



药物

肾脏/胰脏移植后

移植后，您终生都需要每天服用药物。在此章节为您解说您需要服用的药物及补剂。包括它们常见的副作用、剂量、及费用。

开始

手术后，您将服用很多的药物。建议您在移植手术前、尽量学习有关：

- 每种药物的作用
- 它们有何副作用
- 何时、如何服用
- 如何支付

学习规划您的药物的方法是很有帮助的。在手术前、设立一个系统、帮助您记住在正确的时间和方式服用每一种药物。



移植后您将服用多种药物

移植后我需要服用些什么药物？

移植后您需要服用：

- **免疫抑制药物** 来压抑您的免疫系统。此类药物有助于预防或治疗对新器官的排斥。只要您有移植的器官、就需要服用这类药物。
- **抗生素** 抵抗感染。您服用的免疫抑制药物会增加感染的风险。您移植手术后需要服用抗生素 **3 至 6 个月**。
- **抗酸剂** 帮助预防胃部不适或胃酸过多。您移植手术后需要服用抗酸剂 **2 至 3 个月**。
- **泻药及软便剂** 来帮助避免便秘。您移植手术后需要服用此种药 **2 至 3 个月**。

您也可能需要服用：

- **止痛药** 一般在手术后服用 **1 周**。

- **阿司匹林**服用小剂量以防止血栓。
- **抗高血压药物**治疗高血压。
- **脱水药** (脱水) 治疗浮肿。
- **铁剂**有助于防止贫血。
- **多种维生素**以补充您的营养。
- **钙和维生素 D** 有助于预防 *骨质疏松症* (骨骼变薄、脆弱)。
- **镁和磷**: 移植后这些矿物质会经尿液流失而需要补充。

副作用?

您在手术后服用的许多药物都有副作用。保持所有的医生和诊所的预约。在您来门的时、告诉我们您有什么副作用。我们可以根据需要调整您的药物和剂量。

我药物的费用?

您每个月药物的费用可以高达 **1,000 美元**以上。当一些药物可以停止服用、或医生降低您的剂量时、这些费用可能会随着时间而下降。

联邦健保、州政府的医疗补助、私人健保险可能会涵盖部分药物的费用。但即便有健保、您还是可能终生每月需要自己付**\$500 至 \$2,000**。

在您接受手术之前、请与您的健保公司、您当地的药剂师、您的后续护理团队中的社工或财务顾问讨论移植药物。 查明:

- 您的健保计划涵盖那些移植药物
- 您的共同支付或免赔额是多少

移植后一定要持续您的健保。您的药费可能每年要\$12,000 至 24,000 美元。

我到那里取处方药?

紧接着移植后

- 如您住在西雅图地区、您可以在当地或家庭药房配药。
- 大多数患者可以在移植后的 **3 个月**内在 **UWMC 药房**配药。

长期的

从长远来看、您可以在您当地的药房配药、也可以使用邮购药房。一些保险计划要求移植病人从“专业药房”购买他们的一些药品。

告诉您的健保公司及您当地药房、您将成为移植病人、这样他们就会知道您的药物需求。它们可以帮助您安排购买及补充您的处方。

随身携带您的处方药物保险卡放在您的钱包或皮包里。您的药房需要看这些卡来结账。

我需要那些医疗仪器？

您需要一些医疗设备来监控药物的影响。您可能需要购买：

- 可以测脉搏的血压计
- 体温计
- 磅秤
- 测血糖计

手术前、购买血压计及体温计、并学习如何使用它们。如此、在手术后您可以即刻开始使用它们。

住院

携带什麼

当您来医院接受移植手术时、请携带：

- **您目前的药物** 他们的名字及剂量清单。您的移植团队需要知道您目前所有服用的药物及补品。
- **此讲义** (*您的肾脏/胰脏移植指南 Your Kidney/Pancreas Transplant Guide*)
- 任何请您购买的 **仪器** (请参看以上)

认知您的新药物

手术后、您及您的照顾者会学习您的药物计划。您需要知道您服用的每一种药物的名称、强度、每次服用剂量、用途及副作用。

医院药剂师会在手术后 **1 至 2** 天告诉您有关您的药物的资讯。家人及看护人与您一起学习您的药物是很重要的。

开始时、服用这么多种药物可能会让人很有压力。但是、在未来几个月内它们的数量就会减少。移植患者告诉我们、还在医院时自己开始服用药物、就是学习您需要知道的一切的最佳方式。

提醒您服药的提示

- 您的药剂师会给您一个叫 **mediset** 的药盒。可以用它来帮助您追踪您的药物。把它存放在室温下、远离直射光。
- 与您的药剂师合作、制定适合您的药物计划。尽量安排您每天只服用 4 次、早餐、午餐、晚餐和睡前。就可以更容易记住服药。
- 白天随身携带 1 天的药物、以便您按时服用药物
- 使用手机或带闹钟的手表。设置闹钟以提醒您何时需要服用药物。

出院后

- **当您离开医院时、我们会给您 3 至 5 天的药物。** 也会给您处方。请尽快在您选择的药房取药。以确保您的药物不会脱节。
- **随身携带最新的所有药物的清单。包括它们的服用方法。**
 - 药物更换时更新此列表。按新的列表来补充您的药盒（**mediset**）。
 - 在您门诊时、请您的医生打印出最新的列表。
 - 您也可将列表保存在电脑里、平板电脑或手机上、以便您可以很容易地更新药物清单、且随身携带。
- **每次您来门诊时请携带：**
 - 您的药盒
 - 您在药房取药时它们用的药瓶
 - 您的药物清单
- **如果您对药物有问题或疑问、请致电您的移植联系护士。**
- **尽量早些补取药物。** 且勿让药物中断。
- **保持您的后续预约**以便检查及调整您的药物
- **3 个月后、您需要更新处方。** 这可由您的家庭医生（**PCP**）或您的肾病专科医生来开。

服用您的药物

以下是服用药物的一些基本规则：

- **仅服用您医生开给您的药物。**
- **完全按照处方服用您的药物。**
 - **切勿**服用比规定剂量更多或更少的剂量。
 - **切勿**在没有与您的医生或移植联系护士 交谈的情况下停止服药。

- **切勿**在没有与您的医生、移植联系护士 或药剂师确认之前、服用任何新药或补剂。
- **如您错过了服药：**
 - 切勿服用超过一次的剂量。等您需要服用下一剂的时间、服用正常的剂量。
 - 致电移植联系护士 或医生、听他们的指示。
- **了解您药物的副作用。**告诉您的医生或者移植联系护士您有什么副作用。如症状很困扰您、您的医生可能会开另一种药。
- **告诉您所有的医生、您是一个移植病人**并且正在服用抑制免疫系统的药物。告诉您的牙医、验光师及所有您其他医护人员。
- **把所有药物放在儿童和宠物无法获取的地方。**
- **切勿让他人吃您的药物。**
- 在与您的移植医护人员（医生、护士、药剂师、及营养师）咨询之前、**切勿吃中草药、或任何营养补品。**因为这些产品：
 - 可能含有隐藏的成分可导致副作用。
 - 可能会与您所服用的移植药物起相互作用而伤害您。
 - 可使您的药物规划更复杂。
- **在服用免疫抑制药物时避免（尽可能）下列物品：**
 - 西柚、石榴和杨桃
 - 非固醇类抗炎药（NSAIDs），如布洛芬（Advil, Motrin）和萘普生（Aleve, Naprosyn）
 - 阿司匹林 (除非您的医生开给您)
 - 中草药或“天然”药物
 - 对乙酰氨基酚（泰诺）-每日不可超过 **2000 毫克**（所有来源的总量）
 - 营养补品、除非您的移植组开给您

预防排斥的药物

这些药物被称为抗排斥药物或免疫抑制剂。

为何我需要服用这些药物？

移植后、您的免疫系统将尽力保护您的身体。 它会将新器官视为威胁、并试图摧毁（排斥）它。

它们起什么作用？

这些药物通过减少 T 淋巴细胞(一种白细胞)的作用而削弱(抑制)您的免疫系统。

我需要服用多少种免疫抑制剂？

移植组会给您开三种不同的抗排斥药物。每一个都是以不同的方式影响免疫系统。当这些药物一起服用时：

- 它们会更有效地阻止排斥。
- 每一种药物的剂量可以减少。
- 副作用较少、副作用较轻。

您的移植组会为您解释所需要服用的特定药物。

我需要服用多长时间？

在您有移植器官时就需要服用抗排斥的药。

这些药物的效果如何？

即使您按规定服用抗排斥药物、还是可能会出现排斥反应。排斥反应通常发生在移植后 1 年内。有时、可以通过使用静脉药物来逆转。

从血液测试结果我们可知道您的身体是在否排斥新器官。因此一定要按预约的时间验血。

如我有一次忘记服用该怎么办？

要切记每天按规定服用这些药物。

如您不确定是否已经服过药

- 切勿加倍服用。
- 致电给医生或移植联系护士、听他们的指示。

它们会有那些副作用？

- **感染:** 这些药物可能会使您更容易感冒、流感、其他病毒及真菌感染。您也可以被通常不会引起疾病的细菌感染。这就是所谓的**机会性感染**。
- **癌症:** 他们可能会导致更高风险的皮肤癌及其他癌症。

引发式免疫抑制剂

您在医院时将接受静脉注射免疫抑制剂。这个过程称为**引发**、在移植手术后迅速降低您的免疫系统。

这些引发药物没有列出费用。它们只在您住院期间给您。您不需要长期付款。

抗胸腺细胞球蛋白

商品名: *ATG, Thymoglobulin*

目的: 抗胸腺细胞球蛋白是一种强效的抗排斥药物。它会破坏 T 淋巴细胞。一些患者接受 ATG 治疗急性排斥反应。

如您需要 ATG:

- 在移植手术后立即开始为您静脉输注 **12** 小时。
- 然后每天或每隔一天输注一次、总共至少 **3** 次。

可能有的副作用: T 淋巴细胞在被破坏时会释放化学物质。这些化学物质可引起过敏或类似流感的症状。这些症状在接受最初的几次剂量后更常见。在前 3 次接受注射前, 可能会给您对乙酰氨基酚 (泰诺), 抗组胺药 (Benadryl) 及皮质类固醇 (甲基强的松龙)、以防止这些副作用。

抗胸腺细胞球蛋白 ATG 的副作用包括:

- 类似流感的症状、如发烧、发冷
- 恶心
- 头痛
- 呼吸急促
- 血压降低或升高
- 减少白细胞、血小板、红血球。
- 增高被感染的风险

巴利昔单抗 (Basiliximab)

商品名: *舒莱 Simulect*

目的: Basiliximab 是一种抗体。它阻断白细胞介素-2 (IL-2) 的作用、白细胞介素-2 是体内有助于激活 T 淋巴细胞的物质。阻断 IL-2 有助于防止免疫系统试图摧毁您的移植器官。

移植后立即从静脉注射巴利昔单抗。4 天后给予第二剂。有些患者可能会接受这种药而不是抗胸腺细胞球蛋白 (ATG)。

可能有的副作用: 这种药物的副作用风险很低。可能有过敏或类似流感的症状、如发烧或发冷。

甲基强的松 (Methylprednisolone)

商品名: 琥纳甲强龙 (Solumedrol)

目的: 此药物、也称为类固醇或皮质类固醇、可阻断许多类型的免疫细胞。您在移植手术期间接受大剂量的甲基强的松。手术后、您每天将另外接受 1 次静脉注射、最多 3 天。该药物还用于治疗排斥反应。

可能有的副作用: 高剂量的类固醇可导致:

- 血糖增高
- 伤口愈合较慢
- 视力模糊
- 肌肉酸痛
- 情绪不稳
- 失眠
- 浮肿

长期免疫抑制药物

只要您有移植的器官、您就需要服用抗排斥药物。 这些被称为 *维持* 药物。

他克莫司 Tacrolimus

商品名: 普乐 (Prograf)、FK-506

目的: 他克莫司使 T 淋巴细胞不排斥移植的器官。 大多数移植患者在手术后约 1 至 3 天开始服用他克莫司并长期服用。

形式: 胶囊式。有 3 种剂量: 0.5 毫克、1 毫克及 5 毫克。 您可以配合大小剂量来组合您需要服用的剂量。 商品名称是普乐 (Prograf)、但也有非商品品牌产品。

一般的剂量: 您他克莫司的服用方法是每 12 小时服用 1 毫克至 10 毫克、通常在上午 8 点及晚上 8 点。 您可以在用餐时服用。 您的医生会根据血液测试水平的结果调整您的剂量。

来诊所的那天、不要服用他克莫司、要在抽血之后服用。

可能有的副作用: 他克莫司 (tacrolimus) 最严重的副作用是肾脏及神经系统受损、引起震颤和头痛。 您的医生可能会调整您的剂量以减少这些副作用。 他克莫司 (tacrolimus) 与许多药物及一些食物 (葡萄柚, 石榴和杨桃) 起相互作用。 吃这些食物会增加副作用。

副作用包括：

- 肾功能减退
- 血糖增高
- 高血压
- 血钾高
- 血镁减低
- 颤抖
- 头痛
- 抽搐（癫痫）
- 恶心、呕吐
- 脱发
- 高胆固醇
- 易被感染

费用：非品牌的他克莫司每月 300 至 500 美元。您需要长期服用它。大多数的健保；包括 **Medicare B** 在内、对符合条件的移植接受者都涵盖此药物的费用。

霉酚酸酯（Mycophenolate Mofetil）

商品名：*山喜多（CellCept）*、*睦體康（Myfortic）*

目的：霉酚酸酯(Mycophenolate, MMF)降低淋巴细胞的产生。患者在服用他克莫司时服用这种药物。

形式：霉酚酸酯（MMF）有两种不同的形式：

- 山喜多（CellCept）是 250 毫克的胶囊、及 500 毫克的药片。它们也有口服液的形式（液体）。
- 睦體康（Myfortic）有肠溶性的包膜、有 180 毫克及 360 克片剂。

一般的剂量：

- 山喜多（CellCept）：1,000 毫克 (1 公克) 口服、每天 2 次。
- 睦體康（Myfortic）：720 毫克口服、每天 2 次。

空腹时服用霉酚酸酯（MMF）效果最佳、但如有必要、为了预防恶心可餐后服用。

您每日必须在同一个时间服药。基于验血结果您的医生可能会调整药的剂量。

可能有的副作用：

较常见的：

- 白细胞减少症（白血球指数低）
- 恶心或呕吐
- 腹部疼痛
- 腹泻
- 感染风险提升

不常见的：

- 贫血（红血球指数低）
- 血小板减少（血小板指数低）
- 可能导致胎儿先天缺陷、所以准备或正在怀孕的妇女不该服用此药

费用：非商品品牌的通用名麦考酚酯（**Mycophenolate**）每月花费是 300 至 500 美元。您需要长期服用。多数的保险计划、包括联邦医保 B 部分、为合格的受赠者涵盖此药的费用。

泼尼松（**Prednisone**）及甲泼尼龙（**Methylprednisolone**） （类固醇的一种）

目的：泼尼松（口服）及甲泼尼龙（静脉注射）是类固醇 *steroids* 或皮质激素 *corticosteroids*。这些药物减低淋巴细胞的功能与活力。它们用于预防或治疗排斥。

如您有急性排斥反应、您可能会透过静脉注射接受大剂量的甲泼尼龙（此治疗名为 *脉冲疗法*）。如您的医生为您开此种药、就会在手术后数天透过静脉注射给您。在此以后您将口服泼尼松。

形式：泼尼松药片有 6 种剂量：1 毫克、2.5 毫克、5 毫克、10 毫克、20 毫克、及 50 毫克。这些药片通常是白色、并且表面上带有刻痕以便分成两半。

一般的剂量：每日一次 5 至 10 毫克。为了避免腹部不适、都在用餐或点心后才服泼尼松。

可能有的副作用：这些药的剂量越高、副作用就越多。一般来说、副作用在药量减轻的时候亦会降低。

即便是低剂量、其他的副作用也可能在服用此药数月或多年后发生。在服用泼尼松期间、要多运动及摄取均匀的营养来保持身体（特别是骨骼与肌肉）强壮。

有些患者在服用泼尼松期间可能需要胰岛素来控制血糖。如您有糖尿病、紧接着手术后可能需要加强胰岛素的剂量。

短期的副作用（使用高剂量时）：

- 肠胃不适、烧心、胃溃疡
- 情绪上的变化、情绪波动、睡眠问题
- 盗汗
- 体重增加、肿胀
- 伤口愈合较慢
- 胃口增长、饥饿感
- 血糖较高
- 脸部肿胀（“满月脸”）
- 青春痘
- 视力模糊
- 感染机率增高
- 肌肉酸痛

长期的副作用：

- 肌肉无力
- 骨关节无力与疼痛
- *骨质疏松*（骨头变脆以及更容易骨折）
- 高血糖（糖尿病）
- 妊娠纹以及皮肤脆弱、干燥、削薄
- 毛发增加并可能长在不想要的地方
- 圆肩（“水牛肩”）
- 皮肤容易瘀青
- 视觉上的变化、白内障
- 胆固醇较
- 罹患某些癌症的机率增高
- 感染机率增高

费用：泼尼松的每月话费于 \$5 至\$10 之间。您需要长期服用。此药有非商品牌形式。

其他免疫抑制药

环孢霉素 (Cyclosporine)

商品名：新体陆软胶囊 *Neoral*、金格福 *Gengraf*、新山地明胶囊 *Sandimmune*

目的：环孢霉素阻止 T 淋巴细胞对移植器官的排斥反应。如您的医生开此药给您、此药会代替他克莫司。这两种药对于免疫系统的功能是相等的。

剂量：环孢霉素有多种形式。此药有 3 种剂量的胶囊：25 毫克、50 毫克、及 100 毫克。您可能需要混合几种剂量来调成您所需的剂量。液体形式的配方强度是每毫升 100 毫克 (100 mg/ml)。

特别指示：环孢霉素胶囊会受空气影响。在不需要服药的时候、把这些药储存于原厂的密封包装。开封后这些胶囊的有效期限是 7 天。

一般的剂量：每 12 小时服用 100 毫克至 500 毫克、通常于早上 8 点及晚上 8 点。每日于同时间服用、可在饭前或饭后服。基于验血结果、您的医生会调整您所需的剂量。

可能有的副作用：肾脏受损是环孢霉素最严重的副作用。所以需要仔细观察您的肾脏来避免这种副作用。如发现问题、您的医生会调整药量。

副作用包括：

- 肾功能减退
- 血压升高
- 血液内的钾升高
- 血液内的镁减低
- 颤抖
- 手、脚 烧痛或有针扎的感觉
- 毛发增长
- 牙龈增长
- 情绪改变
- 青春痘
- 肝功能减退
- 抽搐 (癫痫)
- 头痛
- 血脂增高
- 感染的风险增高

费用：环孢霉素每月的费用是\$300 至\$500 美元。此药是长期服用的。已有非商品品牌药可用。

西罗莫司 **Sirolimus**

商品名：雷帕霉素 *Rapamune*

目的：西罗莫司阻止 T 淋巴细胞对于移植器官的破坏。此药亦有抗癌或抗肿瘤的作用。此药一般与他克莫司或泼尼松在同一个时期服用（也可能三种药都服）。

形式：西罗莫司药片分为 0.5 毫克、1 毫克、及 2 毫克。亦有液体形式的、浓度是每毫升 1 毫克（1 mg/ml）。

一般的剂量：1 毫克至 10 毫克、每日一次、可在餐前或餐后服用。每日应在同一个时间服药。基于验血结果、您的医生可能会调整您所需的剂量。

可能有的副作用：

- 增加血液中胆固醇及三酸甘油酯水平
- 伤口愈合能力减低
- 血液中血小板、红血球、及白血球减少
- 口腔溃疡或长疮
- 青春痘
- 手或脚有针扎的感觉
- 关节疼痛
- 感染风险增高
- **可能引致先天缺陷** - 如您准备或正在怀孕、您就不可服用此药

费用：西罗莫司每月的费用是\$500 至\$1,000 美元。此药是长期服用的。市面上没有非商品品牌的形式。

硫唑嘌呤 **Azathioprine**

商品名：依木兰 *Imuran*

目的：硫唑嘌呤针对骨髓来减少体内产生白细胞的数量。它可能会取代您免疫抑制方案中的吗替麦考酚酯。此药长期与他克莫司或环孢霉素及类固醇一并服用。

形式：硫唑嘌呤是一粒 50 毫米。其药片表面上带有刻痕以便分成两半。

一般的剂量：25 至 175 毫克、通常在每晚睡前服用 1 粒。

可能有的副作用：硫唑嘌呤会影响快速增长的细胞、比如白血球与红血球、血小板、以及毛细胞。减低了剂量后、此药对血球引起的改变就可还原。

副作用包括：

- 白血球指数太低
- 贫血（红血球指数太低）
- 出血（因血小板指数太低）
- 脱发
- 恶心
- 黄疸（影响到肝脏而导致皮肤变黄）

费用： 硫唑嘌呤每月的费用是\$15 至\$100 美元。此药须长期服用、并且有非商品品牌可用。

预防感染的药物

当您的免疫系统被抑制、您就比较容易受感染、并且这些感染会比较难治。一般会引起感染的病菌：

- 来自您的周边环境
- 来自其他人
- 在免疫能力正常的情况下长在您体内外并不会引起感染（这种病菌引起的感染叫做 *机会性/ 伺机性感染*）

因为移植手术后的头 3 个月内服用的抗排斥药的剂量颇高、所以在这段时间内您比较容易被感染。

因此这 3 个月内您需要服几种抗生素。它们包括：

克霉唑锭剂 **Clotrimazole Troche** 及氟康唑 **Fluconazole**

商品名： 克霉唑锭剂 (*Mycelex*) 及大扶康 (*Diflucan*)

目的： 在移植后的 3 个月内、您需服用 *抗真菌药*（抗酵母）。此药是预防 *鹅口疮*（口腔内酵母的过度繁殖）。

一般的剂量：

- 克霉唑锭剂（商品名 *Mycelex*）是一种含在口腔内便可融化的 **10 毫克** 含片。每剂服用后须等 **30 分钟** 以上才可饮食。
- 氟康唑（大扶康）是每日或每周服一次的口服药。此药可用餐后服用。

可能有的副作用：

- 有关克霉唑锭剂：
 - 口感不良
 - 口干
 - 恶心

- 有关氟康唑：

- 恶心
- 皮疹
- 腹泻
- 腹痛

费用：克霉唑锭剂每月的费用是\$50 美元。氟康唑每月的费用是\$20 美元。这两种药都有非商品品牌的形式。

缬更昔洛韦 **Valganciclovir**、更昔洛韦 **Ganciclovir**、及阿昔洛韦 **Acyclovir**

商品名：万赛维 *Valcyte*、*Cytovene*、及舒维疗 *Zovirax*

目的：这些是抗病毒的药。有些病毒、如疱疹病毒、在感染痊愈后还会留在体内。这些病毒在体内保持休眠（不活跃）的状态、直到免疫系统降低的时候才“苏醒”。

对于免疫力低下的患者来说、病毒感染可成为很严重并可危及生命的病症。缬更昔洛韦 **Valganciclovir**、更昔洛韦 **ganciclovir**、及阿昔洛韦 **acyclovir** 用于预防与治疗单纯疱疹病毒感染（如唇疱疹）以及一种较有抗药性、名为巨细胞病毒 *cytomegalovirus (CMV)* 的疱疹病毒。

移植后的 3 至 6 个月内、您需要服用这些药物。它们并不是用于治疗如伤风、流感、或肝炎的其它病毒。

一般的剂量：

- 缬更昔洛韦（万赛维）是一种用于预防巨细胞病毒（CMV）感染的口服药。此药可于用餐后服用。一般的剂量是：
 - 预防巨细胞病毒（CMV）感染、每日一次、每次 450 至 900 毫克。
 - 治疗巨细胞病毒（CMV）感染、每日两次、每次 900 毫克。
- 缬更昔洛韦的其中一种形式就是更昔洛韦（商品名 **Cytovene**）、它经静脉注射输入体内、用于治疗巨细胞病毒（CMV）感染。可在医院或家中输药。
- 阿昔洛韦（舒维疗）用于预防疱疹感染、如唇疱疹。它并不预防 CMV 感染。一般的药量是 400 毫克、每日两次。此药可与食物同服用。

可能有的副作用：

- 恶心
- 肾功能降低

- 头痛
- 白血球数量过低

费用：

- 缙更昔洛韦每月的费用可高达\$2,000 美元。已有非商品品牌的药。
- 更昔洛韦的费用不定、其高低基于您的医疗保险涵盖什么。
- 阿昔洛韦每月的费用通常低于\$20 美元。已有非商品品牌的药。

甲氧苄啶 (Trimethoprim) / 磺胺甲恶唑 (Sulfamethoxazole)

商品名： 复方新诺明/增效磺胺甲基异噻唑 (*Bactrim*)、磺胺甲恶唑甲氧苄啶口服混悬液 (*Sepra*) 复方新诺明 (*Cotrimoxazole, Trim/Sulfa, TMP/SMX*)。其它非磺胺药：氨苯砞 (*Dapsone*) 及喷他脒 (*Pentamidine*)。

目的： 这些是抗肺孢子虫类的药物。肺孢子虫是一种在健康人的肺部发现的真菌。它通常不会导致疾病。但是、对免疫力弱的人、这种真菌会导致患有肺部感染。

这些药物会阻止此类真菌感染到肺部。大多数移植患者服用磺胺甲恶唑 (商品名 *Bactrim*) 及甲氧苄啶 (商品名 *Sepra*)、它们是磺胺类药物。如您对磺胺过敏、可以服用氨苯砞 (*Dapsone*) 及喷他脒 (*Pentamidine*)。这些药物通常在移植后服用 6 个月。

一般的剂量：

- 磺胺甲恶唑 (商品名 *Bactrim*) 或甲氧苄啶 (商品名 *Sepra*) 仅有单剂量(SS) 的药片(80/400 毫克)。每天睡前以一整杯水服用。
- 氨苯砞 (*Dapsone*) 一般是 100 毫克每天口服一次。
- 喷他脒 (*Pentamidine*) 一般是一个月一次、是一种喷剂在医院或诊所做。一般的剂量是 每月 300 毫克。

可能有的副作用：

- 皮疹 (如起任何疹子请告诉您的医生)
- 恶心
- 降低白血球数量
- 降低红血球数量 (氨苯砞 *Dapsone*)
- 对阳光敏感
- 咳嗽、喘息 (喷他脒 *Pentamidine*)

费用： 磺胺甲恶唑 (*Bactrim*)、甲氧苄啶 (*Sepra*)、及氨苯砞 (*Dapsone*) 非商品品牌每月约 \$5 至 \$25 美元。喷他脒 (*Pentamidine*) 的价格不定、因您的健保计划而异。

预防烧心的药物

雷尼替丁 **Ranitidine**、泮托拉唑 **Pantoprazole**、奥美拉唑，**Omeprazole** 及兰索拉唑 **Lansoprazole**。

商品名: *Zantac*、*Protonix*/*Prilosec* 及 *Prevacid*

目的: 抗酸剂可以中和胃酸、也可以阻止胃酸分泌。移植后服用大约 3 个月、以防止由其他药物或压力引起的胃不适、胃灼热或胃的问题。空腹服用抗酸剂效果最好。

一般的剂量:

- 雷尼替丁 (Ranitidine /Zantac) 睡前服用 150 毫克。
- 泮托拉唑 (Pantoprazole /Protonix) 每日服用 40 毫克。
- 奥美拉唑 (Omeprazole /Prilosec) 每日服用 20 毫克。
- 兰索拉唑 (Lansoprazole /Prevacid) 每日服用 30 毫克。

可能有的副作用:

- 皮疹
- 头痛
- 头昏

费用:

- 奥美拉唑一个月约 10 美元。也有非商品牌。
- 泮托拉唑 (Pantoprazole)、奥美拉唑 (Omeprazole /Prilosec) 及兰索拉唑 (Lansoprazole) 约 10 至 100 美元。是处方药。

预防便秘的药物

泻药会刺激肠道、帮助大便通过肠道。大便软化剂使硬质大便更柔软、因此更容易通过。

多库酯 (**Docusate**)、番泻叶 (**Senna**)、聚乙二醇 (**Polyethylene Glycol**) 及 **Bisacodyl**

商品名: 科拉切 (*Colace*)、新来福润肠通便片 (*Senakot*)、聚乙二醇 (*Miralax*)、及乐可舒 (*Dulcolax*)

目的: 手术后排便用力可以导致伤口不易愈合。移植后需避免便秘或大便干硬、并在手术后要保持大便软化 3 个月。

避免便秘:

- 手术后尽快减少服用处方止痛药。这些药物可引起便秘。
- 多喝水。
- 增加身体的活动量。
- 多吃高纤维的食物。

它们如何起作用

- 多库酯 (**Docosate /Colace**) 是一种温和的大便软化剂。移植后最常开的处方。
- 聚乙二醇 (**Polyethylene glycol PEG 或 Miralax**) 帮助您的大便保持更多的水分、使它更柔软。
- 塞纳 (**Senna /Senakot**) 及 **Bisacodyl /Dulcolax** 是有刺激性的泻药。

如您在服用这些药物时腹泻、请询问您的医生是否减少剂量。

费用: 泻药和大便软化剂每月费用为 **5 到 10 美元**。也有非商品牌药。您可以不用处方购买。

控制血压的药物

氨氯地平 (**Amlodipine**) 及美托洛尔 (**Metoprolol**)

商品名: 脈優錠 (**Norvasc**)、酒石酸美托洛尔缓释片 (**Lopressor**)、酒石酸美托洛尔片 (**Toprol XL**)

目的: 控制血压是很重要的。高血压会伤害您的新器官。它还可能导致中风、心脏病及其他问题。有些人在移植前有高血压、移植手术后有高血压也是很常见。一些抗排斥药物也可提高您的血压。

为控制血压、移植团队经常开这些处方:

- 钙通道阻滞剂、如氨氯地平 (**amlodipine /Norvasc**)
- 一种 β 受体阻滞剂、如美托洛尔 (**Lopressor 或 Toprol XL**)

特别的注意事项:

- 除非有医嘱可以停止服用、否则**不可**停止服用降压药。
- 记录您的血压和脉搏、每天记录 **2 次**:
 - 早上服用降压药**之前**量血压
 - 服用睡前的血压药**之前**量血压

您来后续门诊时请携带您的血压记录来、有需要时我们可能会调整您血压药物的剂量、以确保它对您是最佳的剂量。

- 需要慢慢地从床上或椅子上起身、以避免晕眩或头晕。

可能有的副作用：

- 头昏
- 血压迅速下降
- 心率高或低
- 热潮
- 头痛
- 疲乏

费用: 血压药每月费用为 20 至 50 美元。许多这些药物都有非商品牌药。

预防血栓的药物

阿司匹林（Aspirin）

目的: 小剂量的阿司匹林有助于阻止通往新器官的血管内形成血栓。阿司匹林还可以预防心脏病发作和中风。会开处方给某些患者、但不是所有的患者。

一般的剂量: 每日 1 粒（81 毫克或婴儿阿司匹林）。

可能有的副作用：

- 胃肠道（消化道）出血
- 小便有血
- 耳鸣

费用: 阿司匹林每月费用约 5 美元。您需要长期服用。它也有非商品牌药。您不需处方即可购买。

治疗肿胀的药物

呋塞米（Furosemide）及托拉塞米（Torsemide）

商品名: 來適泄錠（Lasix）及 Demadex

目的: 有些移植药物会引起肿胀（水肿）。利尿剂（脱水药）可帮助您的身体排出导致肿胀的多余的水及钠。使这种液体从尿液中排出。

利尿剂还可以降低血压、去除体内的钾和镁。但如您失去了太多的这些矿物质、您可能就需要补充剂。

可能有的副作用：

- 血钾或镁的水平降低
- 失水过多（脱水）
- 头昏

- 尿频
- 头痛
- 没有饥饿感
- 腿抽筋
- 心跳加速

降低血脂（胆固醇）的药

阿托伐他汀（**Atorvastatin**）、辛伐他汀（**Simvastatin**）普伐他汀（**Pravastatin**）、瑞舒伐他汀（**Rosuvastatin**）及洛伐他汀（**Lovastatin**）。

商品名: 立普妥（*Lipitor*）、舒降之（*Zocor*）、普伐他汀钠片（*Pravachol*）、可定（*Crestor*）、及洛伐他汀（*Lovastatin*）

目的: 大多数抗排斥药物会增高胆固醇。高胆固醇与心脏病、血管疾病及新器官的损害有关。一些移植患者需要药物来降低胆固醇。

特别说明: 如您有任何肌肉无力或疼痛、请告诉您的医生

可能有的副作用: :

- 头昏
- 头痛
- 皮疹
- 恶心
- 腹部痉挛
- 肌肉疼痛

维生素及矿物质

铁

铁剂的形式: 硫酸亚铁或葡萄糖酸亚铁

目的: 移植后、您可能需要额外的铁剂来预防贫血。在没有足够的健康红细胞向组织输送氧气时、就会发生贫血。失血是贫血的最常见原因。

贫血可能会让您感到疲倦和虚弱。铁帮助您身体创建新的红细胞来治疗贫血症。

一般的剂量: 324 毫克每日服用 1-3 次。大多数的铁剂是非处方药。

特别说明: 维生素 C 有助于身体吸收铁质。在服用补铁剂时、可以吃富含维生素 C 的食物、如橙子、西兰花及深绿叶蔬菜。

多种维生素

商品名：*善存 (Centrum)*、*One a Day*、*Nature Meds*、*施尔康 (Theragran)*、及其他

目的:我们建议您在移植后每天服用含有矿物质的多种维生素、以确保您体内有愈合及恢复所需的所有营养素。您可以不用处方就可购买多种维生素。

钙质

钙质的形式：*碳酸钙 (Tums, Oscal)* 及 *柠檬酸钙 (Citracal)*

目的:大多数移植患者在术后骨质疏松(骨衰弱)的风险较高、尤其是在移植前已经有骨病的患者。这种风险来自于服用抗排斥药物、以及在移植前体内维生素 D 及性激素(雌激素及睾酮) 指标偏低。

钙有助于建立强壮的骨骼。移植后服用钙有助于预防骨病、骨质流失和骨折。

您的身体需要维生素 D 来吸收钙、所以您还需要补充维生素 D (请参阅下面有关“维生素 D”一节)。

一般的剂量:每日 600 至 1200 毫克。您需要的量因您吃的食物中含有多少钙而定。

乳制品及深色绿叶蔬菜是钙的良好来源。请参阅本指南的“营养”一章、或与您的移植营养师讨论、了解有关含钙丰富食物的更多资讯。

乳制品和深绿色的蔬菜是钙质的良好来源。请参阅本指南的“营养”一章、或与您的移植营养师讨论以了解更多资讯。

您不需处方就可购买钙补充剂。咀嚼片的钙通常是人体最容易吸收的形式。

请细读标签。含有 500 毫克碳酸钙的产品、如 **Tums 500**、您身体可以的钙质可能只有 200 毫克。

维生素 D

维生素 D 的形式：*胆钙化醇 Cholecalciferol (维生素 vitamin D3)*、*麦角甾醇衍生 (ergocalciferol 维生素 vitamin D2)*、*合成维生素 D. calcitriol (Rocaltrol)*、及其他。

目的:您的身体需要维生素 D 来吸收钙。大多数人维生素 D 的主要来源是阳光。移植患者通常需要服用维生素 D 补充剂、因为他们必须避免日晒、以减少患皮肤癌的风险。

一般的剂量:

大多数维生素 D 补剂是胆钙化醇 (cholecalciferol 维生素 D3)。每天服用约 1,000 单位的胆钙化醇 (cholecalciferol)。这是多种维生素以外、再加的维生素 D 补剂。您不需处方即可购买胆钙化醇。

- 麦角甾醇衍生 (Ergocalciferol)、及合成维生素 D. (calcitriol) 都是较强的形式、必需有医生的处方。

镁 Magnesium

镁的形式 氧化镁: *Magnesium oxide (Mag-Ox)*、镁氨基酸螯合物 (镁加蛋白) (*magnesium amino acid chelate (Mag plus Protein)*)、等、及其他。

目的: 您的身体需要矿物镁来保持肌肉和神经的健康。镁也有助于一些酶的作用。酶是帮助加速体内重要化学反应的蛋白质。

许多移植患者镁的指标变低。这可能是由抗排斥药物或服用利尿剂引起的。您的镁水平可以从血液测试来测量。

您可能没有从您吃的食物中摄取足够的镁。请参阅本指南的“营养”一章节或与您的移植营养师讨论以了解更多信息。

一般的剂量: 每日服用 400 至 800 毫克。镁有药片及液体两种形式。是非处方药。

磷酸盐 Phosphate (Phosphorus)

磷酸钠 (*Sodium phosphate (K-Phos Neutral, Phospha 250 Neutral)* (K-PHOS 中性, 磷 250 中性)

目的: 您的身体需要矿物质磷酸盐来生长和修复身体组织、以及健康的骨骼。移植病人有时会出现低血磷水平。这可能是由于您的身体对这种矿物质的处理方式发生了短期的变化。

鱼和乳制品是磷酸盐的良好来源。请参阅本指南的“营养”一章、或与您的移植营养师讨论以了解更多资讯。

一般的剂量: 250 至 500 毫克每日服用两次。您需要处方才能购买 K Phos Neutral 及 Phospha 250 Neutral。

您有疑问吗?

我们很重视您的疑问。当有疑问或顾虑时, 请致电您的医生或医护人员。

移植科电话: 206.598.3882

Medicines

After a kidney/pancreas transplant

After a transplant, you will take medicines every day for the rest of your life. This chapter describes many of the drugs and supplements you will be taking. It includes common side effects, doses, and costs.

Getting Started

You will take many medicines after transplant. Before your surgery, learn as much as you can about:

- How each medicine works
- What its side effects are
- When and how to take it
- How you will pay for it

It will be helpful to learn ways to organize your medicines. Before your surgery, set up a system that will help you remember to take each medicine at the right time and in the right way.



You will take many medicines after your transplant.

What medicines will I take after transplant?

After transplant, you will take:

- **Immunosuppressants** to suppress your immune system. These drugs help prevent or treat rejection of your new organ(s). You will take these drugs as long as you have your graft.
- **Antibiotics** to fight infection. The drugs you take to suppress your immune system will increase your risk of infection. You will take antibiotics for 3 to 6 months after your transplant surgery.
- **Antacids** to help prevent upset or excess acid in your stomach. You will take antacids for 2 to 3 months after transplant.
- **Laxatives and stool softeners** to help avoid constipation. You will take these for 2 to 3 months after transplant.

You may also need to take:

- **Pain medicines**, usually for about 1 week after surgery.
- **Aspirin** in small doses to prevent blood clotting.
- **Antihypertensive drugs** to treat high blood pressure.
- **Diuretics** (water pills) to help treat swelling.
- **Iron** to help prevent anemia.
- A **multivitamin** to supplement your diet.
- **Calcium** and **vitamin D** to prevent *osteoporosis* (thin, weak bones).
- **Magnesium** and **phosphate supplements** to make up for the loss of these minerals through urine after transplant.

What about side effects?

Many of the drugs you will take after surgery have side effects. **Keep all of your doctor and clinic appointments.** At your visit, tell us about any side effects you have. We can adjust your medicines and doses as needed.

What will my medicines cost?

Your medicines can cost \$1,000 or more a month. These costs may go down over time, when you no longer need to take some drugs or your doctor lowers the doses.

Medicare, Medicaid, and private health insurance may cover some drug costs. But even with insurance, you may need to pay \$500 to \$2,000 out of your own pocket for drugs every month for the rest of your life.

Before your surgery, talk about transplant medicines with your health insurance company, your local pharmacist, and the social worker or financial counselor who are on your follow-up care team. Find out:

- What transplant medicines are covered by your healthcare plan
- What your co-pays or deductibles will be

Be sure to keep your insurance coverage after transplant. Your medicine costs can be \$12,000 to \$24,000 a year.

Where can I get my prescriptions filled?

Right After Transplant

- If you live in the Seattle area, you can fill your prescriptions at your local or home pharmacy.
- Most patients may be able to fill their prescriptions at the UWMC Pharmacy during the 3 months after transplant.

Long Term

In the long term, you can fill your prescriptions at your local pharmacy or use a mail order pharmacy. Some insurance plans require that transplant patients buy some of their medicines from “specialty pharmacies.”

Tell your health insurance company and local pharmacy that you will be a transplant patient, so they will know your medicine needs. They can help you arrange for buying and refilling your prescriptions.

Always carry your prescription insurance cards in your wallet or purse. Your pharmacy needs to see these cards for billing purposes.

What medical equipment will I need?

You will need some medical equipment to monitor the effects of your medicines. You may need to buy:

- A blood pressure machine that also measures your pulse
- A thermometer
- A scale
- A blood glucose meter

Before your surgery, buy both the blood pressure machine and thermometer and learn how to use them. That way, you can start to use them right after surgery.

At the Hospital

What to Bring

When you come to the hospital for transplant, bring with you:

- **Your current medicines** and a list of their names and doses. Your transplant team needs to know **all** of the medicines and supplements that you are taking.
- **This manual** (*Your Kidney/Pancreas Transplant Guide*)
- Any **equipment** you were asked to buy (see above)

Learning About Your New Medicines

After surgery, you and your caregiver will learn your medicine schedule. You will need to know the names, strengths, doses, purposes, and side effects of each medicine you take.

The hospital pharmacist will teach you about your medicines 1 to 2 days after surgery. It is a good idea for family members and caregivers to learn about your medicines along with you.

At first, taking so many medicines can be overwhelming. But, the number you take will decrease over the next few months. Transplant patients tell us that the best way to learn everything you need to know is to start taking the medicines yourself while you are still in the hospital.

Tips to Help You Keep Track

- Your pharmacist will give you a box called a *mediset*. Use it to keep track of your pills. Store it at room temperature, away from direct light.
- Work with your pharmacist to set up a medicine schedule that will work for you. Try to schedule your medicines so that you take them only 4 times a day, at breakfast, lunch, dinner, and bedtime. This will make it easier to remember to take your pills.
- Carry a 1-day mediset with you during the day to make it easy to take your medicines on time.
- Use your cell phone or get a watch with an alarm. Set the alarm to remind you when it is time to take your medicines.

After Discharge

- **You will receive medicines to last 3 to 5 days when you leave the hospital.** You will also be given prescriptions. Fill these as soon as you can at the pharmacy you have chosen. Make sure you do not run out of your medicines.
- **Keep an up-to-date list of all of your medicines with you. Include the directions for taking them.**
 - Update this list when your drugs change. Use it to refill your mediset.
 - Ask your doctors to print out a current list at your clinic visits.
 - You may want to keep your list on your computer, tablet, or cell phone so that you can update it easily and always have it with you.
- **When you come for clinic visits, bring:**
 - Your mediset
 - Medicine bottles you had filled at your pharmacy
 - Your medicine list
- **If you have problems or questions about your medicines, call your transplant nurse coordinator.**
- **Refill your medicines early.** Do not let your supplies run out.
- **Keep your follow-up appointments** so that your medicines can be checked and adjusted.

- **After 3 months**, you will need to get your prescriptions renewed. This can be done by your primary care provider (PCP) or your nephrologist.

Taking Your Medicines

Here are some basic rules for taking medicines:

- **Take ONLY the medicines your doctor prescribes for you.**
- **Take your medicines exactly as they were prescribed.**
 - Do **not** take more or less than your prescribed dose.
 - Do **not** stop taking a medicine without talking with your doctor or transplant nurse coordinator.
- **Do not take any new medicines or supplements** without first talking with your doctor, transplant nurse coordinator, or pharmacist.
- **If you miss taking a dose:**
 - Do **not** take more than a single dose at a time. Wait until it is time to take your next dose and take your usual amount.
 - Call your transplant nurse coordinator or doctor for instructions.
- **Know the side effects of your drugs.** Tell your doctor or transplant nurse coordinator about any side effects you have. If symptoms bother you too much, your doctor may be able to prescribe a different drug.
- **Tell all of your healthcare providers that you are a transplant patient** and are taking drugs that suppress your immune system. Tell your dentist, optometrist, and all other providers.
- **Keep all medicines out of reach of children and pets.**
- **Do not let anyone else take your medicines.**
- **Do not take herbal, natural, or nutritional supplements** without first talking with your transplant providers (doctors, nurses, pharmacists, and dietitian). This is because these products:
 - May have hidden ingredients that can cause side effects
 - Might interact with your transplant medicines and harm you
 - Can make managing your medicines even more complex
- **Avoid these (if possible) while taking immunosuppressants:**
 - Grapefruit, pomegranate, and star fruit
 - *Non-steroidal anti-inflammatory drugs* (NSAIDs) such as ibuprofen (Advil, Motrin) and naproxen (Aleve, Naprosyn)
 - Aspirin (unless prescribed by your doctor)
 - Herbal or “natural” medicines

- Acetaminophin (Tylenol) – do not take more than 2,000 mg a day (total from all sources)
- Nutritional supplements, unless prescribed by your transplant team

Drugs to Prevent Rejection

These medicines are called *anti-rejection drugs* or *immunosuppressants*.

Why do I have to take these drugs?

After transplant, your immune system will try to protect your body. It will see the new organ as a threat and try to destroy (reject) it.

How do they work?

These drugs weaken (suppress) your immune system by decreasing the effects of *T lymphocytes*, a type of white blood cell.

How many immunosuppressants will I take?

The transplant team will prescribe 3 different anti-rejection drugs for you. Each one affects the immune system in a different way. When these drugs are taken together:

- They are more effective at stopping rejection.
- You can take smaller doses of each drug.
- You will have fewer side effects, and less severe side effects.

Your transplant team will explain the specific drugs you will take.

How long will I need to take them?

You will take anti-rejection drugs for as long as you have your graft.

How well do these drugs work?

Even when you take your anti-rejection drugs as prescribed, rejection may still occur. Rejection most often occurs within 1 year after your transplant. Sometimes it can be reversed by using IV medicines.

Your blood test results will tell us if your body is rejecting your new organ. Be sure to keep all appointments for blood tests.

What should I do if I forget a dose?

It is important that you remember to take these medicines every day as prescribed. **If you forget whether you took your dose:**

- Do **not** double your dose.
- Call your doctor or transplant nurse coordinator for instructions.

What kind of side effects do they cause?

- **Infections:** These drugs may make it easier for you to get colds, flu, and other viral and fungal infections. You can also get infections from germs that usually would not cause illness. These are called *opportunistic* infections.
- **Cancers:** They may cause a higher risk of skin and other cancers.

Immunosuppressant Drugs for Induction

You will receive IV immunosuppressants while you are in the hospital. This process, called *induction*, rapidly lowers your immune system right after transplant surgery.

Costs are not listed for these induction drugs. They are only given while you are in the hospital. You will not need to pay for them long term.

Antithymocyte Globulin

Brand names: *ATG, Thymoglobulin*

Purpose: Antithymocyte globulin (ATG) is a strong anti-rejection drug. It destroys T-lymphocytes. Some patients receive ATG to treat acute rejection episodes.

If you receive ATG:

- It will be given to you by IV infusion over 12 hours, starting right after your transplant surgery.
- You will then have infusions every day or every other day, for a total of at least 3 doses.

Possible side effects: T-lymphocytes release chemicals as they are destroyed. These chemicals can cause allergic or flu-like symptoms. These are more common after the first few doses. You will most likely be given acetaminophen (Tylenol), an *antihistamine* (Benadryl), and a *corticosteroid* (methylprednisolone) before your first 3 doses to prevent some of these side effects.

Side effects of ATG include:

- Flu-like symptoms, such as fever and chills
- Nausea
- Headache
- Shortness of breath
- Low or high blood pressure
- Low counts of white blood cells, platelets, and red blood cells
- Greater risk of infection

Basiliximab

Brand name: *Simulect*

Purpose: Basiliximab is an antibody. It blocks the action of *interleukin-2* (IL-2), a substance in the body that helps activate T-lymphocytes. Blocking IL-2 helps keep your immune system from trying to destroy your transplanted organ(s).

An IV infusion of basiliximab is given right after transplant. A 2nd dose is given 4 days later. Some patients may receive this drug instead of ATG.

Possible side effects: This drug has a very low risk of side effects. Allergy or flu-like symptoms, such as fever or chills, are possible.

Methylprednisolone

Brand name: *Solumedrol*

Purpose: This drug, also known as a steroid or corticosteroid, blocks many types of immune cells. You will receive a large IV dose of methylprednisolone during your transplant surgery. You will receive another IV dose every day for up to 3 more days after surgery. This drug is also used to treat rejection episodes.

Possible side effects: High doses of steroid drugs can cause:

- Higher blood sugar
- Slower wound healing
- Blurred vision
- Muscle aches
- Mood swings
- Insomnia
- Swelling

Long-Term Immunosuppressant Drugs

You will take anti-rejection drugs by mouth for as long as you have your graft. These are called *maintenance* medicines.

Tacrolimus

Brand names: *Prograf, FK-506*

Purpose: Tacrolimus keeps T-lymphocytes from trying to reject the transplanted organ. Most transplant patients start taking tacrolimus about 1 to 3 days after surgery and keep taking it long term.

Forms: Capsules come in 3 sizes: 0.5 mg, 1 mg, and 5 mg. You can combine sizes to make your full dose. The brand name is Prograf, but there are also generic forms.

Usual dose: Your dose of tacrolimus will be between 1 mg to 10 mg taken every 12 hours, usually at 8 a.m. and 8 p.m. You may take it with meals. Your doctor may adjust your dose based on the result of a blood level test.

On clinic days, do not take your dose of tacrolimus until after your blood is drawn.

Possible side effects: The most serious side effects of tacrolimus are injury to the kidney and the nervous system, causing tremor and headache. Your doctor may adjust your dose to reduce these side effects. Tacrolimus interacts with many drugs and some foods (grapefruit, pomegranate, and star fruit). Eating these foods can increase side effects.

Some side effects include:

- Lower kidney function
- Higher blood sugar
- Higher blood pressure
- Higher blood potassium
- Lower blood magnesium
- Shakiness or tremor
- Headache
- Convulsions (seizures)
- Nausea or vomiting
- Hair loss
- Higher cholesterol
- Greater chance of infection

Cost: Tacrolimus costs \$300 to \$500 a month for generic forms. You will take it long-term. Most insurance plans, including Medicare Part B, cover the cost for eligible transplant recipients.

Mycophenolate Mofetil

Brand names: *CellCept, Myfortic*

Purpose: Mycophenolate (MMF) lowers the production of lymphocytes. Patients take this drug while they are also taking tacrolimus.

Forms: MMF comes in 2 different forms:

- CellCept comes as a 250 mg capsule and a 500 mg tablet. It also comes as an oral suspension (liquid).
- Myfortic is enteric-coated and comes in 180 mg and 360 mg tablets.

Usual dose:

- CellCept: 1,000 mg (1 gram) taken by mouth 2 times a day
- Myfortic: 720 mg taken by mouth 2 times a day.

MMF is best taken on an empty stomach, but can be taken with food, if needed, to avoid stomach upset.

Take your doses at the same time every day. Your doctor may adjust your dose based on the result of a blood level test.

Possible side effects:

More common:

- *Leukopenia* (low white blood cell count)
- Nausea or vomiting
- Abdominal pain
- Diarrhea
- Greater risk of infection

Less common:

- *Anemia* (low red blood cell count)
- *Thrombocytopenia* (low platelet count)
- **May cause birth defects, so should not be taken by pregnant women or women who plan to become pregnant**

Cost: Mycophenolate costs \$300 to \$500 a month for generic forms. You will need to take it long term. Most insurance plans, including Medicare Part B, cover the cost for eligible transplant recipients.

Prednisone and Methylprednisolone

(Types of steroids)

Purpose: Prednisone (oral) and methylprednisolone (IV) are also called *steroids* or *corticosteroids*. These drugs lower the function and activity of lymphocytes. They are used to prevent or treat rejection of the graft.

You may receive methylprednisolone in large IV doses (*pulse therapy*) to treat acute rejection of your transplant. If your doctors prescribe this drug to you, you will receive it by IV for several days after your surgery. You will then start taking prednisone by mouth.

Forms: Prednisone tablets come in 6 sizes: 1 mg, 2.5 mg, 5 mg, 10 mg, 20 mg, and 50 mg. The tablets are usually white and scored, so that they break in half more easily.

Usual dose: 5 to 10 mg a day as a single dose every day. Always take prednisone with food or a snack to avoid stomach upset.

Possible side effects: Higher doses of these drugs cause more side effects. These usually lessen when the doses are reduced.

Other side effects can occur after many months or years of taking the drug at lower doses. It is important to get plenty of exercise and good nutrition to keep your body strong (especially bones and muscles) while you are taking prednisone.

Some patients may need to take insulin to control their blood sugar while taking prednisone. If you have diabetes, you might need higher doses of insulin at first, right after your surgery.

Short-term side effects (at high doses):

- Stomach upset, heartburn, stomach ulcers
- Emotional changes, mood swings, problems sleeping
- Night sweats
- Weight gain and swelling
- Slower wound healing
- Increased appetite, feeling hungry
- Higher blood sugar
- Face swelling (“moon face”)
- Acne
- Blurred vision
- Greater chance of infection
- Muscle aches

Long-term side effects:

- Muscle weakness
- Bone and joint weakness and pain
- *Osteoporosis* (bones become brittle and can break more easily)
- High blood sugar (*diabetes*)
- Stretch marks and weak, dry, thin skin
- Increased or unwanted hair growth
- Rounded shoulders (“buffalo hump”)
- Easy bruising
- Vision changes, cataracts
- Higher cholesterol

- Greater chance of getting certain cancers
- Greater chance of infection

Cost: Prednisone costs \$5 to \$10 a month. You will need to take it long term. There are generic forms.

Other Immunosuppressant Drugs

Cyclosporine

Brand names: *Neoral, Gengraf, Sandimmune*

Purpose: Cyclosporine keeps the T-lymphocytes from trying to reject the transplanted organ. If your doctor prescribes this drug for you, you will take it instead of tacrolimus. Both drugs work the same way on the immune system.

Dose: There are many forms of cyclosporine. Capsules come in 3 sizes: 25 mg, 50 mg, and 100 mg. You may need to mix different sizes of capsules to make your dose. The liquid formula strength is 100 mg/ml.

Special instructions: Cyclosporine capsules are affected by air. Keep them sealed in their package until you are ready to take your dose. The capsules are stable for 7 days after you open the package.

Usual dose: 100 mg to 500 mg taken every 12 hours, usually at 8 a.m. and 8 p.m. Take it at the same time every day, with or without food. Your doctor will adjust your dose based on the result of a blood level test.

Possible side effects: The most serious side effect of cyclosporine is kidney damage. This effect can be avoided by closely monitoring your kidneys. Your doctor will adjust your dose if there are any problems.

Side effects include:

- Lower kidney function
- Higher blood pressure
- Higher blood potassium
- Lower blood magnesium
- Shakiness or tremor
- Burning or tingling in your hands or feet
- Increased or unwanted hair growth
- Increased gum growth
- Mood changes
- Acne
- Lower liver function

- Convulsions (seizures)
- Headache
- Higher cholesterol
- Higher risk of infection

Cost: Cyclosporine costs \$300 to \$500 a month. You will take it long term. There are generic forms.

Sirolimus

Brand name: *Rapamune*

Purpose: Sirolimus keeps T-lymphocytes from destroying the graft. It also has anti-cancer or anti-tumor effects. If your doctor prescribes this drug, you will usually take it while you are also taking tacrolimus or prednisone (or both).

Forms: Sirolimus tablets come in 0.5 mg, 1 mg, and 2 mg. It also comes as a liquid in a strength of 1 mg/ml.

Usual dose: Between 1 mg to 10 mg taken once a day, with or without food. Take your dose at the same time every day. Your doctor may adjust your dose based on the result of a blood level test.

Possible side effects:

- Higher blood cholesterol and triglyceride levels
- Decreased wound healing
- Lower blood platelets, red blood cells, and white blood cells
- Mouth ulcers or sores
- Acne
- Tingling in your hands or feet
- Joint pain
- Higher risk of infection
- **May cause birth defects** – do **not** take if you are pregnant or planning to become pregnant

Cost: Sirolimus costs \$500 to \$1,000 a month. You will take it long-term. There are no generic forms.

Azathioprine

Brand name: *Imuran*

Purpose: Azathioprine affects your bone marrow so that your body produces fewer white blood cells. You may take azathioprine instead of mycophenolate. You will take it long term along with tacrolimus or cyclosporine and steroids.

Forms: Azathioprine comes as a 50 mg tablet. The tablets are scored so they can be broken in half more easily.

Usual dose: 25 mg to 175 mg taken every day in 1 dose, usually in the evening at bedtime.

Possible side effects: Azathioprine affects cells that grow rapidly, such as white and red blood cells, platelets, and hair cells. The effects on blood cells can be reversed by lowering your dose.

Side effects include:

- Low white blood cell count
- Anemia (low red blood cell count)
- Bleeding (from low platelet count)
- Hair loss
- Nausea
- Jaundice (yellow skin caused by effects on the liver)

Cost: Azathioprine costs \$15 to \$100 a month. You will take it long-term. There are generic forms.

Drugs to Prevent Infections

When your immune system is suppressed, you can get infections more easily and they can be harder to treat. Infections can be caused by germs that:

- Come from your environment
- Come from another person
- Normally live in or on you but usually do not cause infection (*opportunistic* infections)

For the first 3 months after transplant surgery, it is easier to get infections because of the large doses of anti-rejection drugs you are taking.

You will need to take several antibiotics during the first 3 months to prevent infection. The antibiotics you make take include:

Clotrimazole Troche and Fluconazole

Brand names: *Mycelex* and *Diflucan*

Purpose: You will take an *antifungal* (anti-yeast) drug for 3 months after transplant. These drugs help prevent *thrush* (yeast growing in your mouth).

Usual doses:

- Clotrimazole troche (Mycelex) is a 10 mg lozenge that you dissolve in your mouth. Do not eat or drink for at least 30 minutes after each dose.

- Fluconazole (Diflucan) is taken by mouth once a day or once a week. It may be taken with food.

Possible side effects:

- Clotrimazole troche:
 - Bad taste in your mouth
 - Dry or chalky mouth
 - Nausea
- Fluconazole:
 - Nausea
 - Rash
 - Diarrhea
 - Abdominal pain

Cost: Clotrimazole troche costs \$50 a month. Fluconazole costs \$20 a month. There are generic forms of both.

Valganciclovir, Ganciclovir, and Acyclovir

Brand names: *Valcyte*, *Cytovene*, and *Zovirax*

Purpose: These are antiviral drugs. Some viruses that cause infection, such as *herpes* virus, do not leave the body after an infection has healed. These viruses stay *dormant* (not active) until a weakened immune system “wakes them up.”

Viral infections can be severe and life-threatening for people who are immunosuppressed. Valganciclovir, ganciclovir, and acyclovir are used to treat and prevent simple herpes virus infections (such as cold sores) and a more resistant herpes virus called *cytomegalovirus* (CMV).

You will take these drugs for 3 to 6 months after transplant. They do not treat other viruses like cold, flu, or hepatitis.

Usual doses:

- Valganciclovir (Valcyte) is taken by mouth to prevent or treat CMV infections. It can be taken with food. The usual dose:
 - To **prevent** CMV is 450 to 900 mg, taken once a day.
 - To **treat** CMV is 900 mg, taken twice a day.
- Ganciclovir (Cytovene) is a form of valganciclovir. It is given by IV to treat CMV infections, either in the hospital or through home infusion.
- Acyclovir (Zovirax) is used to prevent herpes infections such as cold sores. It is not used to prevent CMV. The usual dose is 400 mg twice a day. It can be taken with food.

Possible side effects:

- Nausea
- Lower kidney function
- Headache
- Low white blood cell count

Costs:

- Valganciclovir can cost up to \$2,000 a month. There is a generic form.
- Ganciclovir cost varies depending on your insurance coverage.
- Acyclovir usually costs less than \$20 a month. There is a generic form.

Trimethoprim/Sulfamethoxazole

Brand names: *Bactrim*, *Septra*, *Cotrimoxazole*, *Trim/Sulfa*, *TMP/SMX*

Alternate non-sulfa drugs: Dapsone and Pentamidine

Purpose: These are *anti-pneumocystis* drugs. Pneumocystis is a fungus that is found in the lungs of healthy people. It usually does not cause illness. But, the fungus can cause a lung infection in someone who has a weak immune system.

These drugs stop this fungus from infecting the lungs. Most transplant patients take Bactrim or Septra, sulfa-based drugs. If you have a sulfa allergy, you may take Dapsone or Pentamidine instead. These drugs are usually taken for 6 months after transplant.

Usual dose:

- Bactrim or Septra are single-strength (SS) tablets (80/400 mg). Take it every day at bedtime with a full glass of water.
- Dapsone is usually taken as 100 mg once a day by mouth.
- Pentamidine is usually taken once a month in an inhaled form (*aerosol*) at the hospital or clinic. The usual dose is 300 mg a month.

Possible side effects:

- Rash (report any rashes to your doctor)
- Nausea
- Lowered white blood cell count
- Lowered red blood cell count (with Dapsone)
- Sensitivity to the sun
- Cough, wheezing (with Pentamidine)

Cost: Bactrim, Septra, and Dapsone cost \$5 to \$25 a month. There are generic forms. Pentamidine cost varies depending on your insurance plan.

Drugs to Prevent Heartburn

Ranitidine, Pantoprazole, Omeprazole, and Lansoprazole

Brand names: *Zantac, Protonix, Prilosec, and Prevacid*

Purpose: Antacids either neutralize stomach acid or stop acid from being secreted. They are taken for about 3 months after transplant to prevent stomach upset, heartburn, or stomach problems caused by other medicines or stress. Take antacids on an empty stomach for the best effect.

Usual doses:

- Ranitidine (Zantac) is taken in a 150 mg dose at bedtime.
- Pantoprazole (Protonix) is taken in a 40 mg dose once a day.
- Omeprazole (Prilosec) is taken in a 20 mg dose once a day.
- Lansoprazole (Prevacid) is taken in a 30 mg dose once a day.

Possible side effects:

- Rash
- Headache
- Dizziness

Cost:

- Ranitidine costs \$10 a month. There are generic forms.
- Omeprazole, pantoprazole, and lansoprazole cost from \$10 to \$100 a month. There are generic forms. You do not need a prescription for these.

Drugs to Prevent Constipation

Laxatives stimulate your intestines to help stool move through your bowel. *Stool softeners* make hard stool softer, so that it is easier to pass.

Docusate, Senna, Polyethylene Glycol, and Bisacodyl

Brand names: *Colace, Senakot, Miralax, and Dulcolax*

Purpose: Straining to have a bowel movement after surgery can keep your incision from healing. Avoid constipation and hard stools after transplant, and keep your stools soft for 3 months after your surgery.

To avoid constipation:

- Reduce your use of prescription pain medicines as soon as you can after surgery. These drugs can cause constipation.
- Drink plenty of fluids.
- Increase your physical activity.
- Eat more foods with fiber.

How they work:

- Docusate (Colace) is a mild stool softener. It is prescribed most often after transplant.
- Polyethylene glycol (PEG or Miralax) helps your stool hold more water, which makes it softer.
- Senna (Senakot) and Bisacodyl (Dulcolax) are stimulant laxatives.

If you have diarrhea while you are taking these medicines, ask your doctor about taking less.

Cost: Laxatives and stool softeners cost \$5 to \$10 a month. There are generic forms. You can buy them without a prescription.

Drugs to Control Blood Pressure

Amlodipine and Metoprolol

Brand names: *Norvasc* and *Lopressor* or *Toprol XL*

Purpose: It is important to control your blood pressure. High blood pressure can harm your new organ. It can also cause stroke, heart disease, and other problems. Some people have high blood pressure before transplant, and it is very common to have high blood pressure after transplant surgery. Some of the anti-rejection drugs can also raise your blood pressure.

To control blood pressure, the transplant team often prescribes both:

- A *calcium-channel blocker* drug such as amlodipine (Norvasc)
- A *beta-blocker* drug such as metoprolol (Lopressor or Toprol XL)

Special instructions:

- Do **not** stop taking your blood pressure medicines unless your doctor tells you it is OK to do so.
- Take your blood pressure and pulse and record the numbers 2 times a day:
 - **Before** your morning dose of blood pressure medicine
 - **Before** your bedtime dose of blood pressure medicine

Bring your record with you to your follow-up clinic visits. Over time, we may adjust your dose of blood pressure medicine to make sure it is at the best level for you.

- Get up slowly after lying or sitting to keep from feeling dizzy or lightheaded.

Possible side effects:

- Dizziness
- Rapid fall in blood pressure
- High or low heart rate
- Flushing
- Headache
- Feeling tired

Cost: Blood pressure medicines cost \$20 to \$50 a month. Many of these drugs have generic forms.

Drugs to Prevent Blood Clots

Aspirin

Purpose: A small dose of aspirin can help keep clots from forming in the blood vessels leading to a new organ. Aspirin may also prevent heart attacks and strokes. It is prescribed for some patients, but not all.

Usual dose: 1 tablet (81 mg or baby aspirin) taken once a day.

Possible side effects:

- Bleeding in your *gastrointestinal* (digestive) tract
- Blood in your urine
- Ringing in your ears

Cost: Aspirin costs \$5 a month. You will take it long term. There are generic forms. You can buy it without a prescription.

Drugs to Treat Swelling

Furosemide and Torsemide

Brand names: *Lasix* and *Demadex*

Purpose: Some of your transplant medicines can cause swelling (*edema*). Drugs called *diuretics* (water pills) help your body excrete the excess water and sodium that cause the swelling. This fluid comes out in your urine.

Diuretics also lower blood pressure and remove potassium and magnesium from the body. You may need supplements if you lose too much of these minerals.

Possible side effects:

- Low blood potassium or magnesium
- Too much water loss (dehydration)

- Dizziness
- The need to urinate more often
- Headache
- Not feeling hungry
- Leg cramps
- Higher heart rate

Drugs to Lower Cholesterol

Atorvastatin, Simvastatin, Pravastatin, Rosuvastatin, and Lovastatin

Brand names: *Lipitor, Zocor, Pravachol, Crestor, and Lovastatin*

Purpose: Most anti-rejection drugs raise cholesterol. High cholesterol is linked to heart disease, blood vessel disease, and damage to your new organ. Some transplant patients need drugs to lower their cholesterol.

Special instructions: Tell your doctor if you have any muscle weakness or pain.

Possible side effects:

- Dizziness
- Headache
- Rash
- Nausea
- Abdominal cramps
- Muscle aches

Vitamins and Minerals

Iron

Forms of iron: *ferrous sulfate* or *ferrous gluconate*

Purpose: After transplant, you may need extra iron to prevent *anemia*. Anemia occurs when there are not enough healthy red blood cells to carry oxygen to your tissues. Blood loss is the most common cause of anemia.

Having anemia may make you feel tired and weak. Iron treats anemia by helping your body build new red blood cells.

Usual dose: 324 mg, taken 1 to 3 times a day. You can buy most iron supplements without a prescription.

Special instructions: Vitamin C helps your body absorb iron. Take your iron supplement at the same time that you eat foods that are high in vitamin C, such as oranges, broccoli, and dark leafy greens.

Multivitamins

Brand names: *Centrum, One a Day, Nature Meds, Theragra, others*

Purpose: We suggest you take a multivitamin with minerals every day after transplant to make sure your body has all the nutrients needed for healing and recovery. You can buy multivitamins without a prescription.

Calcium

Forms of calcium: *Calcium carbonate (Tums, Oscal) and calcium citrate (Citracal)*

Purpose: Most transplant patients have a higher risk of *osteoporosis* (bone weakness) after surgery, especially if they already had bone disease before transplant. This risk is from taking anti-rejection drugs, and from having low levels of vitamin D and sex hormones (estrogen and testosterone) before transplant.

Calcium helps build strong bones. Taking calcium after transplant can help prevent bone disease, bone loss, and fractures.

Your body needs vitamin D to absorb calcium, so you will also need to take a vitamin D supplement (see “Vitamin D” below).

Usual dose: Take 600 to 1,200 mg of calcium each day. The amount you need depends on how much calcium is in the foods you eat.

Dairy foods and dark leafy greens are good sources of calcium. See the “Nutrition” chapter of this guide or talk with your transplant dietitian to learn more about calcium-rich foods.

You can buy calcium supplements without a prescription. Calcium in chewable tablets is often in a form that your body can absorb most easily.

Read labels carefully. A product with 500 mg calcium carbonate, such as Tums 500, may contain only 200 mg calcium that your body can use.

Vitamin D

Forms of vitamin D: *Cholecalciferol (vitamin D3), ergocalciferol (vitamin D2), calcitriol (Rocaltrol), and others*

Purpose: Your body needs vitamin D to absorb calcium. Sunlight is the main source of vitamin D for most people. Transplant patients usually need to take a vitamin D supplement since they must avoid sun exposure to lessen their risk of skin cancer.

Usual dose:

- Most vitamin D in supplements is cholecalciferol (vitamin D3). Take about 1,000 units of cholecalciferol every day. This is in addition to the

vitamin D that is in your multivitamin. You can buy cholecalciferol without a prescription.

- Ergocalciferol and calcitriol are stronger forms of vitamin D. They must be prescribed by your doctor.

Magnesium

Types of magnesium: *Magnesium oxide (Mag-Ox)*, *magnesium amino acid chelate (Mag plus Protein)*, and others

Purpose: Your body needs the mineral magnesium for healthy muscles and nerves. Magnesium also helps some enzymes work. Enzymes are proteins that help speed up important chemical reactions in your body.

Many transplant patients develop low magnesium levels. This may be caused by anti-rejection drugs or from taking diuretics. Your magnesium levels can be measured with a blood test.

You may not be getting enough magnesium from the foods you eat. See the “Nutrition” chapter of this guide or talk with your transplant dietitian to learn more.

Usual dose: 400 to 800 mg, taken twice a day. Magnesium comes in tablet and liquid forms. You can buy it without a prescription.

Phosphate (Phosphorus)

Sodium phosphate (K-Phos Neutral, Phospha 250 Neutral)

Purpose: Your body needs the mineral phosphate for the growth and repair of body tissues, and for healthy bones. Transplant patients sometimes develop low blood phosphate levels. This may be because of a short-term change in how your body handles this mineral.

Fish and dairy products can be a good source of phosphate. See the “Nutrition” chapter of this guide or talk with your transplant dietitian to learn more.

Usual dose: 250 to 500 mg, taken twice a day. You will need a prescription for K Phos Neutral and Phospha 250 Neutral.

Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.

Transplant Services:
206.598.3882