

Lab Panel Results

Reviewed by <> on September 20th 2024

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Message from your clinical team

Dear <>

Welcome to Healthspan. Your health and well-being are of the utmost importance to us, and we are committed to ensuring that you have a clear understanding of your medical journey. Right now we'll walk through your Lab Analysis.

Introduction

Measuring blood serum levels of rapamycin (sirolimus) is a critical aspect of its therapeutic management. The peak level, measured a few hours after dosing, reflects the highest concentration of the drug in the bloodstream. The trough level, measured before the next dose, indicates the lowest concentration of the drug. The mid-cycle level, measured halfway between doses, provides insight into the speed at which the medication is metabolized by the body.

Ideal dosing of rapamycin involves hitting a peak above 10 ng/ml a few hours after dosing and then reaching levels below 1 ng/ml by 24-48 hours before the next dose. The reason for this lies in the mechanism of rapamycin.

Rapamycin is an inhibitor of mTOR (mechanistic target of rapamycin). mTOR isn't just a solitary entity; it functions through two distinct complexes: mTORC1 and mTORC2. Each has unique roles.

The mTORC1 complex is crucial for several cellular processes including protein synthesis, autophagy (the cell's way of cleaning out damaged components), and nutrient sensing. The mTORC2 complex plays a key role in regulating immune responses, cell survival, and lipid metabolism (how the cell handles fats).

These two mTOR complexes differ not only in their functions but also in their responsiveness to rapamycin. mTORC1 is highly responsive to rapamycin, meaning that even small amounts of the drug can significantly influence its activity. In contrast, mTORC2 is generally less affected by rapamycin, especially at lower doses.

Low doses of rapamycin show immense promise in enhancing metabolic health, physical fitness, and immune response, primarily through their action on mTORC1. However, interactions with mTORC2 at higher doses raise concerns about potential adverse effects.

The impact of rapamycin on mTORC1 and mTORC2 can vary significantly depending on an individual's unique metabolism, which is influenced by factors like genetic makeup, overall health, and lifestyle. This variability can affect how the body processes the drug and responds to its mechanism of action. Therefore, by carefully monitoring both peak and trough levels of the drug, dosages can be customized to an individual's unique metabolic profile. This personalized approach ensures that the drug's effects on mTORC1 are optimized while minimizing unintended effects on mTORC2, thus enhancing both the safety and efficacy of the treatment.

- Sirolimus, Blood is at **3.2**

Peak Level of Sirolimus

What is Peak Level? The peak level of sirolimus is the highest concentration of the drug in your bloodstream. It reflects the maximum absorption of the drug after it's taken and is crucial for determining if the dosage is at a therapeutic level that is both effective and safe.

How to Schedule Lab Work for Peak Level Schedule your blood draw for 3-4 hours after taking your sirolimus dose. This timing is critical as it corresponds to when sirolimus typically reaches its highest concentration in the blood. Ensure you take your sirolimus dose at the same time every day for consistent results.

Expected Results of Peak Level Testing The results will show if the sirolimus concentration is within the therapeutic range prescribed for longevity purposes. High peak levels may suggest a risk of toxicity, while low levels might indicate insufficient dosage for therapeutic efficacy.

Result

Interpretation

Less than 10 A low peak level of rapamycin might suggest an insufficient dosage, potentially warranting an increase to achieve the desired therapeutic efficacy. However, it's

Result**Interpretation****ng/ml**

crucial to understand that a low peak level alone does not automatically justify a dose increase. Individual variations in metabolism can mean that some people achieve effective therapeutic levels even with a lower peak, due to slower drug metabolism. To accurately assess the need for a dosage adjustment, a mid-cycle test is recommended. If this mid-cycle test also indicates low levels, then an increase in the rapamycin dosage may be considered.

**10-20
ng/ml**

This result suggests effective therapeutic absorption of the medication with a reduced risk of adverse effects. However, it's important to acknowledge that even with peak levels within this range, individuals might still experience adverse effects due to variations in metabolism and individual sensitivities. Trough level testing is recommended to ensure that the medication is being metabolized efficiently. This approach provides a comprehensive understanding of the medication's pharmacokinetics, confirming that it reaches its peak concentration and then decreases appropriately.

**Above
20
ng/ml**

This result suggests that your current rapamycin dosage could be higher than necessary, potentially leading to adverse effects. To ensure your safety, a reduction in dosage might be considered. However, before making any changes, it's important to conduct trough testing. Some individuals, despite having an elevated peak level, may metabolize the drug quickly. In such cases, a higher dose might still be appropriate due to its rapid clearance from the body.

Trough Level of Sirolimus

What is Trough Level? The trough level is the lowest concentration of sirolimus in your blood, occurring just before the next dose. This measurement is helpful for ensuring that most of the drug clears the system. Maintaining a trough level within a specific range helps prevent adverse effects. It ensures that the drug concentration does not accumulate over time to levels that could cause harm. In the case of sirolimus, which inhibits the mTOR pathway, monitoring the trough level is crucial. It's particularly important to prevent the over-inhibition of the mTOR2 complex, which could lead to undesirable cellular and physiological effects.

How to Schedule Lab Work for Trough Level Arrange the blood draw for 24-48 hours before your next scheduled sirolimus dose. Consistent timing is key for accurate measurement of the trough level. Maintaining a regular dosing schedule is important for reliable trough level results.

Expected Results of Trough Level Testing The results will show if the sirolimus concentration is within the therapeutic range prescribed for longevity purposes. For trough testing, we want to ensure that the rapamycin has cleared your system 24-48 hours before your next dose. This is to avoid a buildup of the medication that can lead to adverse effects and to prevent over-inhibition of the mTOR complex. High trough levels may suggest a risk of adverse effects.

Result	Interpretation
Less than 1 ng/ml	This trough level indicates that the majority of the drug has cleared from the system, reducing the risk of over-inhibition of the mTOR2 complex. However, to ensure that the medication is not being metabolized and cleared too rapidly, mid-cycle testing is recommended. This will help us confirm that the drug maintains its therapeutic levels for an adequate duration, balancing efficacy and safety.
Above 1 ng/ml	A measurement in this range would imply that the dosage is higher than necessary, potentially leading to continuous over-inhibition of mTOR2 and associated adverse effects. A dose adjustment or change in dose frequency may be considered to avoid this risk.

Mid-Cycle Level of Sirolimus

What is the Mid-Cycle Level? The mid-cycle level is measured halfway between doses and

provides insight into the speed at which the medication is metabolized by the body. This information is crucial for determining the optimal dosing frequency and amount, ensuring that the drug maintains its therapeutic levels for an adequate duration, balancing efficacy and safety.

How to Schedule Lab Work for Mid-Cycle Level Arrange the blood draw for 72 hours after your scheduled sirolimus dose. Consistent timing is key for accurate measurement of levels. Maintaining a regular dosing schedule is important for reliable results.

Expected Results of Mid-Cycle Level Testing The results will show if the sirolimus concentration is within the therapeutic range prescribed for longevity purposes. We want to ensure that your serum rapamycin levels remain in therapeutic levels mid-way through your dosing cycle.

Result	Interpretation
Less than 3 ng/ml	This level indicates that the majority of the drug may have cleared from your system earlier than expected, which could affect its therapeutic efficacy. A dose increase may be considered to achieve full therapeutic efficacy.
Above 3 ng/ml	This result suggests effective therapeutic absorption of the protocol with a reduced risk of adverse effects.

<> I hope this has been helpful. Let me know if you would like to discuss any aspect of these results.

Sincerely,

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Healthspan Clinical Team

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