, and adoptive cell therapy. Here's a breakdown of what depth I can provide: 1. Immune checkpoint inhibitors: I can explain the concept of immune checkpoints, such as programmed cell death protein 1 (PD-1) and cytotoxic T-lymphocyte-associated protein 4 (CTLA-4), and how they regulate immune responses. I can discuss how immune checkpoint inhibitors work to block these checkpoints, unleash the immune system's ability to recognize and attack cancer cells, and the genetic considerations that may influence their effectiveness. 2. CAR-T cell therapy: I can describe the basic principles of chimeric antigen receptor (CAR) T cell therapy, including the genetic modification of a patient's own T cells to express CARs that specifically target cancer cells. I can explain how CAR-T cells recognize and kill cancer cells, potential genetic factors that affect CAR-T cell therapy outcomes, and the challenges associated with this treatment approach. 3. Cancer vaccines: I can provide an overview of cancer vaccines, including both preventive (prophylactic) vaccines and therapeutic vaccines. I can discuss how cancer vaccines stimulate the immune system to recognize and attack cancer cells, the genetic considerations in vaccine development, and the challenges faced in achieving effective immune responses against cancer. 4. Adoptive cell therapy: I can explain the concept of adoptive cell therapy, which involves the transfer of immune cells, such as tumor-infiltrating lymphocytes (TILs) or genetically modified T cells, to enhance anti-tumor immune responses. I can discuss the genetic considerations and techniques involved in modifying immune cells for adoptive cell therapy, as well as the mechanisms by which these cells recognize and target cancer cells. Please note that while I can provide a general understanding and explain the underlying genetic considerations and mechanisms of action for these therapies, the field of immune-based cancer therapies is complex and constantly evolving. For more detailed and specific information, consulting scientific literature, research papers, and healthcare professionals specialized in this field would be beneficial.
The future of immune-based cancer therapy belongs to which method?	The future of immune-based cancer therapy is an active area of research and development, and it is difficult to predict which specific method will dominate. However, several promising approaches hold great potential for the future. Some of these include: 1. Combination therapies: Combining different immunotherapeutic approaches, such as immune checkpoint inhibitors with CAR-T cell therapy or cancer vaccines, has shown promising results in preclinical and clinical studies. Combination therapies aim to enhance the effectiveness of immune-based treatments by targeting multiple aspects of the immune response and tumor microenvironment simultaneously. 2. Personalized medicine: Advancements in genomic profiling and biomarker identification are enabling the development of personalized immunotherapies. By understanding the genetic and molecular characteristics of a patient's tumor, it may be possible to tailor immune-based therapies to individual patients, maximizing their efficacy and minimizing adverse effects. 3. Novel immune targets: Ongoing research is focused on identifying new immune targets beyond the currently targeted immune checkpoints. Discovering and targeting novel immune targets on cancer cells could lead to the development of more effective immunotherapies. 4. Improving CAR-T cell therapy: CAR-T cell therapy has shown remarkable success in certain blood cancers, but its effectiveness in solid tumors is still a challenge. Researchers are exploring ways to enhance CAR-T cell therapies by improving their persistence, increasing their targeting capabilities, and overcoming the immunosuppressive nature of the tumor microenvironment. 5. Immune engineering and gene editing: Genetic engineering techniques, such as CRISPR-Cas9, hold promise for modifying immune cells and enhancing their ability to recognize and eliminate cancer cells. This includes improving the specificity and potency of CAR-T cells and TILs, as well as engineering immune cells to resist tumor immune evasion mechanisms. It's important to note that the future of immune-based cancer therapy is likely to involve a combination of approaches tailored to individual patients and specific cancer types. Continued research, clinical trials, and advancements in understanding the immune system and tumor biology will shape the landscape of immune-based therapies in the years to come.

What is the future of tissue repair and regenerative medicine research with ChatGPT assistance?	The future of tissue repair research will likely integrate ChatGPT as a knowledge accelerator and research partner. By rapidly synthesizing data on molecular pathways, biomaterials, and stem cell therapies, ChatGPT can significantly reduce the time required to identify promising strategies. Its role may expand into: 1. Personalized medicine: Helping design patient-specific regenerative approaches by aligning omics data with therapeutic options. 2. Integrative modeling: Assisting in the creation of computational models that link molecular signaling with tissue-level outcomes. 3. Translational bridge: Supporting the transition from laboratory to clinical trial design by highlighting safety concerns, regulatory requirements, and ethical considerations. 4. Collaborative science: Facilitating interdisciplinary communication between biologists, engineers, and clinicians. In summary, ChatGPT could become a vital enabler of precision regenerative medicine, guiding research towards safer, faster, and more targeted innovations in tissue repair.