The meibomian glands are embedded within the **specific structure**.
The meibomian glands are embedded within the tarsal plate.
Glands of the Orbit *(but not that one)*

Meibomian glands
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The product of a meibomian gland is called meibum.
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The product of a meibomian gland is called meibum.

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How do these differ (other than in their gland of origin)?
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How do these differ (other than in their gland of origin)? **Meibum** has a much lower concentration of polar triglycerides and free fatty acids than does **sebum**. Also, **product #1** has a lower melting point (≤ to ocular surface temp).
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Q/A

Glands of the Orbit (but not that one)

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OK, but how does this cause tear dysfunction?
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OK, but how does this cause tear dysfunction? By contaminating the mucin layer, these polar lipids disrupt its ability to stabilize the tear film, leading to early tear-film break-up.
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In some forms of meibomian gland dysfunction, bacterial lipase released within the glands renders the meibum more polar. And how does this cause tear dysfunction?

For two reasons:
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What is the vicious cycle involving altered meibum lipids?

altered lipids \rightarrow \text{effect of increased viscosity}

And how does this cause tear dysfunction? As the melting temp approaches or exceeds ocular surface temp, the meibum will become more viscous (and thus resistant to excretion). This leads to a vicious cycle of deleterious effects.
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What is the vicious cycle involving altered meibum lipids?

altered lipids → plugging of the MG orifi
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What is the vicious cycle involving altered meibum lipids?

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What is the vicious cycle involving altered meibum lipids?

altered lipids → plugging of the MG orifi → stasis of lipid in the MGs → effect of lipid stasis in the glands
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**What is the vicious cycle involving altered meibum lipids?**

- **altered lipids** → **plugging of the MG orifi** → **stasis of lipid in the MGs** → **enhanced bacterial colonization and overgrowth within MGs**.
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What is the vicious cycle involving altered meibum lipids?

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Which takes us back to where we started!
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What systemic drug used to manage MGD/DES works by blocking bacterial lipase activity?
Glands of the Orbit (but not that one)

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What systemic drug used to manage MGD/DES works by blocking bacterial lipase activity?
Doxycycline (and similar tetracycline derivatives)
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What systemic drug used to manage MGD/DES works by blocking bacterial lipase activity? **Doxycycline (and similar tetracycline derivatives)**

Um, hello--dioxycycline is an antibiotic, and it’s being used to treat a bacteria-related condition. Surely its anti-microbial properties play a role?
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Um, hello--doxycycline is an antibiotic, and it’s being used to treat a bacteria-related condition. Surely its anti-microbial properties play a role? Actually no--they’re probably only minimally contributory to its effects. But there is another effect worth mentioning…
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What systemic drug used to manage MGD/DES works by blocking bacterial lipase activity?

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In addition to blocking bacterial lipase activity, what other salutary effect does doxy have with respect to DES?
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Glands of the Orbit (but not that one)

What systemic drug used to manage MGD/DES works by blocking bacterial lipase activity?
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In addition to blocking bacterial lipase, what other salutary effect does doxy have with respect to DES? It blocks the effects of MMP-9

In the present context, what does MMP stand for? Matrix metalloproteinase

MMP-9 is a pro-inflammatory cytokine released by distressed corneal epithelial cells.
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What are the side effects of doxy?

--Photosensitivity: patients should avoid prolonged sun exposure
--GI upset: Diarrhea is common
--And the classic eye-related side effect: Idiopathic intracranial HTN

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The meibomian glands are embedded within the tarsal plate. The product of a meibomian gland is called meibum. The product of a sebaceous gland is called sebum. How do these differ (other than in their gland of origin)? Meibum has a much lower concentration of polar triglycerides and free fatty acids than does sebum. Also, meibum has a lower melting point (≤ to ocular surface temp). There are up to twice as many meibomian glands in the upper lids, which probably accounts for the increased risk of getting chalazia there.
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Glands of the Orbit (but not that one)

Meibomian glands: UL and LL
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How many MGs are we talking about for each lid?

--Uppers: (looking for a range here)

--Lowers: (ditto)
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How many MGs are we talking about for each lid?
--Uppers: 30-40
--Lowers: 20-30
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What are the glands of Krause and Wolfring?
The meibomian glands are embedded within the tarsal plate. The product of a meibomian gland is called **meibum**. The product of a sebaceous gland is called **sebum**. How do these differ (other than in their gland of origin)? **Meibum** has a much lower concentration of polar triglycerides and free fatty acids than does **sebum**. Also, **meibum** has a lower melting point (≤ to ocular surface temp). There are up to twice as many meibomian glands in the **upper** lids, which probably accounts for the increased risk of getting **chalazia** there. What are the **glands of Krause and Wolfring**? The so-called **glands**.
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- There are up to twice as many meibomian glands in the upper lids, which probably accounts for the increased risk of getting chalazia there.
- What are the glands of Krause and Wolfring? The so-called accessory lacrimal glands.
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What are the glands of Krause and Wolfring? The so-called accessory tarsal gland.

Where are they located? The and same noun for both.
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What are the glands of Krause and Wolfring? The so-called accessory lashmal glands.
Where are they located? The palpebral and fornical conjunctiva
Glands of the Orbit *(but not that one)*

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What are the glands of Zeiss and Moll? Glands of the eyelash pilosebaceous unit.
- Zeiss glands are sebaceous glands
- Moll glands are sweat glands
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